

QST



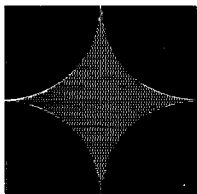
devoted entirely to

amateur radio



December
1931
25 cents

In Vain He Prayed for Percolation!



For weeks he'd tried to get his transmitter on the air. Days on end he'd hoped to curb refractious volts, amperes and watts. Begged them to listen to reason, implored his oscillator to osc, his amplifiers to amp. Would they do it? Not on your grid bias they wouldn't! Daily he became more deeply mired in the sloughs of frustration and uncertainty; nightly his eye became more glassy, his frayed nerves jangled with the jitters. . . .

AND THEN IT CAME!

He'd Almost Forgotten He'd Ordered It.
But One Morning It Came—A Copy of

THE RADIO AMATEUR'S HANDBOOK

— and exactly 17½ minutes later his troubles were solved! Oscillator perking contentedly; push-pull amplifier pushing and pulling as never before. Dozens of strong, healthy watts surging up to the antenna and out to a waiting world. Other amateurs who heard his signals marveled at their strength, their steadiness, their excellent quality.

BY THE HEADQUARTERS STAFF
OF THE A. R. R. L.

The HANDBOOK is the biggest dollar's worth in radio. Everything about amateur radio and modern short-wave practice from "Amperes" to "Zeppelin."

YOU CAN'T AFFORD TO BE WITHOUT IT!

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West Hartford, Connecticut, U. S. A.

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Paper Cover
\$1.00

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Dry Battery Tubes Attain A. C. Performance



A new filament makes this possible for the first time

60%
GREATER EMISSION
AREA GIVES

higher emission
longer service life
greater efficiency
than Nickel with the same
filament input, voltage, and
temperature and is

one-third as microphonic



30%
GREATER DIAMETER
FILAMENT GIVES

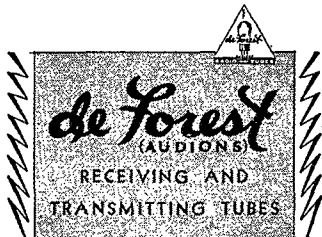
stronger filament
more accurate alignment
more uniform tension
than Nickel with consistent life
of 1000 hours and more. New
DeForest Types 430-31-32-99-20

with cobalt alloy filament

Remember, There's an Audion for Every Radio Need

Typical of original and unrelenting DeForest research and engineering is the foregoing filament. Such efforts mean a DeForest version of every standard and special type receiving or transmitting tube, always incorporating obvious refinements and improvements to make it a worthy successor of the Audion or original radio tube.

Write for literature describing DeForest receiving and transmitting tubes.



After All, There's No Substitute for
25 Years' Experience

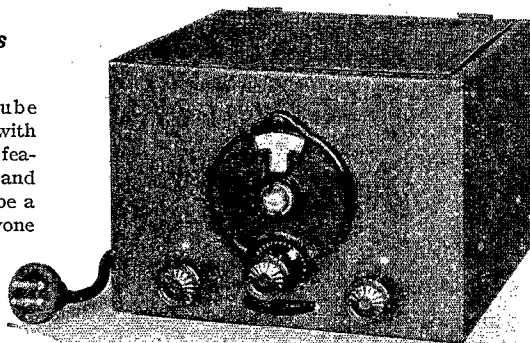
DE FOREST RADIO COMPANY
PASSAIC, NEW JERSEY

Export Department
304 East 45th Street
New York City

Tideman & Whetter
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Chicago, Ill.

**For Amateurs
Only**

This new three-tube Ham receiver bristles with original and ingenious features. Its efficiency and ease of handling will be a revelation to everyone who employs it.



**Read R-Rating
Direct**

The attenuation control is arranged so that angle of rotation is directly proportional to the R-Rating of signal intensity. Control wheel is so mounted that it may be operated by the hand that does the tuning. This is a new and exclusive feature.

NEW! the NATIONAL SW-3 HAM RECEIVER

A three-tube head set receiver with one stage of AF, for full A.C. or storage battery operation with 6 v. heater tubes. A.C. model uses two 235 tubes. **EXTREMELY HIGH SIGNAL TO NOISE RATIO**—a feature of the SW-3. **EXTREME STABILITY AT POINT OF MAXIMUM SENSITIVITY.** Employing hitherto unknown feature of 235 tubes, the point of maximum sensitivity is approached along inverse exponential curve, giving stable operation without critical setting of control.

TRUE SINGLE CONTROL. Easy to tune and log. **ALL COILS WOUND ON R-39**, especially developed for NATIONAL CO. by the Radio Frequency Laboratories, practically eliminating dielectric losses in coil fields. **AMATEUR BAND-SPREAD COILS STANDARD EQUIPMENT.** Free from fringe-howl. Compact: 9 3/4" x 9 1/4" x 7", specially suitable also for portable aircraft and boat use. **THE PRICE IS RIGHT.**

Write for Bulletin SW-3T

	<p>R. F. TRANSFORMERS</p>		<p>SE AND ST VARIABLE CONDENSERS</p>		<p>PRECISION VELVET-VERNIER DIALS Type N</p>
<p>Available to cover range from 33 m.c. to 150 k.c. Forms are moulded R-39, the new low loss coil material developed by Radio Frequency Laboratories. Blank forms also available for winding experimental coils.</p>	<p>Model SE, a special high-frequency design, not a cut-down broadcast job. Insulated main bearing and constant impedance pigtail. 270 degree straight-line frequency plates. Model ST has 180 degree equitune plates. Either model available in capacities up to 150 mmf.</p>	<p>Made in four-inch and six-inch sizes. Solid German Silver Dial for use in amateur receivers, frequency meters and other apparatus requiring maximum accuracy. Equipped with real vernier, —four-inch dial reads to 1/10 div., six-inch model can be estimated to 1/20 div.</p>			
	<p>LEVER-TYPE INDICATORS Types S, M and J</p>		<p>NEW DOUBLE SECTION TRANSMITTING CONDENSER, Model TM For push-pull transmitters or for High-C circuits (connect two stator sections in parallel), or connect both sides in series to double voltage rating. Made in capacities up to .00023 Mfd, and in larger sizes in TMU frames.</p>	<p>THE POWER UNIT</p>	
<p>For transmitter panel use. Bakelite handles, bronze pointers, available for 1/4" and 3/8" shafts. Details on request. Etched metal scale now included with M and J Indicators.</p>	<p>A separate unit with cable and soft rubber covered connecting plug, especially designed for humless operation of high-frequency receivers. 180 Volt B, 2.5 Volt filament supply. Licensed under R.C.A. Patents.</p>				



NATIONAL



Amateur Parts and Receivers

NATIONAL COMPANY, INC., Sherman, Abbott & Jackson Sts., Malden, Mass.

QST

Published monthly, as its official organ, by the American Radio Relay League, Inc., at West Hartford, Conn., U. S. A.; Official Organ of the International Amateur Radio Union

devoted entirely to **AMATEUR RADIO**

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DECEMBER
1931

VOLUME XV
NUMBER 12

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

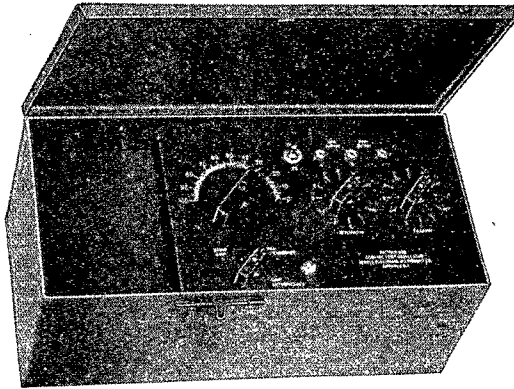
Advertising Offices 55 West 42d Street, New York City
Editorial Offices 38 La Salle Road, West Hartford, Conn.

Subscription rate in United States and Possessions, Canada, and all countries in the American Postal Union, \$2.50 per year, postpaid. Single copies, 25 cents. Foreign countries not in American Postal Union, \$3.00 per year, postpaid. Remittances should be by international postal or express money order or bank draft negotiable in the U. S. and for an equivalent amount in U. S. funds.

Entered as second-class matter May 29, 1919, at the post office at Hartford, Connecticut, under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized September 9, 1922. Additional entry at Concord, N. H., authorized February 21, 1929, under the Act of February 25, 1925.

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A New Jewell Oscillator



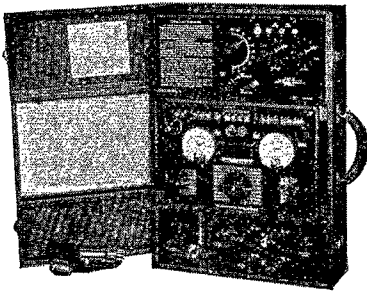
» with every
 necessary test feature
 » with Jewell
 quality construction
 and
 dependable operation

at an astonishing low price!

In the Pattern 563 Test Oscillator, Jewell has again set new standards in value.

Now no serviceman need go without an adequate oscillator or be handicapped by an inaccurate or undependable instrument.

This remarkable instrument combines every oscillator feature necessary for servicing modern radio receivers and Jewell dependability of operation.



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Here is combined in a single unit all the testing equipment the radio serviceman needs for quickly and accurately performing every service task.

The Jewell Pattern 531 Professional Service Combination includes a Jewell Pattern 444 Set Analyzer, a special model of the oscillator described to the right, and a power unit that supplies all necessary power for testing tubes in the analyzer. No separate output meter is needed as receiver output measuring ranges are available in the set analyzer.

Write for complete details

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**A Jewell Transmitting
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Features of the Pattern 563

Output frequency continuously variable from 550 to 1,500 K. C. in the broadcast band.

Two intermediate bands, 125 to 185 K. C. and 175 to 450 K. C., allow servicing of all modern supers.

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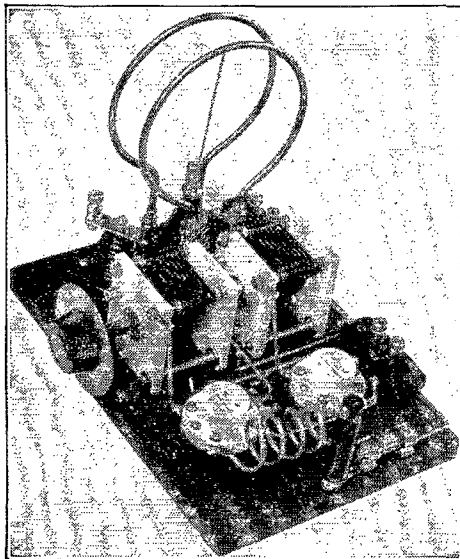


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Transmitting Apparatus
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LEEDS leads again with the
latest 56 MC transmitter kit



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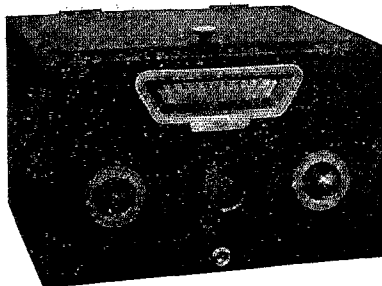
2 G. R. 568 K. Condensers @ \$4.	\$8.00
2 G. R. 657 Isolantrite sockets @ \$1.50..	3.00
1 G. R. 310 F. Dial80
2 G. R. 260 Insulators @ 20c. . . . .	.40
2 G. R. 274 K. Binding Posts and Strips	1.30
4 G. R. 138 V. Posts @ 20c. . . . .	.80
1 G. R. 437 Resistor . . . . .	.35
2 R. F. chokes @ 95c.	1.90
1 Special 10,000 ohm leak . . . . .	.65
1 Special Grid coil . . . . .	.50
1 Special Antenna coil . . . . .	.65
1 Special Plate coil . . . . .	.65
1 Baseboard	1.00
Misc. parts	1.70

Total \$21.70

COMPLETE KIT
or parts separately as listed **\$18.50**

This 5 meter transmitter, fully described in Oct.
1931 General Radio Experimenter.

Write for **FREE** folder giving complete data and
hook up



**IT
JUST
CAN'T
BE
EQUALED**

That's what D X Fans say about
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The loud speaker signals this set brings
in clearly from everywhere are almost
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Contains 18 important features — such as
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Works on A.C. or D.C., size 11" x 7" x 9½", weight 11½
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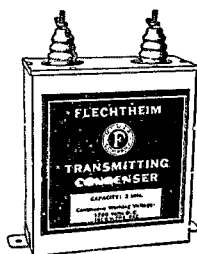
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The Choice of Two of
Every Three of the
Broadcasting Stations
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Short Wave Fans Everywhere



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750 VOLTS rms. R.C.A.**

TC-100	1 Mfd.	\$2.14
TC-200	2 Mfd.	3.70
TC-400	4 Mfd.	6.27

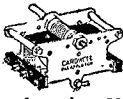
**TYPE T: 1500 VOLTS D.C.
1000 VOLTS rms. R.A.C.**

T-100	1 Mfd.	\$2.56
T-200	2 Mfd.	4.56
T-400	4 Mfd.	7.98

**TYPE TH: 2000 VOLTS D.C.
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Prices on 3000-V, 5000-V and 7000-V on request



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0003 capacity. List
\$4.75. Special — \$1.50
King Cardwell
Dual Condensers

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164-B .00022 List 5. Spec. 3

All other Cardwell condensers in
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a double button
quality in a single
button mike. Just
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\$25. Special \$4.45

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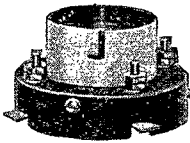
1/16" thick. 7/10c sq. in.
3/32" thick. 1/2c sq. in.
1/8" thick. 1c sq. in.
3/16" thick. 1 1/2c sq. in.

Aluminum Shield Cans Assem- bled with Slotted Corner Pieces

Height	Width	Length	Price
5"	5"	5"	\$1.00
6"	5"	9"	1.85
7"	7"	10"	2.25
7"	7"	10"	2.40
7"	6"	14"	2.85
7"	6"	14"	3.25
7"	8"	14"	3.95
7"	7"	12"	2.95

Special sizes to order, can be shipped
same day.

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Heavy special
porcelain base.
Double
phosphor
bronze
springs,
high grade
construc-
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through-
out.

Extra
special price **\$1.50**



COPPER COIL

Make your own transmitting coils.
Copper tubing transmitting inductance.

Inside Dia.	Size of tubing		
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2 3/8"	9c	10c	15c
3 1/8"	10c	12c	17c
1 5/8"	8c	9c	

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MIKE with that new stretched
diaphragm found only in \$75 to
\$100 mikes. List \$23. Special \$11.75

LEEDS 866
Rectifier
Tube **\$5.00**
Guar.

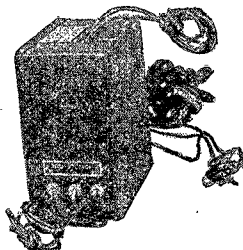
AIR GAP
SOCKET
As described
in May QST. **35c**
Special each

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Dustproof, the kind you usually pay
not less than \$2.50 for. Our price
\$1.95

Precision made holder as illustrated
in Oct. issue. Special \$3.45
Oscillating crystal 1" sq. 80 to 160
meter band. Guaranteed. Special
\$7.50

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All Brand New
T-2124-A — has 2-
7 1/2 volt filaments, 4
amps each — 1 center
tapped; also 2 heavy
duty 30 H. 150 mil
chokes. Weight 12
lbs., size 6 x 4 1/2 x
3 3/8" complete with
mounting bracket and
extension cord to
socket.
T-2572 — same as
T-2124-A only differ-
ence is — 1 single
choke, 30 H. 200 mils.
2115 — 620 volts —
center tapped. One
5 wolt filament
center tapped; two 30
H. 120 mil chokes;
size 5 3/4 x 4 3/8 x 3",
weight 8 lbs.

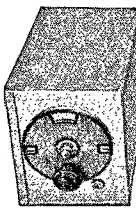
These transformers were made to sell from \$15 to \$20
each. Due to business conditions we bought them for a
fraction of their value — all new — all guaran-
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NEW — Filament Transformer. Has 3 separate 7 1/2 v. C.T. windings for
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Special 866 Fil. Trans. 2 1/2 v. 10 amps, 10,000 v. insulation. Special . . . \$4.35
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are offering
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above 10c each

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whether D.C. or not.
THE ONLY SURE
CHECK. Gives you
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what your signal
sounds like to the
other fellow. The
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shield, 5" x 6" x 9"
overall. Completely
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teries self contained.
Supplied with A. & B.
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and 2 3/4" meters. Prac-
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sizes to select from, at
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12E 3/4¢ foot
10E 1 1/4¢ foot

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7/20 1¢ foot
7/18 heavy duty 2¢ foot
9/18 heavy duty 3¢ foot

Silicon Phosphor Bronze — Ship Antenna

7/22 1 1/2¢ foot
7/20 2¢ foot
7/19 super sensitive 2 1/4¢ foot
7/18 super sensitive 4¢ foot

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• EDITORIAL •

APPROXIMATELY every so often an anguished member writes in to ask us how we can dare to apply the term *ham* to radio amateurs. Not because it is undignified, for we're not much on false dignity in amateur radio, particularly within our own family, but because, says our correspondent, everybody knows that a *ham* means a punk, a lid, a poor performer, a person not fully familiar with his vegetables. Why throw asparagus upon ourselves, our inquirers ask.

Now we arise to remark that if we felt for one moment that that was a correct interpretation of the meaning of *ham*, it would be a thoroughly hated word at the very top of our Index Expurgatorius. We'd have a town ordinance in West Hartford prohibiting its utterance and we'd pay a bounty to *QST*'s proof-readers to run down the despised term. But as a matter of fact we're quite convinced that the appellation is an honorable one, one over which we need have no qualms whatever.

Somebody's dictionary suggests that *ham* is derived from *hamsfatter*, which was a word used in a popular refrain of many years ago. Just what the significance was is not now clear. Then there are many people who believe that the word comes from the theatrical field, being derived from "Hamlet" — because the *ham actor* was forever strutting the boards and reciting from "Hamlet." For ourselves, we find a much more convincing account in an article on the etymology of the language of sports, by William Henry Nugent, appearing in *The American Mercury* several years ago. Mr. Nugent establishes that the United States learned its first lessons in sports journalism and sports slang from the British Isles, where early writers invented a special style and vocabulary that are still in use. *Ham*, says he, "began as an abbreviation of *amateur* to *am*, which the cockney foot-racers and pugilists of the 70's pronounced *b' am*."

The moment one glimpses that *ham* is derived directly from *amateur*, much is apparent that before escaped recognition. One has only to consider, for instance, the way the word *amateur* is abused. Webster says that an amateur is "one who is attached to or cultivates a particular pursuit, study, or science from taste, without pursuing it professionally"; there is no implication of lack of skill. Yet how often have we heard people say, speaking of many things besides radio, "Pooh, he's only an amateur!" They are wrong, dear friends, as sure as you're born, and they've merely displayed the depths of their ignorance. We accept no such connotation with respect to *amateur*; neither do we with respect to *ham*, and for the identic reason.

The word came to us in amateur radio from the wire telegraphing fraternity, where a beginning operator was known as a *ham operator*. That our wire brethren, in professional scorn, employed it to mean a poor operator does not make that application correct; the misuse is, in fact, blood brother to the even more common distortion of *amateur*. If we borrowed the term from them we took it in its proper sense, and emphatically left behind any stigma of the opprobrious. There is, we repeat, nothing in the derivation of either *amateur* or *ham* to imply a lack of skill, but rather the contrary.

Hams we are, then, and proud of it!

K. B. W.

High-Power Performance From the Small 'Phone Transmitter

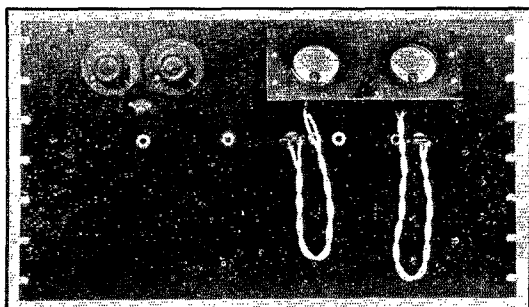
A Class B Modulator for Sets Using Type '10 Tubes

By James J. Lamb, Technical Editor, and George Grammer, Assistant Technical Editor

ACTUAL application of a Class B push-pull audio-frequency power amplifier to the business of modulation in a low-power amateur 'phone transmitter, promised in last month's *QST*, has justified fully the expectations aroused by Loy E. Barton's article introducing the system to amateur radio in our November issue. In that article it was shown how a pair of Type '03-A tubes in push-pull as Class B modulators could duplicate the performance of ten 845's as Class A modulators, providing sufficient audio power to modulate 100% some 400 watts plate input to a Class C r.f. amplifier using a pair of 50-watt or 75-watt type tubes — and do it with much better efficiency and economy than the Class A modulator. With usual r.f. amplifier plate circuit efficiency, this would mean a carrier output of approximately 250 watts — real high

power for the amateur bands where carrier powers of 50 watts and less are the general rule. Because of this and also because experience has taught us that it is a good idea first to acquire familiarity with new equipment in a low-power version, the Class B unit described in this article has been built up around Type '10 tubes and is intended to be used as the audio end of a 'phone transmitter which need employ no tube larger than a Type '10 and a plate supply voltage no greater than 500. Despite the smallness of the tubes and the low plate voltage, the transmitter using this Class B unit is capable of delivering a 30- or 40-watt carrier with 100% modulation, as attested by actual measurements of its performance. Here is a striking case illustrating that this old game of amateur radio "do move". The application of Class B modulation gives this little

transmitter practically the same output rating as the now historic *QST* 'phone transmitter that marked the beginning of the 100% modulation era back in April, 1929. In contrast to the little set illustrated and described here, that transmitter wound up with a pair of Type '52's as linear Class B r.f. amplifiers, required plate supplies of 500 and 2000 volts, and represented an outlay of about eight hundred dollars. Its rated carrier output was only 37.5 watts with 100% modulation. At that time, modulation of the '52's operated as a Class C amplifier to obtain maximum power from this stage would have called for a Class A modulator using a pair of Type '49's (200 watts audio output) and a 3000-volt plate supply! To-day the same job could be done by a pair of much smaller Type '03-A tubes as Class B modulators operating at a plate vol-



THIS COMPACT UNIT MORE THAN DOUBLES THE POWER OUTPUT OF THE 'PHONE SET WINDING UP WITH A PUSH-PULL TYPE '10 CLASS C MODULATED AMPLIFIER, WHEN IT REPLACES THE PAIR OF PARALLELED TYPE '50 CLASS A MODULATORS COMMONLY USED

Although the Class B modulator tubes are only Type '10's, they deliver more than twice as much audio power output as two Class A Type '50's operating at the same plate voltage and are equivalent in performance to an 845 or W. E. 212-D Class A modulator that has 1250 volts on its plate. Complete details of the construction and operation are given in this article.

tage of but 1000. Enough said.

Duplication of the Class B unit in both construction and performance should not be difficult to one having a sound understanding of the major modulation principles, provided the design features and operating precautions to be described in detail are observed closely. A brief summary of these essentials will clarify what is to follow.

FUNDAMENTALS TO BE GRASPED

First, the modulating system must effect an increase in antenna power. Although it is customary to think of modulation in terms of current amplitudes, voltage swings and the like, it is essentially the variation in transmitter power output that gives us modulation. As Mr. Barton shows in the article referred to previously, the

increase in antenna power required for 100% modulation is 50% of the unmodulated carrier power when the modulating signal is sinusoidal. (This should not be confused with the so-called "instantaneous peak power.") Needless to say, this additional power must be supplied from some source. Something cannot be obtained for nothing. And this applies whether the modulation system be called "Heising," "grid," "screen-grid," or something else. Where the modulation system operates directly to vary the power input to the modulated r.f. amplifier plate circuit, as in the Heising system, it is necessary to supply audio-frequency power equal to 50% of the steady (d.c.) plate input to the modulated amplifier. Modulation systems of the types that use an audio-frequency voltage to vary the r.f. amplifier grid bias or screen-grid voltage, or in which the r.f. amplifier is supplied with modulated excitation, are not exceptions to the rule. Less audio-frequency power may be required for complete modulation, as compared with the systems in which the plate input power is modulated, but the requirement of 50% increase in antenna power must be met just the same. These modulation systems, in effect, operate to vary the plate circuit efficiency of the amplifier — the additional power comes from the amplifier plate supply — and the unmodulated power output cannot be greater than 25% of the maximum obtainable from the r.f. amplifier. In its practical aspect this means that the tube power rating of the r.f. amplifier must be at least four times that of an equivalent r.f. amplifier using plate power modulation. Other systems may prove to be economically advantageous in large transmitters but plate power modulation has the best of it at the transmitter powers used by amateurs, as a few minutes figuring of tube costs versus transmitter performance will show.

The second and more generally misunderstood fundamental is the relation between the modulator and modulated Class C amplifier in the plate or Heising system of modulation. The two should be considered separately. The modulator is nothing more or less than an audio-frequency power amplifier which has the plate circuit of the Class C amplifier for its load. The conditions for maximum undistorted modulator output are identically the same as they would be were the modulator supplying power to a pure resistance or a loud speaker. This is illustrated in Fig. 1. "A" shows the schematic arrangement of a Class A audio power amplifier with shunt plate feed, coupling through a suitable transformer to a loud speaker. The value of the optimum load impedance, as determined from the tube's plate curves, is 7500 ohms, suited to the low speaker-coil impedance by the transformer. In "B" a pure resistance of 7500 ohms is substituted for the speaker and its associated transformer, the power being dissipated in heat instead of in mechanical

motion and sound as it was in "A". Progressing to "C", the audio amplifier (now designated a modulator) has as its plate load the plate circuit of a Class C r.f. amplifier, the value of the load resistance being made proper by adjusting the steady input to the r.f. stage to 40 ma. at 300 volts — which, dividing 300 by .040, is of course the same 7500 ohms. This particular audio

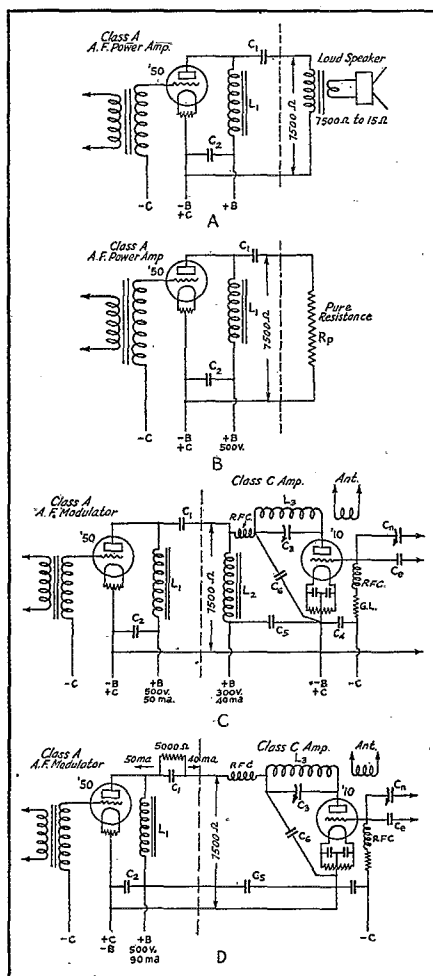


FIG. 1 — THE MODULATOR IS NOTHING MORE OR LESS THAN AN AUDIO-FREQUENCY POWER AMPLIFIER THAT HAS THE PLATE CIRCUIT OF THE MODULATED CLASS C AMPLIFIER FOR ITS LOAD

Its operation is the same whether it is blasting a loud speaker (A), burning up a resistor (B) or modulating the plate input to a radio-frequency amplifier (C and D).

coupling arrangement, involving two chokes and separate plate supplies, can be simplified by the scheme shown at "D". Here there is but one audio-frequency choke, L_1 , and but one plate supply, the drop from 500 to 300 volts for the

r.f. amplifier being taken care of by the 5000-ohm resistor shunting C_1 . In all four figures the circuit to the left of the dash line remains essentially unchanged, and so does the operation of the audio-frequency power amplifier or modulator. With proper bias and excitation, as long as the value of the load is 7500 ohms the tube will continue to supply maximum undistorted audio power output, little caring whether its 6 watts of audio output power are being used to blast a loud

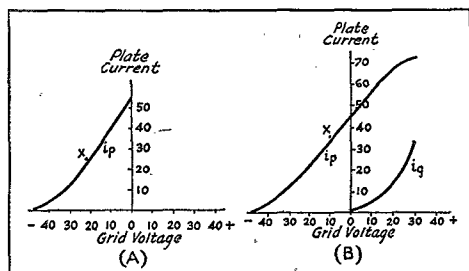


FIG. 2 — THE CLASS A AMPLIFIER

In A the operation of the tube is limited to the negative grid voltage region, as is the case in most audio amplifiers. More power output can be obtained by operating the tube as shown in B, in which the grid voltage is positive during part of the cycle. A special form of input circuit is required, however.

speaker, burn up a resistor or modulate the 12 watts input of a Class C amplifier.

Of course there could be any one of a number of circuit arrangements of the modulator. Two tubes could be connected in parallel, for instance, to modulate 24 watts input to the Class C stage; or a pair in push-pull connection would serve with a suitable impedance-matching transformer to couple to the r.f. amplifier plate circuit. The particular arrangement is relatively unimportant. The points to remember are that the modulator is an audio-frequency power amplifier; that it requires a definite load resistance for maximum undistorted power output; that the value of this optimum load resistance is determined either experimentally or, graphically, by plotting a load line on its-plate characteristic curves. This value is not the same as the modulator tube's "rated plate impedance" and has nothing to do with the "rated plate impedance" of the r.f. tube that is modulated. Irrespective of the type of tube in the r.f. stage, the value of the load resistance it presents to the modulator is simply the Class C amplifier plate voltage divided by its plate current. This steady plate voltage should be no greater than the maximum plate voltage swing of the modulator, of course, because otherwise 100% modulation will not be obtained. This requirement is satisfied automatically when the modulated amplifier's plate input power is twice the modulator's audio output power and the coupling circuit is suitable.

With these fundamentals digested we are

ready now to tackle the Class B modulator which, be reminded, is but a more economical and efficient audio power amplifier particularly adapted to use as a modulator in the amateur 'phone transmitter. It has the same kind of work to do as the more familiar Class A modulator, so it will be well to compare their operation and find out wherein they differ.

CLASS A VS. CLASS B

Although it is not intended to go deeply into the operation of the Class B audio amplifier in this article, we shall review briefly the outstanding features for the sake of a clearer understanding of the principles involved. Those 'phone operators who are seriously interested in the technical side of radiotelephony should read Barton's paper in the *Proceedings of the I.R.E.* for July, 1931. A careful study of the paper cannot help but result in a better insight into the operation of audio amplifiers in general as well as the more particularized case of the Class B amplifier.

It has been accepted practice for a long time in the case of amplifiers intended for accurate reproduction of audio frequencies to assume that the applied grid voltage should not be of such amplitude that on the positive input voltage peaks the instantaneous grid voltage (the algebraic sum of the input signal voltage and the grid bias) becomes greater than zero; nor on the negative peaks becomes so highly negative as to cause a cessation of plate current flow. The conventional Class A amplifier works between these extreme limits. Fig. 2A illustrates the operation of such an amplifier, i_p representing the instantaneous values of plate current plotted against instantaneous grid voltage. The curve is assumed to be a dynamic characteristic; that is, a load resistance of suitable value is assumed to be connected in the plate circuit. The operating point, X, is chosen so that a grid voltage swing between zero and that value which almost cuts off the plate current will result in equal plate current swings above and below the steady operating value. The choice of the operating point depends upon the load resistance and the characteristics of the tube. This method of operating amplifiers has led to the use of low- μ , low plate-resistance tubes of the '71-A, '45 and '50 type as power amplifiers because a large variation in plate current can be obtained with such a tube when the operation is restricted to the negative side of the zero grid voltage line.

If the limitations on the input voltage are removed, however, the undistorted audio output power obtainable no longer depends primarily upon such characteristics of the tube as amplification factor and plate resistance but more upon such physical characteristics as safe plate power dissipation and filament emission. For example, tubes of the "210" type of construction, which includes the Type '10, the 841 and the 842, all

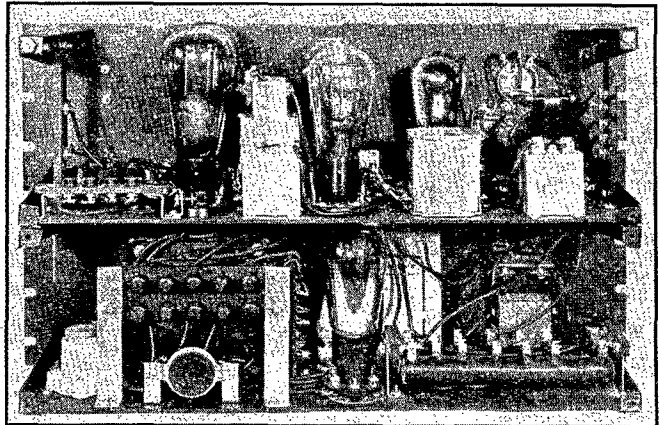
will give approximately the same undistorted audio output, with μ 's of 8, 30, and 3 respectively, provided the grid swing is not limited, even though in ordinary Class A operation as exemplified by Fig. 2A the audio power ratings are widely different.

Fig. 2B illustrates a theoretical case of a Class A amplifier with the grid swing limitations removed. The characteristic is again a dynamic curve assumed to be drawn for the optimum load resistance. The operating point is again chosen so that equal positive and negative grid voltage swings on either side will cause equal increases and decreases in plate current; in other words, the operating point is placed at the middle of the straight portion of the curve. The difficulty in using this type of Class A amplifier arises from the fact that as soon as the grid voltage crosses the zero bias line to the positive region grid current begins to flow, the magnitude of the grid current depending upon the extent to which the grid voltage goes positive. Grid current flow represents a consumption of power in the grid-filament resistance of the amplifier tube and, unless proper precautions are taken in the design of the preceding stage, serious distortion will be set up in the input circuit because grid current flows during only part of the cycle, resulting in lopping off the positive peaks of the grid voltage wave. With proper excitation, however, the power output is limited chiefly by the plate dissipation rating of the tube. A Class A amplifier operates with constant plate current and the tube must be capable of safely dissipating all the power supplied to its plate even when no signal voltage is applied to its grid — in other words, when there is no output.

In the Class B amplifier the plate power input depends upon the exciting grid voltage, and this characteristic is responsible for the fact that much higher audio output can be obtained from a given tube as a Class B amplifier than as a Class A amplifier. When there is no signal the plate input is nearly zero; on the other hand when the signal voltage is maximum the efficiency of the amplifier is high so that comparatively large output can be obtained without exceeding the rated plate dissipation. The factors which limit the output obtainable are simply the excitation available, the plate dissipation on the output peaks and the filament emission.

The operation of the Class B push-pull audio amplifier can be explained by reference to Fig. 3,

which is an actual curve for Type '10 tubes reproduced from the paper previously mentioned. The curve represents the operating conditions with a 2000-ohm plate load, the optimum value for this type of tube when the plate voltage is 500 volts. Since a Class B amplifier is biased almost to cut-off, it is obvious that plate current flows only during the positive half of the excitation cycle. It is therefore not feasible to use a single



THE DOUBLE-DECKED ASSEMBLY BEHIND THE MAIN PANEL

From right to left on the upper shelf are the microphone input circuit, Type '27 speech amplifier, push-pull Class A exciting power amplifier and the Class B modulator tubes. The modulator output circuit equipment is on a separate panel, shown in another illustration, that mounts above this unit in the rack assembly. The power pack for the speech and exciting amplifiers is on the lower shelf. Further details are given in the text and with the diagrams.

tube as a Class B audio amplifier since half of each cycle would be missing in the output; the second tube, the curve for which is below the reference line, supplies the part of the power which would be missing if only one tube were used, and the combined output wave shape is therefore the same as the input wave shape. This curve is similar to the one illustrating the operation of Type '03-A tubes in the article in November *QST*. The method of determining the proper grid bias is fully explained in that article and therefore need not be repeated here. This "push-pull" circuit (it has been dubbed "push-push" with some reason) is actually equivalent to a single tube delivering both halves of each cycle, and may be so considered in the design of the amplifier. Alternatively we might look at the thing as being a single amplifier of the Class A type in performance, with the operating point placed at the junction of the straight portions of the two curves; that is, at the point where the fixed bias very nearly cuts off the plate current, as indicated by the dotted line crossing the reference axis in Fig. 3. But there is this all-important difference between Class A and Class B audio amplifiers: in the Class A amplifier the plate current is constant with all

signal inputs up to maximum, while in the Class B amplifier the plate current is a function of the signal voltage.

Calculations for audio power output are made in the same way as for any power circuit, and in this case the most convenient computation is made by taking the value of the alternating plate current, squaring it and multiplying by the load resistance in which the power is dissipated — nothing else than the familiar I^2R . Inspection of the curves will show that the maximum value which the plate current of either tube can reach before the curves begin to bend off appreciably is approximately 170 milliamperes. Power calculations are based on effective, not maximum, values; therefore it is necessary to multiply by .707, resulting in an effective current value of approximately 120 milliamperes. Squaring this gives

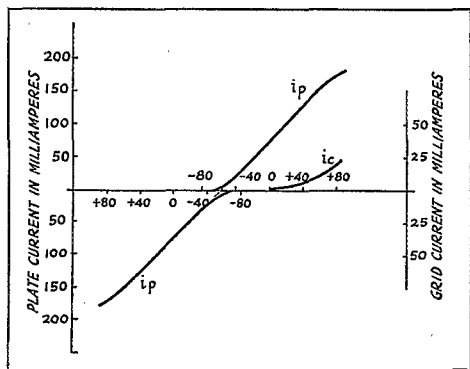


FIG. 3 — MUTUAL CHARACTERISTICS OF TYPE '10'S AS CLASS B AUDIO AMPLIFIERS

The curve below the reference line represents the second tube in the amplifier. It is shifted along until it coincides with the upper curve extended. These curves are drawn for a 2000-ohm plate load.

14,400 (.0144 ampere²), which when multiplied by 2000, the resistance of the load, shows that the power developed is 28 watts. A d.c. milliammeter in the plate circuit indicates average values of plate current, so that the d.c. plate current would be .636 times the maximum current, or approximately 108 milliamperes when the amplifier is delivering full output. The power input to the tubes is therefore 54 watts, representing a plate efficiency of about 52 percent.

Obtaining this sort of performance on the output side with minimum distortion is contingent upon correct excitation of the Class B tubes. The effect of grid current upon the input wave shape has been pointed out above; to minimize distortion from this cause it is necessary first of all that the amplifier or driver preceding the Class B amplifier shall have sufficient power output to supply the maximum grid losses in the latter. With ordinary Class A amplifiers the tube preceding the power amplifier need only supply

such losses as may occur in the coupling device and the dielectric losses in the following tube, both of which are nearly always negligible, so that such exciting amplifiers are usually considered as voltage amplifiers only. This is not the case with the driver for a Class B amplifier; it must supply appreciable grid losses as well. It is not enough, however, that the driver have the necessary power capabilities; the input circuit must be designed so that the power will be supplied without detectable distortion of the wave form.

Fig. 3 shows that the grid current is 15 milliamperes at the peak plate current of 170 ma., and that the grid must be 75 volts positive at the same instant. Since the bias is approximately 57 volts, the total grid swing is 132 volts. The maximum instantaneous power required of the driver is therefore 132 volts times 15 ma., or about 2 watts. The instantaneous input resistance is minimum at the same point, and is equal to 132 divided by .015, or 8800 ohms. Another factor must be considered, however; the grid resistance as indicated by the slope of the grid current curve. This is approximately equal to the peak positive grid voltage divided by the peak grid current so long as the grid current curve is a nearly straight line through the origin, and for the Type '10's shown in Fig. 3 is 75 divided by .015, or 5000 ohms.

Given these conditions, the thing to do is to provide a driving source which will deliver the necessary power, and *do it with good regulation*. One way would be to tie a dummy load across the grids of the Class B amplifiers — exactly what is done in the Class B linear r.f. amplifiers in 'phone transmitters. This scheme is not very practicable in an audio amplifier, however, because audio power is too expensively obtained to be wasted in resistors. A much better method is to use a driving source of low resistance — impedance, rather, since reactance as well as resistance is bound to enter into the coupling device — in just the same way as we use amply-rated generators and transformers to give good regulation in our power supply equipment. The optimum value of driver impedance probably would be rather difficult to calculate without plotting a series of curves with different impedances and harmonically analyzing the resulting output wave shapes, or else by doing the same thing experimentally. Barton's paper states that in the case of the Type '10's, where the minimum instantaneous input resistance and grid resistance are quite different, a value of 1000 ohms is satisfactory.

We therefore have the problem of getting a driver which will introduce a series impedance of no more than 1000 ohms in each grid circuit and which will supply at least two watts of power at 132 peak volts. A pair of '45's in push-pull with a suitable coupling transformer will meet these requirements. The '45's have a plate resistance of

2000 ohms each, or a total of 4000 ohms for the pair in push-pull as Class A amplifiers. As was pointed out above, a Class B push-pull amplifier should be considered as a single tube working on both halves of the cycle instead of as a true push-pull arrangement, so that although the input and output transformers have center-tapped windings, only one-half of each winding is considered to be working in making calculations. Therefore the impedance ratios are calculated between one-half of the secondary winding of the input transformer and the total primary (the '45's are in a true push-pull arrangement and therefore the whole primary is considered). We therefore have an impedance ratio of 4-to-1 from total primary to one-half of the secondary. Since the impedance ratio varies as the square of the turns ratio, the turns ratio is 2-to-1. The resulting input transformer would have identical center-tapped primary and secondary windings.

DESIGNING THE TRANSFORMERS

Fortunately there is nothing particularly difficult about the design or construction of a transformer of this type — it happens that manufacturers are not regularly building 1-to-1 output transformers for '45 tubes, dynamic speakers calling for an entirely different turns ratio. The experimental model used in this particular set-up was made up by the National Company, but any amateur with some core material, wire and some spare time can make one without much effort.

Although audio transformers perhaps belong to a rather special class of transformer, that does not exempt them from working on the same principles as other transformers. The familiar fundamental equation of transformer design is therefore the starting point. It is

$$N = \frac{E \times 10^8}{B \times A \times f \times 4.4}$$

where

- N = Number of turns.
- A = Area of core in square inches.
- B = Flux density in lines per square inch.
- f = Frequency in cycles per second.
- E = Induced e.m.f.

There are thus three variables, A , B , and f , which will determine the number of turns required. The voltage, E , is fixed by the characteristics of the tube with which the transformer is to work. The frequency, f , should be the lowest it is desired to reproduce faithfully. Since we are primarily interested in reproduction of speech, which covers a smaller frequency range than music, 100 cycles is plenty low enough. The flux density, B , will depend upon the grade of iron used in the core; the figure should be conservative if hysteresis losses are to be kept down. With commercial silicon steel 30,000 lines per inch is (we have it upon competent authority) a good value. The

third variable, A , rests with the individual builder. The laminations should not be more than .02 inches in thickness, and the core and windings should be so proportioned that the core window will be very nearly completely filled by the windings. The information on transformer

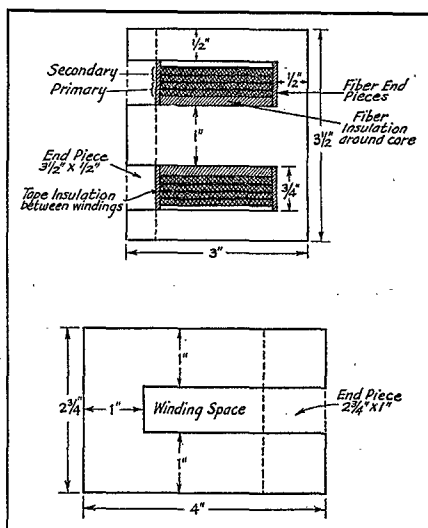


FIG. 4—SUGGESTED FORM OF INPUT TRANSFORMER

Dimensions for both core and shell type transformers are given. The core type will be easier to make, and the core pieces may be strips of transformer iron one inch wide cut to appropriate lengths. The windings should be placed and insulated as shown.

building in the *Radio Amateur's Handbook* will be helpful in laying out the transformer to fit individual needs.

The actual design of a transformer will be given here for the benefit of those who prefer following a set of instructions to working out an individual design. It also will serve as an example of the method.

THE INPUT TRANSFORMER

We have already determined that the turns ratio of total primary to total secondary is to be 1-to-1, or from total primary to one side of secondary, 2-to-1. The minimum instantaneous load resistance is 8800 ohms; therefore the load transferred to one-half of the primary (for one tube) is also 8800 ohms. Inspection of the plate characteristics for the type '45 tube for this load shows that the total maximum voltage swing is 280 volts. This must be converted to an a.c. r.m.s. value before it can be used in the formula given above, which is done by multiplying by .354, giving 99 volts. Since the voltage doubles when two tubes are used in push-pull, we multiply by two, resulting in 198 volts, the value used in the calculations. If one wants to be on the safe

side the voltage swing can be measured for an infinite load, or determined by simply drawing a horizontal line through the operating point, using the conventional published plate curves. This would give an r.m.s. value of 220 volts in the present case. It is generally better to have a few too many turns than not enough.

Suppose the core pieces are one inch wide and that they are to be stacked up one inch thick. Nominally this is a 1 square-inch core, but about 10% should be deducted for the space taken up by the insulation between laminations. This insulation, incidentally, may be a thin coating of shellac or the natural oxide on the iron. We shall therefore use 0.9 square inches as the core area, A. Substituting the various values in the formula

$$N = \frac{198 \times 10^3}{30,000 \times .9 \times 100 \times 4.4}$$

which gives a figure of 1666 turns for the total primary. Since the ratio is 1-to-1 the secondary will have the same number of turns, and both windings will be center-tapped at the 833rd turn.

Since the power output is of the order of only two watts and the steady direct current through either half of the primary is only 25 milliamperes, quite small wire may be used. For convenience in winding, however, the wire should not be smaller than No. 30. Double silk covered or silk-enamel wire should be used. The total of 3332 turns will occupy less than one square inch, if wound to occupy minimum space. The windings may be scrambled, in which case somewhat more space will be required; and of course there must be some allowance for insulation between windings and between windings and core.

Fig. 4 shows the resulting core dimensions for both core and shell type transformers. Probably the shell type is better, although it undoubtedly will be easier to get the laminations cut out for the core type. Since the magnetic fluxes set up by the direct currents in the two halves of the primary winding buck each other, there is no necessity for providing an air gap or using an excessively large core to prevent saturation. The joints in the core therefore should be interlaced in the same way as in ordinary power transformers.

If one does not wish to go to the trouble of making up a special core, one taken from an old output transformer or choke should be entirely satisfactory so long as the necessary space is available for the windings. In such case the actual core area would be substituted in the formula and the number of turns computed as before. If No. 30 wire is too large to fit into the available winding space smaller wire may be used.

THE OUTPUT TRANSFORMER

The output transformer presents a somewhat more complicated problem, because its design

will depend upon the job the amplifier is expected to do. We want to use it to modulate something, of course; but the question is, what can be modulated, and how? It was explained earlier in this story that with complete modulation the modulator must supply 50% as much power to the plate of the r.f. tube as the d.c. input to the tube. A pair of Type '10's as class "B" audio amplifiers have an output of approximately 25 watts, using easily handled figures; therefore the d.c. input to the r.f. tube can be 50 watts. If the d.c. input is to be 50 watts obviously there is nothing to be gained by using anything bigger than a pair of Type '10's in the modulated amplifier. It will be noted, however, that this is about as good a layout as a single 845 Class A modulator with a Type '03-A or '11 r.f. tube; although the resulting transmitter may not look as formidable it will have just as much range.

With a required input of 50 watts, the next question to be settled is the plate voltage to be employed. It might be possible to use 1000 volts at 50 ma. or 100 volts at 500 ma., to quote some rather absurd extremes, but our knowledge of Type '10's as r.f. amplifiers indicates that 500 volts at 100 ma. is about right, because we know that with adequate excitation it is not at all difficult to make the tubes operate as Class C amplifiers at that plate input. The load resistance for the Class "B" modulator is therefore 500 divided by 0.1, or 5000 ohms.

The transformer must suit the 5000-ohm load offered by the plate circuit of the r.f. tubes to the 2000-ohm load required by the Class B audio tubes for optimum output. Keeping in mind the fact that only one-half of the primary is considered in the calculations, we find that the impedance ratio required is 5000 divided by 2000, or 2.5, and that the turns ratio from one side of the primary to the secondary is $\sqrt{2.5}$, or 1.58. The turns ratio from total primary to secondary is half that, or .79.

Referring next to the curves of Fig. 3, the peak current through the load is 170 ma., equivalent to an effective current of 120 ma. This current multiplied by the load resistance (120×2000) gives the r.m.s. a.c. voltage developed across one side of the primary, or 240 volts. Only one half of the cycle is represented, the other half being considered to be furnished by the other tube into the same primary as the first tube. It is therefore necessary to design the total primary for twice the voltage of one, or 480 volts. Another way of looking at it would be to consider that each primary is working at only half the frequency being passed; in other words, if 100 cycles is the lower limit, each primary is working at 50 cycles and therefore needs twice as many turns as first thought might indicate. Either way the result is the same: the total primary must be designed for twice the voltage output of one tube.

The formula used in determining the number

of turns for this transformer is the same as for the input transformer. The transformer shown in the photograph was built to fit core material we could buy locally, the dimensions of which are as shown in Fig. 5. In the completed core the laminations are piled up to a thickness of two inches, giving a core area of 2×1.125 , or 2.25 square inches. Deducting 10% leaves two square inches as the useful area. Substituting in the formula as before,

$$N = \frac{480 \times 10^8}{30,000 \times 2 \times 100 \times 4.4} = 1820 \text{ turns}$$

for the total primary. Multiplying this by .79, the turns ratio, gives 1440 turns for the secondary. The primary winding should be center-tapped but the secondary need not be.

In building this transformer no allowance was made for d.c. core saturation due to current through the secondary because of the method of coupling to the r.f. tubes. If the plate current for the Class C tubes is to be fed through the secondary winding of the output transformer, the steady magnetization produced by this current must be taken into account. It is somewhat difficult to do it without having a magnetization curve for the iron, but if this is obtainable the core should be enlarged until the total flux, including the steady flux produced by the d.c., works out to 30,000 lines per square inch. Coupling through a choke and condenser allows the use of a smaller core and will not, as a general rule, require the purchase of additional apparatus since the choke is already present in the transmitter using ordinary Heising modulation. The impedance of the choke at 100 cycles should be three or four times that of the load, 5000 ohms, for good results. A 30-henry choke (actually 30 henries with 100 ma. through the winding) will be adequate, but more inductance will help a bit in improving the regulation of the audio output.

INSULATION!

Winding the output transformer is not quite so simple a matter as winding the input transformer. Insulation is important — with the word "important" in giant capitals. We have learned that. The transformer in the photographs is the fifth of a series, the first four of which blew up because the insulation wasn't good enough. If anyone wants to repeat our experience of winding five transformers for the sake of learning the lesson that good insulation is indispensable, we wish them the joy that comes with some hours of winding. Scramble-winding decidedly is not good enough in this transformer; the windings must be put on in layers and there must be insulation between each layer. Fig. 5 shows how the windings are placed on the core; between each layer of turns there is a paper separator, and each winding is wrapped with varnished cambric tape. This transformer has, up to the present writing, stood

up under the severe test of removing the load from the secondary side. Since this is likely to happen in any 'phone transmitter should the r.f. excitation fail, the output transformer must be built to handle the abnormal voltages encountered. Measurements have shown that the voltage across the secondary of the transformer with the load removed is more than four times the normal voltage with load — meaning that one can expect

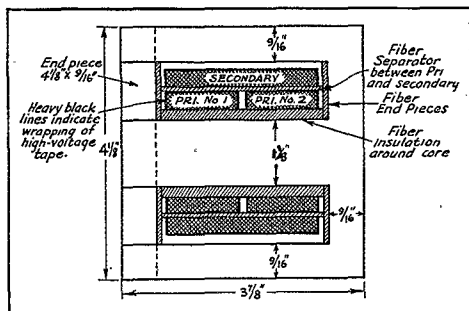


FIG. 5—DETAILS OF THE OUTPUT TRANSFORMER SHOWN IN PHOTOGRAPH

The windings should be put on in layers just as in building a regular power transformer, with insulation between each layer. This transformer cannot be too well insulated.

something like 2000-volt audio-frequency peaks across the secondary of the transformer with the load removed and full excitation on the modulator tubes.

To make a permanent job the windings should be impregnated in a vacuum with some good insulating compound and baked to keep out moisture. Since this is somewhat beyond the means of most amateurs, the next best substitute would be to use cotton or silk-covered wire and shellac each layer, using waxed or "fish" paper between layers. When the winding is completed it should be baked for several hours in an oven (about 250 degrees) to drive the moisture out of the shellac. An unbaked shellacked winding is worse than useless until the shellac dries thoroughly, which may take several days. Bake it and be safe.

It is not imperative that the windings be put on exactly as shown in Fig. 5, but it is worthwhile to have the two primary windings identical because then the same amount of wire is used on each and their resistances are therefore the same. If the total primary is wound layer on layer with a tap brought out at the midpoint, the induced voltages will still be correct but the resistances of the two windings will be different.

PUTTING THE UNIT TOGETHER

With the all-important input and output transformers completed, assembly of the modulator and its exciting amplifier becomes a straightforward job of audio-frequency power amplifier construction. Although it is not essential to duplicate in detail the unit that is used as an example

here, it is recommended that the practices utilized in it be followed generally. Complete shielding, for instance, is not absolutely necessary. On the other hand, the elimination of troublesome radio frequency currents in the audio system, induced from the nearby transmitter, is extremely difficult unless the audio equipment is completely shielded, even to the microphone cord. Components other than those specified may be used, of course, provided they have equivalent ratings and characteristics. Variations in the physical arrangement also are permissible if they do not introduce harmful regeneration or degeneration due to coupling between amplifier output and input circuits. The arrangement shown, incidentally, has given none of this trouble.

The specification of a push-pull Class A stage using Type '45 tubes as the exciting amplifier for the modulator, previously made in connection with the design of the input transformer, gives the basis for deciding of what the speech amplifier must consist. With normal plate voltage, 250 volts, and grid bias, -50 volts, the two '45's in push-pull will take a total grid swing of approximately 100 volts. This can be supplied by a good transformer coupled stage using a single Type '27 with 180 volts or a little less on its plate. The next thing to decide is whether or not the single '27 stage will be able to amplify the input from the microphone sufficiently to give the required swing to the push-pull stage. This will depend entirely on the microphone. Using a vacuum-tube voltmeter, a few measurements of the outputs of three microphones that happened to be available showed that the single '27 stage would be adequate for double-button microphones such as the Gavitt Star and Universal Model BB but that an additional microphone amplifier would be necessary for less sensitive double-button microphones such as the Western Electric 387-W. These measurements were made across the 500,000-ohm gain control in the grid circuit of the '27 with the contact at the maximum position, using normal speech input to the microphones. The power from the Western Electric 387-W was too small for anything like accurate measurement of the voltage developed across the resistor, the voltmeter being insensitive to less than one volt, but the more responsive microphones gave measurements of approximately 5 volts r.m.s. on peaks of normal speech with the diaphragm

about eight to ten inches from the speaker's lips. This input proved adequate to give the normal modulator power output of 25 watts, the overall power ratio being nearly 100,000 and the total gain of the unit approximately 50 db. Putting the ratings in terms of the standard reference power of 6 milliwatts, the microphone power level is something like 14 db. "down" and the modulator output level 36 db. "up."¹ If the amplifier as it stands was to be used with a microphone of lower sensitivity rating than about minus 15 db. it would be advisable to add a separate one-stage microphone amplifier ahead of the '27. We wish,

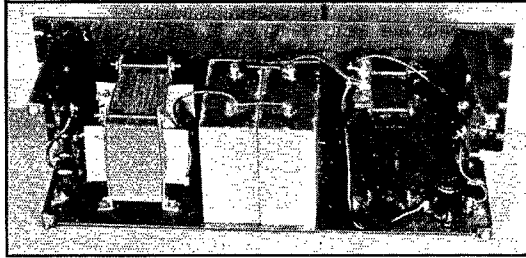
hopefully, that all manufacturers would make a practice of giving sensitivity ratings for their microphones. The information would eliminate a lot of guesswork in figuring out the amplification necessary to do a given job.

The photographs and circuit diagrams (Figs. 6 and 7) of the modulator unit, which includes the 300-volt power pack,

show quite clearly its constructional details. The line-up of the components corresponds to their respective positions in the schematic diagrams and the specifications for the parts are given beneath them.

The complete equipment is built up on two steel panels of the standard 19-inch relay-rack mounting type. (Rack and panels salvaged at depression prices from a defunct commercial outfit's remains.) The larger panel, 21 inches wide by 12 $\frac{1}{8}$ inches high by 3/16 inch thick, fronts an upper shelf carrying the microphone input apparatus, speech amplifier, push-pull exciting power amplifier and the modulator tubes; and a lower shelf on which is mounted the 300-volt power pack supplying the filament and plate power for the first two stages. The top shelf is 6 inches above the one at the bottom, each being a steel sheet 18 $\frac{3}{4}$ inches wide by 6 $\frac{1}{4}$ inches deep by 1/8 inch thick. The shelves are supported by steel angle brackets screwed to the panel, threaded extensions equipped with wing nuts at the rear ends of these brackets serving to hold in place the removable steel housing that encloses the back and sides. A terminal strip for microphone and microphone-battery connections is fastened between the upper and center brackets at the left side, the G.R. jacks for making connections between the modulator plates and primary of the output

¹ McLaughlin and Lamb, "What Is This Thing Called Decibel?," *QST*, August, 1931.



THE MODULATOR OUTPUT COUPLING CIRCUIT HAS ITS OWN PANEL AND IS SHIELDED FROM THE OTHER APPARATUS

The special output transformer is at the left, the coupling capacitor in the center and the plate circuit reactor at the right.

transformer being mounted on a similar strip at the right. The two milliammeters are on an 8-inch by 3¼-inch by ¼-inch aluminum sloping panel (to facilitate readings without getting down on one's knees) mounted in front of the main panel on brass brackets formed to make the slope about 60 degrees. Each meter has a pair of leads of sufficient length to reach the jacks to which it is to connect. An ordinary telephone plug terminates each lead.

Additional binding posts on a horizontal terminal strip at the rear right of the upper shelf are for modulator bias-battery and 7.5-volt filament-supply connections. Beside this is a

binding post mounted on a brass angle bolted to the shelf for the ground connection. To make the power pack available for use with other equipment, connections to each of the two 2.5-volt filament windings and to voltage divider taps at “-B”, 65, 95, 145, 180 and 300 volts are brought out on a panel mounted vertically behind the power transformer. The 110-volt a.c. connection is plugged into a receptacle mounted on brackets below this panel. The power pack itself is similar to those common in broadcast receivers that use a pair of '45's in the output stage. Its circuit and specifications are given in Fig. 7. The heavy-duty 10,000-ohm voltage divider, tapped to give the

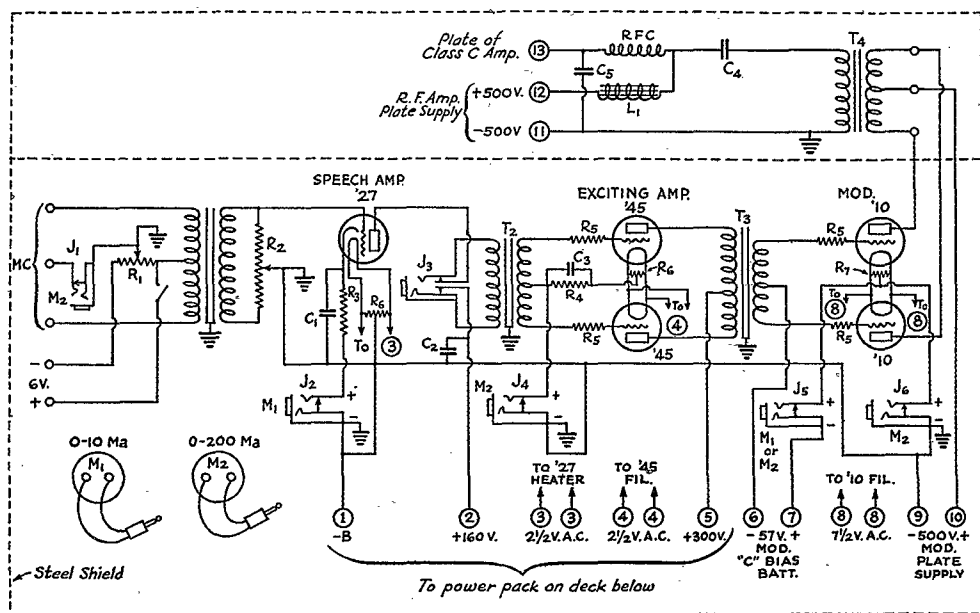


FIG. 6—SCHEMATIC CIRCUIT OF THE EQUIPMENT BEHIND THE MAIN AND MODULATOR OUTPUT PANELS

- T₁—Microphone transformer, Ferranti No. S 57/2.
- T₂—Push-pull input transformer, Amertran Type 151.
- T₃—Special modulator input transformer. See text for details.
- T₄—Special modulator output transformer. See text for details.
- R₁—200-ohm microphone circuit potentiometer.
- R₂—500,000-ohm gain control, Centralab tapered type.
- R₃—2500-ohm 1-watt cathode (bias) resistor.
- R₄—1000-ohm 5-watt cathode (bias) resistor.
- R₅—100-ohm grid-circuit parasitic suppressors.
- R₆—20-ohm filament center-tap resistors.
- R₇—100-ohm filament center-tap resistor.
- M₁—0 to 10 d.c. milliammeter, 2-inch type.
- M₂—0 to 200 d.c. milliammeter, 2-inch type.

Unless otherwise specified, the following jacks are of the closed-circuit type and make contact with the metal panel.

- J₁—Total microphone current, use M₂.
- J₂—Speech-amplifier plate current, use M₁.
- J₃—Two-circuit type, for connecting external amplifier to input of power stages. Insulated from panel.
- J₄—Exciting amplifier plate current, use M₂.
- J₅—Modulator grid current, use M₁ or M₂. Insulated from panel.
- J₆—Modulator plate current, use M₂.
- C₁, C₂, C₃—1-μfd. 200-volt by-pass condensers.
- C₄—Audio-frequency coupling condenser, 2-μfd. or larger, 1000-volt working rating.
- C₅—250-μfd. r.f. by-pass, 2500-volt mica type.
- L₁—Modulator output coupling reactor (“modulation choke”). Should have minimum actual inductance of 30 henries at 100 ma. d.c.
- RFC—Radio-frequency choke for carrier frequency of transmitter. “Grounds” indicate circuit elements that may be connected to metal panel and chassis.

voltages mentioned above, makes for good regulation by virtue of its 30-ma. drain. A 6-ampere plug-type fuse in the primary circuit and a small lamp filament in the center-tap lead from the high-voltage transformer winding provide protection in case of an accidental short, tube failure or filter condenser breakdown. A small 2.5-volt dial light, connected to one of the 2.5-volt filament windings, is mounted in a miniature socket

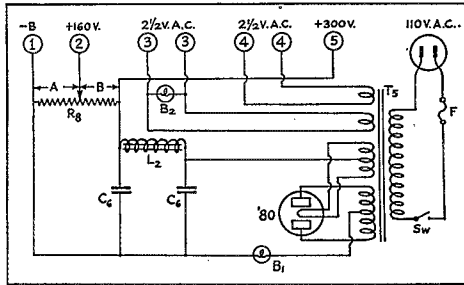


FIG. 7—POWER PACK FOR SPEECH AND EXCITING POWER AMPLIFIERS

- T_5 —Power transformer with center-tapped plate winding rated 350 volts each side, center-tapped rectifier filament winding rated at 5 volts and two 2.5-volt filament windings.
 C_6, C_6 —Electrolytic filter condenser, input section 4 $\mu\text{fd.}$, 700 volts; output section 8 $\mu\text{fd.}$, 350 volts.
 L_2 —30-henry 100-ma. filter choke.
 R_3 —Two 5000-ohm 100-watt resistors in series. Tapped at 160 to 180 volts for speech-amplifier plate supply. Taps to terminal panel for external use not shown.
 F —6-amp. plug-type fuse.
 SW —Toggle switch on panel.
 B_1 —Flash lamp serving as protective fuse in high-voltage circuit.
 B_2 —2.5-volt dial light serving as pilot.

behind a red "bull's-eye" on the panel and functions as a pilot. No. 14 stranded rubber-covered hook-up wire is used for making all connections, including those to the amplifiers on the upper deck.

The output transformer, coupling condenser, plate choke for the modulated amplifier, radio-frequency protective choke and by-pass condenser diagramed at the upper right in Fig. 6 are mounted behind a separate and smaller panel measuring 21 inches wide by 7 inches high by 3/16 inch thick. This modulator output panel mounts above the larger one in the rack. Connections to the output transformer primary terminate on a bakelite strip at the right end, two terminals being G.R. jacks for plug and cord connections to the modulator plates and one being a binding post for the positive 500-volt modulator supply connection. A terminal strip at the left side provides binding-posts for connections to the Class C r.f. amplifier plate input, positive Class C amplifier plate supply and negative of both modulator and Class C amplifier plate supplies. These terminal strips are mounted similarly to the others described.

Although the amplifier circuit arrangement is

generally conventional, as shown in Fig. 6, there are several features which differ somewhat from usual practice. In order to minimize the necessity for insulating from the metal panel the potentiometers and jacks mounted on it, these are connected in the "ground" side wherever practicable. The rotors and shafts of the microphone and gain-control potentiometers, for instance, and the frames of the plate-milliammeter jacks are not insulated from the panel. The jack for connecting an external amplifier and the modulator grid-current jack must be insulated with fiber bushings and washers, however. Circuit elements which need not be insulated from the panel are indicated by "grounds" in the schematic diagrams. Precaution should be exercised to make sure that no common ground connections other than those shown are made either within the unit itself or in the external supply circuits.

MODULATOR PLATE SUPPLY

The 500-volt power supply for the modulator may be the same one used for the Class C modulated amplifier, provided it is capable of taking care of the additional load with good regulation. The varying load demand of the Class B modulator, previously emphasized, will not tolerate poor voltage regulation. Good regulation is a desirable characteristic of motor-generator plate supplies and the amateur who has a good 500-volt m.g. can make good use of it. Two practicable schemes for improving the regulation of rectifier-filter systems were described by Ed. Glaser in October *QST*, the simpler being the use of "saturating" choke input to the filter. We have used both m.g. supply and a separate 500-volt modulator power supply with the choke input arrangement, and have found regulation of 10% to be satisfactory. With no-load voltage of 550 and full-load (110 ma.) voltage of 500, the modulator delivers its rated output with no noticeable impairment of quality. This power supply has a center-tapped plate winding rated at 600 volts each side, total rated current about 150 ma., and uses a mercury-vapor Type '80 full-wave rectifier with a skimpy "B"-eliminator choke ahead of the brute-force filter. The rectifier filament winding is on the same transformer but a separate transformer is used for the modulator filaments. A similar 500-volt supply is used for the modulated Class C r.f. amplifier. Since its load is constant, no voltage-regulating device is necessary. Both of these supplies are practically the same as a number that have been described in these pages and the *Radio Amateur's Handbook* and no detailed instructions for making them up need be given here. It should not be necessary to point out that transformer ratings cannot be taken as the true values of the voltages delivered, however. They must be measured with a voltmeter.

TEST AND OPERATION

Before the modulator unit is ever connected to the Class C r.f. amplifier, and certainly before the complete transmitter is put on the air, the audio equipment should be tested out on a dummy load so that any bugs may be located and cleared up in the privacy of the shack. This is done by connecting a 5000-ohm load to the terminals marked "Class C Amplifier Plate" and "-500 volts" in Fig. 6. The load may be a 50- or 100-watt grid-leak type resistor in series with a small resistor of a few ohms, the latter being at the negative high-voltage (ground) end. A headset or small loud speaker is connected across the small resistor for monitoring. It is assumed, of course, that a careful re-check of all connections, test of the power pack, and so on, have been made before this. For preliminary testing it is convenient to couple the output of a receiver across the primary of the microphone transformer (if the receiver is equipped with an output transformer) or across the outside terminals of the gain control. This gives some of the blah-blah broadcasters an opportunity to do a little useful work.

Preliminary to testing with a signal, plate current readings should be taken for the three stages. The 0-10 ma. meter should be used for the '27 stage and the 0-200 ma. meter for the '45's and '10's. The '27 plate current should be 5 to 6 ma. and that of the '45's nearly 50 ma. With proper bias and plate voltage on the modulators their no-signal plate current should be approximately 15 ma. The use of a 45-volt "B" block and a tapped 22.5-volt "C" block in series facilitates the bias adjustment. The bias batteries should be good ones; nearly worn-out batteries must not be used because their high resistance will make trouble.

Having set the gain control at minimum, connected bias and external power supplies and switched on the power, first make a test for hum. If the hum is serious it is advisable to check up on the filament center-taps, test the grid circuits for opens (including the bias circuits) and make sure that there is an actual ground. If the hum disappears when the first two stages are switched off it is probable that the source is in the speech amplifier or the push-pull exciting amplifier, assuming that the hum is not coming from the receiver or power supplies. A defective tube, particularly a hummy '27, may be at fault. As a last resort each amplifier stage can be checked individually, starting with the '27 output by connecting a headset across the secondary of the push-pull '45 input transformer and then testing at the '45 output using a dynamic speaker with its input transformer primary connected across half of the modulator input transformer secondary. Using the latter connection, by the way, comes in handy when there is occasion to use the front end of the modulator unit as a power amplifier for loud-speaker output.

When the hum has been eliminated to a satisfactory degree, a full-power test for output and quality should be made, the gain control being advanced until the modulator plate current kicks up to slightly above 100 ma. on the signal peaks. The modulator plate current being nearly proportional to the output current makes this meter useful as a volume level indicator. When the pointer "kicks over 100" on signal peaks the modulator should be delivering approximately normal rated output. A re-check of the two preceding stages should show no variations in their plate current on signal peaks. They should operate as Class A amplifiers and any deviation of their plate current from the no-signal value indicates distortion. Listening checks on the quality are made using the phones or speaker connected across part of the load resistor.

Precaution: Do not touch any part of the load circuit except the grounded side while the power is on. Audio-frequency peak voltages of 500 or so give a nasty shock. Also, do not risk transformer insulation breakdown by operating the modulator with the load circuit open. As has been pointed out, the no-load audio-frequency peak voltage

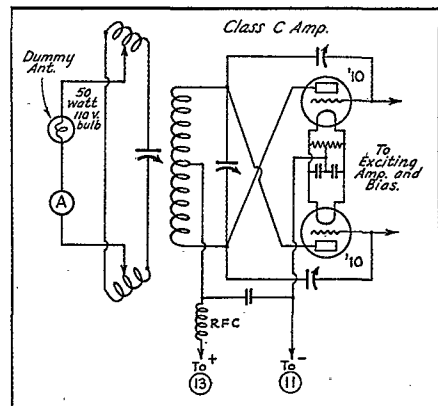


FIG. 8 — A DUMMY ANTENNA LOAD SHOULD BE COUPLED TO THE PUSH-PULL CLASS C MODULATED AMPLIFIER FOR TESTING

Circuit values are as usual for the operating frequency and correspond to those of similar amplifiers described previously in this magazine and in the *Radio Amateur's Handbook*.

across the secondary may rise to 2000 volts or more. It has been suggested that a spark gap consisting of two needles with about 1/16-inch separation between the points should be connected across the secondary terminals to protect the transformer in case of accidental loss of load.

MODULATION TESTS

The radio-frequency section used with the modulator can be any one of a number that have been described in *QST* and in the *Radio Amateur's Handbook*. The rig used in our tests consists of

the low-power set described in July, 1931, *QST*, exciting a push-pull Class C modulated amplifier using a pair of Type '10 tubes. The latter is identical in construction with the low-power push-pull amplifier described in Chapter VII of the *Radio Amateur's Handbook* (Seventh and Eighth Editions) except that a transmitting type variable tank condenser rated at 3000 volts has been substituted for the receiving type condenser shown in the set. This is necessary because the tank circuit originally was intended to handle peak voltages of around 700 (when used with a pair of Type '50's as a Class A modulator) and the peaks to be handled with the Class B modulator are upwards of 1000 volts. Any good amplifier similar to this would serve just as well, of course, provided it has sufficient excitation and will handle the power. A single 50-watt type tube operated at reduced plate voltage (500 volts) could be used, for instance, or a pair of Type '10's in parallel would do. A push-pull circuit is recommended, however, not only because of its convenience but also because it is less likely to cause the radiation of harmonics of its fundamental radio frequency.

Detailed instructions for the adjustment of the Class C amplifier will not be repeated here. For them the reader is referred to the numerous articles describing 'phone transmitters that have appeared in *QST* and to the *Handbook*. Summarizing the main points, the plate current should be brought to 100 ma. (at 500 volts) by adjusting the coupling to the antenna, all radio-frequency circuits being tuned accurately to resonance.

The suggestion is made again that all preliminary testing be done with a non-radiating antenna. (The amateur who puts his transmitter on the air to talk to himself is a dumb one. More dummy antennas and fewer dumb amateurs would be a good rule.) The simple dummy antenna used for testing this transmitter is shown in Fig. 8. It utilizes a 50-watt 110-volt lamp as a load resistor and has the advantage that its glow gives an indication of power output and modulation. Optimum coupling to the lamp circuit is obtained by adjusting the clips on the antenna coils. Since the signal is not being radiated, receiver input as well as microphone input may be used for testing purposes. Receiver input cannot be used with the transmitter connected to the antenna, however, because that constitutes violation of the law, as several amateurs have found out to their sorrow. When putting the microphone into service the current should be adjusted to the value specified by the manufacturer. The adjustment is made with the potentiometer in the microphone circuit, the current being read on the 0-200-ma. meter plugged into the jack at the extreme left of the panel. This current is the total for both buttons, twice the rated current per button.

A check on the over-all performance of the transmitter can be made using a vacuum-tube

voltmeter, of which the modulometer is a particularly applicable version. The percentage of modulation can be measured; "carrier shift" can be detected (making use of the suggestions given in Paul R. Huntsinger's article, "Mechanics of Modulation," October, 1931, *QST*); and that insidious r.f. in the audio circuits, cause of more poor quality transmission than most amateurs suspect, can be hunted down and eliminated. How to do these things is told in Chapter VIII of the latest editions of the *Handbook*. When the final test has been made and the monitor says "quality like a broadcasting station" — why, we're ready to go on the air. We know the reports will be good ones because the performance has been thoroughly tested. Present standards demand that it must be good.

Even our limited experience with a transmitter using the Class B modulator has convinced us that the system can and unquestionably will give to amateur 'phone not only more 100% modulated watts per dollar but also high-grade performance. We hope that this justifiably lengthy article will prove a practical aid to its general use.

The Northwestern Division Convention

AUGUST 29th and 30th will go down in the annals of the Northwestern Division affairs as two days to be long remembered because of the very fine convention held under the auspices of the Tacoma Radio Club, at the Tacoma Hotel, Tacoma, Wash. Dr. F. Clifford J. Spike, W7OS, Chairman of the Convention, started things on time and saw to it that other events on the program were kept moving. A welcome was tendered by His Honor, Melvin G. Tennant, Mayor of Tacoma, and thereafter until the last award of prizes Sunday night there was not an idle moment.

Lieut. Walcott, U.S.N.R., spoke for the volunteer communication reserve; the Army-Amateur Net was handled by A. H. Harrington, W7GR. Director Weingarten gave an account of the last annual Board of Directors meeting. He was followed by Fieldman Hebert, representing A.R.R.L. Headquarters, who spoke on the international aspect of amateur radio and the forthcoming Madrid conference.

The best of technical talent was present. Mr. T. M. Libby, Technical Engineer, Pacific Telephone and Telegraph Company, was one of the leading speakers. Howard Reichert, W7TW, covered the subject of "Crystal Controlled Oscillators and Monitors"; K. S. Johnson spoke on "Transmission Net for Telephone," and A. A. Hebert of A.R.R.L. discussed the "Dynatron Frequency Meter."

Sunday morning bright and early the "gang" started in automobiles to visit W7DK, the official shack of the Radio Club of Tacoma, returning in time to see a wonderful film presented

(Continued on page 68)

Crink-a-Nope

By J. Herbert Hollister, W9DRD*

HELLO London" serves as a never ending source of interest to the lay visitor at the station during those periods when all bands have lapsed into the doldrums. When the usual stock of lies has become exhausted and the decorative QSL cards and souvenirs have begun to pall, the thing to do is to tune in one of the transatlantic 'phones and let Mr. Layman listen to "Crink-a-nope" for a spell.

But perhaps one may be called upon to explain the origin and meaning of the word "Crink-a-nope." It is the inverted resultant of the word "Company"; or, to be more explicit, it is the output of the speech scrambler when the word "Company" is the input. All of us who have had the good fortune to attend one of the excellent lectures and demonstrations conducted by representatives of the Bell Telephone Laboratories, have heard what happens when the speech scrambler or inverter is called upon to do its worst with the oft recurring words "Telephone Company." The result is "Play-o-fine Crink-a-nope," and then when the thing is fed a dose of its own medicine and the above words are repeated back to it we have a pretty fair version of the original phrase "Telephone Company." It really is quite surprising what that remarkable device can do to the King's English.

While enjoying one of these vitally interesting demonstrations recently, the thought kept recurring to me that I had heard it all before. That weird inverted speech, sounding like nothing human, kept haunting me for days after. And then on Friday night, while working through the 3.5-megacycle band for a standard frequency transmission and battling 'phone QRM for a peep out of W1XP, I suddenly realized what it was. Came the dawn! The next time you hear five different 'phones all stacked up on the same band of frequencies asking the world "ows by bodulation," I'm sure you will agree that we long since originated a very effective system of speech scrambling which closely resembles "Crink-a-nope." In fact, it may require careful discrimination on the part of the listener to certain signals ('phone or c.w., willingly or otherwise), to establish definitely the fact that one is not hearing a transatlantic commercial 'phone conversation with the secrecy attachment switched on. However, before typing an outraged note to the A. T. & T. Company complaining bitterly against the operation of one of its stations within the amateur bands, it might be well to apply the following test. Continue listening, and if the

signals get worse it's probably not a commercial 'phone. "Hello London" occasionally switches to straight speech.

Now in this enlightened era of judging all things by a standard of comparison, when signals are QSA-blah and R-blah blah, regardless of the sensitivity of the super-bloopadyne in use at the reporting station and the aural aptitude of its operator, it occurs to one that what we need to make the picture fit the frame, is a "bodulation" scale for reporting on the quality of 'phone and near-c.w. signals. Accordingly it is my wish to here and now respectfully submit to the clan of the "Wouff-hong" and the "Rettysnitch," to the toiler among the "gadgets" and "gimicks," the following scale to be used judiciously and carefully as needed in reporting on signal quality: "Crink-a-nope" 0 to minus 5.

The Chair Warmer's Convention

DOC. KIRK'S Radio Shack (W8ARJ), located at Curtice, Ohio, was the Mecca towards which the C.W.C. pilgrims from several states were bound on Sunday, August 23rd, to attend the Annual Convention. And what a jolly crowd. Their number is not so very large, but what they lack in quantity they make up in QUALITY. From about 9:00 o'clock in the morning until nearly noon, automobiles kept arriving every fifteen minutes or so, and when the convention was called to order by Jim Lisk, W8EQ, Doc's two rooms were filled up. Following precedent, a short business session took place with Walt Colpus, W8BRS, the secretary, making proper notes. President Lisk, then, in well-chosen words welcomed the A.R.R.L. representative, Fieldman Hebert, who addressed the delegation on the League as an organization and discussed international problems facing amateur radio. General discussions took place where everybody joined in, and as afternoon progressed it was almost a debating society. Hebert's dynatron frequency meter proved of interest, and his talk of the importance of frequency stability was to the point.

There was not an idle moment, and when the big picnic lunch was served in the middle of the afternoon it was enjoyed by everybody. As the shadows of dusk began to appear, farewells were in order, and as the last automobiles disappeared around the corner, one thought came to mind: "May the wonderful spirit of the C.W.C. ever continue in our ranks."

— A. A. H.

* Merriam, Kansas.

An Old Spark Soliloquizes

By Ernest Sinclair Hook, W3IY*

LAST night I was urged to visit a friend's house in the city. I say "urged" because I was sad and alone. My thoughts had scampered back into the happy years that have gone forever. And there I met a strange man, a man of queer mien, a man of mystery — and sorrow: a pioneer ham.

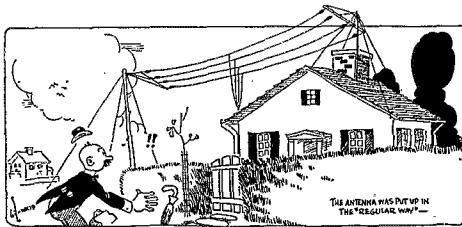
I hope that it will prove interesting, even if not instructive, to those who only lately have been bitten by the Radio Bug, to hear about some of the terrible difficulties that beset the path of the beginner in those good old days (now with "Yesterday's Seven Thousand Years") when wireless first "took to wing" and traveled to — ah! Where?

Perhaps, too, 'twill be of some solace to those neglected wives of to-day to hear of those old hams who left their better halves to pine away alone and then took to brooding and stewing among the coiled wires and tested crystals of the isolated wireless room.

As I remember it (although I must confess that the events are but hazy spots on a dim and fading horizon) the very first step of the Fiend was to get an antenna erected, by fair means or foul.

This incurred the overcoming of many problems and great obstacles. There was one little fellow whose most disconcerting set-back was his father's refusal to allow his "insane" son to put nail holes in the family roof.

A problem of this nature was the real test of the "fan." This was the time for earnest argument and sincere coercion — if the rank of ether pounder was to be achieved. But it soon made



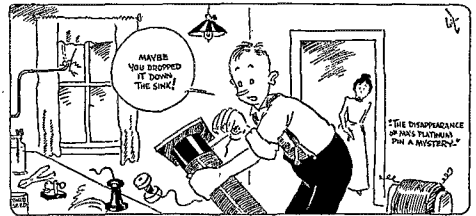
itself manifest, in this mentioned case, that the only alternative would be to use rubber nails; or else, erect the aerial in the regular way, while father was at work, and have it greet the astounded paternal gaze when, too late, he returned home. I suppose that it is quite unnecessary for me to say that the antenna *was* put up and was proudly floating in the breeze, on the highest pinnacle of the domicile, when Pop came home for supper. It happened, once in a great while, that

*3408 Glen Avenue, Baltimore Md.

some lucky fellow would have the good fortune to have his father's permission to "go ahead" with the work of destruction. If so, the lad was lauded and praised — and "great" would be the distance thereof."

If the wash boiler escaped the hawk-like eye of the outfit builder who was looking around the place for something to bury for a good ground connection, you may be sure that an equally good substitute already had been found and quickly buried.

Then came those long, tireless trips among the second-hand and junk dealers in the town. Great, massive, discarded switches of long ago were dug



from beneath the rubbish of ages and converted into lightning change-overs that could be screwed beneath the newly-painted window sill — as a further means of changing father's idea of what the house should look like to the neighbors.

After the antenna and ground had been accomplished — with many holes in the roof, risk of life and limb and the moving of mother's flower bed to accommodate the tank or "what have you" — there was the set to build.

This was purely a matter of experiment, practice, an eye for adaptability and *gall* — for even the salt boxes and bird seed containers were unsafe around the Fiend.

Alas! This was the day of the tuning coil that stretched from the front bedroom to the back library; or from the attic to the cellar, depending only on the experimenter's idea of efficiency, and disregarding entirely household arrangement and bodily hazard. It was necessary, oh Ether God, if Nauen was to be heard on the long wave.

The detector was a piece to be pondered over. Acid spilled on the new rug was only an incident; splinters of galena and silicon in Pop's feet an accident; the disappearance of Ma's platinum pin (from her breast pin) a mystery. Of course there was the piece of pet galena (Arlington tested) worth its weight in gold and prized more highly than the precious yellow metal; and there was the carefully filed brass contact — delicately laid away.

Variable condensers were *attempted* — but few indeed were the fortunate fellows who could make one. Those who could do so were of the First Order and their praises were sung far and near.



The intricacies of the manufacture of the condenser made it necessary to save pennies; and it always proved to be a red-letter day when enough had accumulated in the little tin box to send off to the Whosit company of Wheresit, makers of "high-grade wireless specialties," for one of their guaranteed "non-rubbing" variables.

Fixed condensers were a "pipe" and consisted of almost any old thing around the shack that was not tacked down. There were all sorts of shapes, sizes and degrees brought about by the using of tobacco foil and various other odds and ends.

Begged, borrowed or stolen, were the head-phones, *always*; often, conveniently "lost." Perforce, in the beginning, the telephone companies suffered the losses, for the Fiend was desperate where constructive skill was insufficient to fill his needs.

I almost forgot to mention the aerial lead-in bushing! The memory is a dark spot on the vista of the past. An accidental push on the window pane or a quick drill through the newly-papered wall of the room always brought its reward.

Overlooking the neglected wives, these were the days of distracted mothers and furious fathers. But it is rather hard to forget those martyred women of the stirring pioneer days of the ether. How pathetic was the case of Mrs. X whose husband, an old fellow who had been married so long that he was beginning to like it, left her to knit alone while he (after being gored by the wireless bull) lost all interest in matrimony and began to wind tuning coils and cover her fruit jars to use them for transmitting condensers.

The transmitter! The beginning was always attempted with a Ford Coil. These little ether microbes caused more naval wireless operators and government inspectors to take to drink than any other known reason.

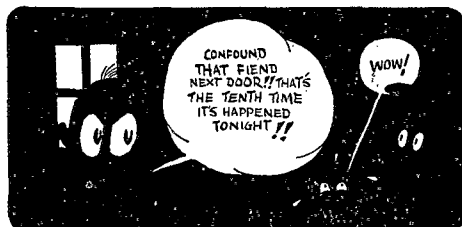
From these squeak boxes the next step was a transformer, home-made or otherwise, of great size — the bigger the better; for show and efficiency was close kin.

Oh, those transformers! When the key was depressed, there was a mighty roar that shook the house; and a blue, flaming spark that shot rasp-

ingly between the electrodes and sent its pale light over the drawn features of the Fiend at the throttle. Neighbors ran frantically to father, complaining that their lights were dimming to darkness, and the telephone and power companies sent crews of men rushing to the scene of the crime.

Such great strains punctured the adolescent condenser; which meant that more jars must be "procured" from the pantry and hastily covered to replace the cracked ones.

Then followed burnt-out meters, kick-backs and ruined house wiring; but, the "work" went on, and on, and on — into the dawn. There were hollowed eyes, pale cheeks and thinly covered, meatless frames, and endless energy expended; and Static and Regulations and Radio Clubs to be reckoned with. But perseverance, eventually,



brought forth success; and one night the time signals from NAA could be heard, and on another evening the fruitjar condensers would hold together long enough to blast forth a mighty "QST" (meaning, "If anyone hears this, for Pete's sake let me know") on only Allah knew just what wavelenght!

So you wives of to-day, whose husbands have been sacrificed before the God of the Ether, and those of you who are just entering the Mystic Spell, take heed. Should there be a stranger in your midst some evening, who is a bit bored when you snap on the gold-plated switch of your highly polished living room radio set, and who acts queerly when some honey-voiced announcer purrs forth his silly twattle, pay him homage and deep respect — and *turn-off* the "music box." . . . For he is

One of the Ether Brotherhood,
An old-time pioneer;
He came with the first,
And, oh, how he cursed
The Static —
And it's still here.

(Without apologies)

Strays

The annual index to *QST* for 1931 (Volume XV) has been published as the second section of the December number, and sent to every member of the League. Newsstand readers may obtain a copy of this index for 4 cents in stamps.

The A B C of Formulas

By W. C. Ellis, W5CP*

THERE has been quite a bit said in the Correspondence Department of *QST* with regard to the technicality of the various articles presented. There are those who want as many such articles as possible each month. Then there are those who, frightened by the formidable array of formulas with which some papers are explained, have asked for more non-technical articles.

The average radio amateur has a distinct aversion for all articles wherein formulas appear. If we can but create an interest in the whys and wherefores of some of our most commonly used formulas we will have accomplished much towards a better understanding of the principles of radio and it is with this thought in mind that this article is tendered.

Let us take a few of these common formulas and investigate their origin.

INDUCTIVE REACTANCE

For example: One commonly used formula is the one denoting inductive reactance. This is written

$$X_L = 2\pi fL.$$

According to our definition, inductive reactance is the opposition to current flow offered by the inductance of a circuit and it varies directly as the frequency and the inductance.

Inductive reactance is represented by the symbol X_L where X is for reactance and L for inductance. The unit of reactance is the *ohm* and since this is the same unit as that of resistance it must mean the same thing.

A circuit has a reactance of one ohm when it allows one ampere to flow in the circuit due to a pressure of one volt. It can be written

$$\text{Ohms} = \frac{\text{Volts}}{\text{Amperes}} = \frac{E}{I} = X.$$

Therefore $E = IX$ (1)

and $I = \frac{E}{X}$, (2)

which is recognized as being similar to Ohm's Law.

*WFAA, Dallas, Texas.

The action of the inductance in a circuit is shown by the definition for the unit of inductance, the *henry*.

A circuit has an inductance of one henry when a change of current of one ampere in one second induces an average e.m.f. of one volt across the circuit. This may be expressed by the equation

$$E_{ave} = L \times \frac{I}{t} \quad (3)$$

Where

E_{ave} = average induced voltage.

L = inductance in henries.

I = change of current in amperes.

t = time of change in seconds.

This also can be stated as follows:

The e.m.f. induced in any circuit by a change in current is equal to the product of the inductance in henries and the rate of change in amperes per second.

In one cycle, as shown in Fig. 1, alternating current makes four complete changes:

1. From zero to positive maximum.
2. From positive maximum to zero.
3. From zero to maximum in opposite direction.
4. From this maximum back to zero.

In each change during the cycle the current rises from zero to a maximum or vice-versa. The frequency, f , is the number of cycles per second.

Since we know that there are four complete changes in one cycle of alternating current, and that the time of one cycle is equal in seconds to the reciprocal of the frequency in cycles per second or

$$\frac{1}{f} \text{ second,}$$

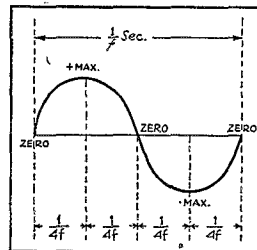


FIG. 1

the time for one change would be one fourth of that for one complete cycle or

$$\frac{1}{4f} \text{ second.}$$

The rate of current change in amperes per second is therefore equal to the total amount of change in amperes divided by the time in seconds of one change. The total amount of change is equal to the maximum amount of current. Therefore the expression

$$\frac{I}{t} \text{ must equal } \frac{I_{max.}}{\frac{1}{4f}}$$

Dividing, we get, $\frac{I}{t} = 4fI_{max.}$

Replacing $\frac{I}{t}$ by its equivalent $4fI_{max.}$ our original equation, (3), now becomes

$$E_{ave} = 4fLI_{max} \quad (4)$$

Therefore the average induced voltage across the circuit must equal four times the frequency in cycles, times the inductance in henries, times the current in amperes.

Since the average value of voltage is very seldom used we will solve for the maximum.

If we were to find all the instantaneous values of voltage or current during a cycle and average these values we could compare this average with the maximum value and it could be found to equal .636 of the maximum value. This holds true for all currents or voltages that vary in the form of a sine curve.

Therefore

$$E_{ave} = .636E_{max.}$$

Substituting, our equation becomes

$$.636E_{max} = 4fLI_{max.}$$

Dividing through by .636, we get

$$E_{max} = \frac{4fLI_{max}}{.636} = 6.28fLI_{max.}$$

Now $\pi = 3.1416.$

and $2\pi = 6.28.$

Therefore we can write the equation

$$E_{max} = 2\pi fLI_{max}$$

but, from (1), $E = IX.$

Therefore, $IX_L = 2\pi fLI,$ (Substituting IX_L for E).

Dividing through by $I,$ the final equation is found to be $X_L = 2\pi fL,$ (5), f and L being expressed in corresponding units.

Therefore the value of an inductive reactance in ohms is equal to 2π times the frequency in cycles, times the inductance in henries.

CAPACITIVE REACTANCE

Another formula commonly used is the one denoting capacitive reactance. The symbol for this is X_C where X is for reactance and C for capacity.

There are two equations expressing the charge in a condenser,

$$Q = EC$$

where $Q =$ amount of charge in coulombs,
 $E =$ voltage of condenser when charged,
 $C =$ capacity of condenser in farads;
 and $Q = I_{ave} \times t,$ times the time of charge.

Now, since the right hand expression in both of these equations is equal to $Q,$ we can write the equation for the charge in a condenser as

$$EC = I_{ave} \times t, \text{ } t \text{ being time of charge.}$$

As was found in our study of the equation for $X_L,$ there are four complete changes during every cycle. In this case we have two charges and two discharges of the condenser.

If the time of each cycle is $\frac{1}{f}$ second, then the time of one change would be equal to one fourth of this or

$$\frac{1}{4f} \text{ second.}$$

Now substituting $\frac{1}{4f}$ for t in our equation, we have

$$EC = I_{ave} \times \frac{1}{4f} = \frac{I_{ave}}{4f}.$$

We know that

$$I_{ave} = .636I_{max.}$$

Therefore,

$$EC = \frac{.636 I_{max}}{4f}$$

Cancelling,

$$EC = \frac{I_{max}}{6.28f} = \frac{I_{max}}{2\pi f}.$$

Since we are solving for $E,$ we divide through by C and the equation now becomes

$$E = \frac{I_{max}}{2\pi fC}.$$

But according to equation (1), $E = IX.$ Therefore

$$IX_C = \frac{I}{2\pi fC} \text{ (Substituting } IX_C \text{ for } E).$$

Dividing through by I we get

$$X_C = \frac{1}{2\pi fC} \quad (6)$$

X_C being in ohms, π being 3.1416, f being in cycles per second, and C being in farads. Therefore the value of a capacitive reactance in ohms is equal the reciprocal of 2π times the frequency times the capacity.

FREQUENCY AND WAVELENGTH

Now by taking these two equations, (5) and (6), just derived and combining them we get still another commonly used formula, that for frequency.

Going back to fundamental alternating current theory, we know that a condition of resonance in a series circuit is reached when the inductive reactance is equal to the capacitive reactance. This can be written in the form of an equation,

$$X_L = X_C,$$

or enlarging,

$$2\pi fL = \frac{1}{2\pi fC}.$$

We wish to solve for f , so by clearing our fractions we get $(2\pi)^2 f^2 LC = 1$

and, dividing through by $(2\pi)^2 LC$, $f^2 = \frac{1}{(2\pi)^2 LC}$.

Extracting the square root of both sides of equation we get

$$f = \frac{1}{2\pi\sqrt{LC}}.$$

It should be remembered that in all of these equations so far f , L , and C have been expressed in corresponding units.

Now we will take up the derivation of still another formula in this particular series, that for wavelength.

The fundamental equation for the wave length of any circuit is

$$\text{Wavelength} = \lambda = \frac{v}{f}$$

where v is the velocity of propagation of an electric field through space, usually expressed in meters per second, and f is the frequency in cycles per second.

Enlarging by substitution of equivalents, we get

$$\lambda = \frac{300,000,000}{\frac{1}{2\pi\sqrt{LC}}}$$

Simplifying 300,000,000 by the use of exponents we have 3×10^8 .

Dividing through by the fraction we now have $\lambda = 3 \times 10^8 \times 2\pi\sqrt{LC}$. $2\pi = 6.28 = 628 \times 10^{-2}$, so our equation now becomes $\lambda = 3 \times 10^8 \times 628 \times 10^{-2}\sqrt{LC}$.

Multiplying,

$$\lambda = 1884 \times 10^6\sqrt{LC}.$$

Since L and C are still in basic units (henries and farads) and these are by far too large for high frequency circuits, we will convert these units into micro-units; that is, into microhenries and microfarads. This can be done by multiplying each unit by 10^{-6} (dividing by one million).

Our equation now appears

$$\begin{aligned} \lambda &= 1884 \times 10^6\sqrt{L \times 10^{-6} \times C \times 10^{-6}} \\ &= 1884 \times 10^6\sqrt{LC \times 10^{-12}} \end{aligned}$$

We can only indicate the square root of L and C

but we can extract the square root of 10^{-12} , so our equation becomes

$$\lambda = 1884 \times 10^6\sqrt{LC} \times 10^{-6}.$$

10^6 and 10^{-6} cancel, leaving our final equation as

$$\lambda = 1884\sqrt{LC},$$

where L and C are in micro-units; that is, L in microhenries (μh), and C in microfarads (μfd).

From these few examples it can be seen that there is nothing very difficult about most formulas. All one needs to work some of our most complicated problems is a fair understanding of the elementary principles of alternating current theory and simple algebra—and a little common sense.

It is hoped that this article will encourage further investigations into the simplification of formulas generally used in the solution of radio problems.

The West Gulf Division Convention

THE fifth annual West Gulf Division convention held at the Hotel Huckins, Oklahoma City, Okla., September 11th and 12th, is now a memory, but all delegates carried away fond memories which we hope will have an influence on attending the next one. Mr. C. E. Bathe, second operator at W5QL, was master of ceremonies and was ably assisted by Harold Hartman, W5QL, and William Gentry, W5GF, the SCM for Oklahoma. A fine welcome was given the delegates by Mr. Geo. A. Davis, Vice-President, Oklahoma Gas and Electric Company. Radio Inspector Newcomb from Dallas was kept busy with examinations and 45 hams were made happy. Mr. Earl C. Hull, Chief Engineer of WKY, reviewed the development of "Sound Moving Picture Recording" and was followed by A. A. Hebert of A.R.-R.L. who brought along his dynatron frequency meter and spoke on the importance of becoming "frequency minded," and the absolute necessity for every amateur station having an accurate measuring instrument.

Herb Hollister, W9DRD, who made the trip from Merriam, Kans., proved that he knew plenty about the cutting of crystals. Capt. Walter Ellis, S.C. 8th Corps Area spoke for the army. Prof. F. G. Tappan, Director, School of Electrical Engineering, University of Oklahoma, entertained us with his "Reminiscences," taking us back to 1901 and how they demonstrated "spark" transmitters at county fairs in New York State.

Convention committees are realizing more and more that trips to points of interest are a good form of entertainment, and the visit to the New Ultra-Modern Arthur S. Huey 30,000-Kw. gas-burning electrical generating station of the Oklahoma Gas and Electric Company was most instructive. Several good contests were held and

(Continued on page 68)

Improving the Receiver Using a Screen-Grid Coupling Stage

By Howard R. Cassler*

THERE are certain disadvantages in the use of an "untuned" r.f. stage in the high-frequency receiver, as compared to a tuned r.f. stage, chief among these being loss in selectivity (already none too great with one lonesome tuned circuit), "cross talk" from local B.C. transmitters, high noise level, etc. Referring to Fig. 1 the usual method of tuned impedance coupling, we see also that the r.f. tube's plate voltage is across the tuning capacity, that there is possibility of d.c. leakage through the detector

be somewhat greater than that provided by the usual size tickler coil. This is accomplished by using a greater than usual number of turns

COIL TABLE

Band Covered	L ₁		L ₂		Tuning Cnd. Used
	Turns	Size	Turns	Size	
1750 kc.	65	36 s.s.c.	12	36 s.s.c.	Both sections
3500 kc.	34	30 s.s.c.	10	36 s.s.c.	" "
7000 kc.	20	28 d.c.c.	9	36 s.s.c.	Small section
14,000 kc.	9	28 d.c.c.	6	28 d.c.c.	" "
28,000 kc.	3	22 d.c.c.	3	28 d.c.c.	" "

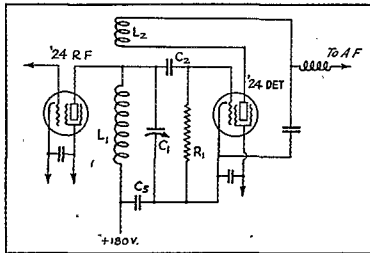


FIG. 1 — THE USUAL METHOD OF TUNED IMPEDANCE COUPLING

grid condenser, a loading up of the minimum tuning capacity, etc. All these have previously been pointed out. The logical method of improvement between the r.f. stage and detector of course is the use of the inductive coupling; but this ordinarily requires coils with three separate windings and coil forms with six prongs, whereas most of us now have four or five-prong forms.

Now the receiver circuit described here was developed with the following in mind: First, to improve the selectivity and signal to noise ratio; second, to provide "hard and fast" single-control tuning retaining calibration; third, to use four-prong tube-base coils.

The unusual feature of this receiver is the method of regeneration, using inductive coupling from a combined primary tickler coil, but with the tickler coil removed from the plate circuit and put into the detector screen-grid circuit and shunt fed (L_2 in Fig. 2). This leaves the tuned secondary or grid circuit free from any direct connection to the r.f. tube. (This is not exactly an original idea and due credit probably belongs to the designers of the new Universal Super Wasp which uses a somewhat similar arrangement.)

Now to obtain a reasonable transfer of energy the impedance of this primary tickler (L_2) should

For all coils L_1 is "close wound" with last few turns at top spaced to cover band. For L_2 , spacing between turns is approximately the diameter of the wire. The spacing between L_1 and L_2 is about $3/8$ inch, except for 28,000 kc. where adjustment may be found necessary. The older type (longer) bakelite tube bases will be required for the first three coils. All coils are made "hard and fast" with several coats of quick drying lacquer.

spaced somewhat further from L_1 and of rather fine wire, space wound. (See coil table.) It is important that as L_2 is increased the spacing from L_1 should be increased to keep the point of oscillation at the optimum value of about 22 volts on

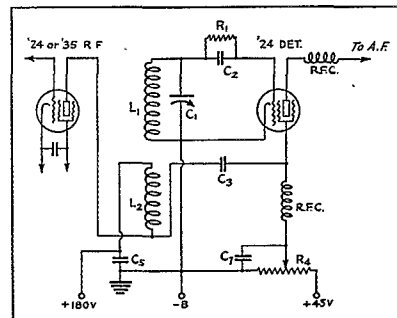


FIG. 2 — THIS CIRCUIT USES INDUCTIVE COUPLING WITH A COMBINED PRIMARY-TICKLER COIL IN THE DETECTOR SCREEN CIRCUIT

the detector screen grid. Right here we might wish that tube bases were just a wee bit longer and that the Type '24 tube did not oscillate quite so easily — which it certainly does in this circuit, no trouble at all being had in getting up to and above 30,000 kc. Further following this impedance matching idea, a Type '35 tube was used in the r.f. stage. The plate impedance of the '35 is about half that of the '24, and a noticeable gain did re-

*306 W. 19th St., Pueblo, Colo.

sult. A '35 tube in the detector stage seemed to make no difference.

A word might be said about the by-pass C_3 . Its value should not be greater than the $40\mu\text{fd}$. shown. Even smaller values gave slightly better

all other wiring beneath in the usual manner. The two r.f. chokes are mounted below the sub-panel as close as possible to their respective socket terminals. The resistor R_5 across the primary of the series-connected audio transformer was used

to suppress fringe howl before the set was changed over. Although now not essential for this purpose it was left in because it improved the quality of phone signals. R_6 and R_7 furnish grid bias for the '27 and '47 tubes respectively. C_8 and C_9 have little effect on the output; no a.c. hum is noticeable with either phones or loud speaker. Incidentally, headphones are not used with a '47 tube in the output stage!

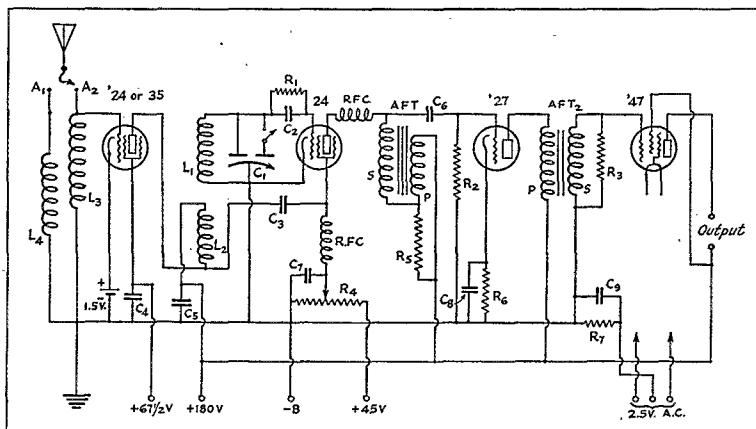


FIG. 3—COMPLETE CIRCUIT OF THE RECEIVER

- C_1 —Remodeled $150\mu\text{fd}$. S. L. F. variable split stator. Large section has two plates, small section one plate. Rotor has three plates. All plates double spaced.
 C_2 — $100\mu\text{fd}$. grid condenser.
 C_3 — $40\mu\text{fd}$. blocking condenser.
 C_4, C_5, C_6 — $.006\mu\text{fd}$.
 C_7, C_8, C_9 — $1.0\mu\text{fd}$.
 R_1 —3 megohms.
 R_2 —1 megohm.
 R_3 —.25 megohm.
 R_4 —50,000-ohm potentiometer; regeneration control.
 R_5 —10,000 ohms.
 R_6 —2000 ohms.
 R_7 —1000 ohms.
RFC—Choke.
AFT₁—Coupling impedance—audio transformer with windings connected in series.
AFT₂—Audio-frequency transformer.
 L_3, L_4 —Next larger coil above L_1-L_2 .

results, except, strangely enough, at 28 mc. In general its size should be kept down to where smooth regeneration results over all the bands to be covered. It goes without saying that both C_3 and C_5 should be high grade mica condensers; for instance, a certain .01- μfd . paper condenser at C_7 resulted in a bad dead spot somewhere about 6800 kc. A beautifully smooth regeneration control resulted with a $100\mu\text{fd}$. midget variable "throttle" at C_3 . It did affect the tuning, however, and was not used.

Other experiments were tried with tuning the grid circuit of the r.f. stage, but even though interlocking was at an absolute minimum, the extra gain did not seem to justify an added control. In this case the antenna was switched to the post "A" and L_3-L_4 wound identical to L_1-L_2 .

The final receiver circuit is shown in Fig. 3. Photos are not available but the mechanical details are much the same as most ham receivers. The receiver is completely and heavily shielded using all-aluminum shields, panel and sub-panel, with sub-panel tube sockets. As much of the r.f. wiring as possible is kept above the sub-panel and

tube noises, the detector hiss being down fully 50%. We haven't figured it out in db.

This drop in tube noises leads us to consider this circuit as the familiar separate detector and regenerator with their common grid circuit. The plate corresponds to the usual detector plate and the detector screen grid takes the place of the oscillator or regenerator tube plate. Incidentally, the detector plate voltage in this circuit can be dropped to as low as $22\frac{1}{2}$ volts with practically no effect on the regeneration. For full signal strength, however, the recommended 180 volts are used.



H. A. Morris, W4KZ, disputes G6WY's claim in October *QST* to the distinction of being the only amateur in the world possessing the initials H.A.M. W4KZ also claims that he can go G6WY one better because he formerly worked for Armour and Co. and counted hams all day as well as talked to them all night!

The Crystal Monitor

A Multi-Frequency Crystal-Controlled Oscillator

By John L. Reinartz, W1QP, NDF*

SOMETIMES we wish for things hard enough to beg, borrow or steal them; then again they just don't exist and cannot be obtained that way. And when a thing just hasn't been done — we go and do it.

At W1QP it is necessary to have good frequency measuring equipment, and while 100-kc. spacing from a standard is not so bad for checking a frequency meter, 6.25-kilocycle spacing is just

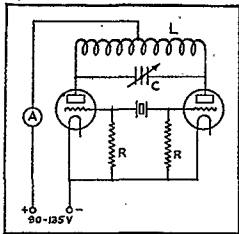


FIG. 1—CONVENTIONAL PUSH-PULL CRYSTAL OSCILLATOR CIRCUIT

Using a split stator condenser and center-tapped coil tuning to 1000 kc., the frequency of the crystal used in the monitor. The tubes may be '99's, '01-A's or any small receiving types.

that much better. So said I to myself nearly a year ago and, since it now is an accomplished feat, maybe some others would like to do likewise.

We all know that given a 1000-kc. crystal we can get harmonics at 1000-kc. intervals and we proceed to do just that, with the circuit of Fig. 1, using two tubes in place of one because the necessary adjustments can be made more readily with this type of circuit. All that is required is to adjust the tank tuning condenser so that the circuit will oscillate at the crystal frequency. We then listen to the 1000-kc. fundamental frequency or any harmonic of 1000 kc. that may be required for our purpose. These harmonics can be plotted on graph paper for reference just as if we were going to calibrate a dynatron frequency meter and had only points 1000 kc. apart to jot down.

So far so good. "Now then," thought I, with pipe well stuffed and well started, "let's go into executive session with the Old Man, the Young Squirt, and Final Authority, and see why a crystal should be allowed to deliver output only at its fundamental frequency and harmonics thereof. Hmmm — harmonics; isn't that just what we are after — only more finely divided? And don't we get them with two oscillating circuits just that many 'harmonic multiples' apart? That's it! Two circuits, each oscillating, and the difference a multiple of the fundamental frequency!"

It pays to be inquisitive. We start our circuit

* 176 Wadsworth, South Manchester, Conn.

(Fig. 1) to functioning just as if it were a regular oscillating circuit with the frequency depending on the adjustment of the tuning condenser, leaving the crystal connected just where it should be if it were controlling the frequency. We merely add to the circuit a capacity from each plate to the grid of the other tube, as shown in Fig. 2. We now carefully tune from low to high frequency and watch the plate milliammeter. As we approach the frequency of the crystal we notice that the meter dips but that the adjustment which causes this dip is rather easy to pass over. As we continue to go to a still higher frequency we find more such dips. Now the first one was at the crystal's fundamental frequency while the subsequent ones were due to the oscillator beating with a harmonic frequency of the crystal.

But all this is of no help to us as yet, because we did not have our receiver going to find what was going on in the oscillator. So we start up our receiver, having the oscillator working on one of those spots where the meter dips due to the crystal being in resonance with the oscillator at

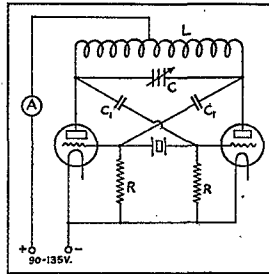


FIG. 2—THE CRYSTAL MONITOR CIRCUIT

It is the same as Fig. 1 with the addition of the two condensers marked C₁. These are 100 μ fd. each, and may be ordinary mica receiving condensers. L and C are the same as in Fig. 1, the only requirement being that they will cover a small band of frequencies in the neighborhood of 1000 kc. The grid leaks,

R, will be between 01. and 2 megohms, depending upon the beat-note spacing desired, as explained in the text.

one of its harmonics; but instead of hearing a beat note only at multiples of the crystal frequency we hear these beat notes at every few degrees on the tuning dial of the receiver. However, if we have reference marks on the receiver dial at points 100 kilocycles apart we can count the number of beat-note points we have in 100-kc. intervals and tell in that manner how many kilocycles each point is removed from the next. For instance if we find fifteen beat note points between any two consecutive 100-kc. points (seventeen points in all) we know that each small step means 6.25 kilocycles. We can proceed now to plot these on our cross-section sheet as fill-ins between the 100-kilocycle marks, giving

us a much smoother curve than we could possibly get otherwise.

We also can control the number of beat notes between any two reference marks. The oscillator can be so adjusted that beat notes are obtained

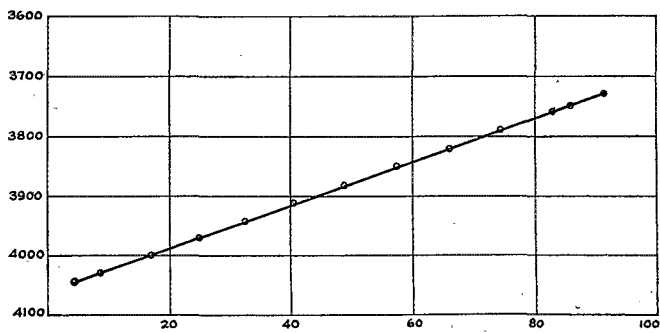


FIG. 3 — A SAMPLE CALIBRATION CURVE

Of a receiver, showing plotted points taken from beats furnished by the crystal monitor, using a 1000-kc. crystal.

spaced 25 kc., 30 kc., 40 kc., 50 kc., 75 kc., or about anything at will. This is accomplished by changing the grid leaks; the higher the resistance (the higher the bias) the more distortion and the greater the number of harmonics; the lower the resistance the smaller the number of beat notes.

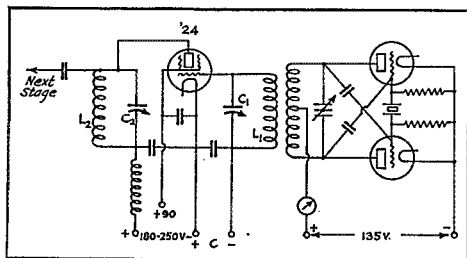


FIG. 4 — A SUGGESTED WAY OF USING THE CRYSTAL MONITOR TO CONTROL A TRANSMITTER

The monitor circuit and constants are exactly the same as in Fig. 2. The tank circuit formed by L_1 and C_1 is tuned to the frequency on which the transmitter is to operate; i.e., if the desired frequency is 3750 kc., L_1 - C_1 would be tuned to that frequency. L_1 is coupled inductively to the monitor tank coil. L_2 - C_2 would be tuned also to 3750 kc., and the output of the '24 tube shown would be fed to another '24 in the conventional way. The second '24 should have enough output to excite a Type '10 neutralized amplifier to rated output. Each stage should be carefully shielded from the other to prevent feedback and any tendency towards self-oscillation.

Mr. Reinartz has used a similar scheme to excite a transmitter at a large number of frequencies in the 3500-kc. band, with, however, a neutralized '99 and '01-A to excite the Type '10 amplifier. With '24's there should be no necessity for neutralization. Good shielding is essential in any case.

So far we have mentioned only that the monitor can be used for checking a receiver or frequency meter; but another possibility is that a single 1000-kc. crystal might be used to control a

transmitter on any one of a number of frequencies within quite wide limits, since the beat notes extend upward from the crystal fundamental frequency — as from 1000 kc. to infinity — and a point may be chosen wherever desired within

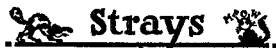
a band allocated to amateurs. Needless to point out, it would be necessary to use as much care in shielding as you ordinarily would so that feed-back is negligible. The method of taking energy off the crystal monitor does not differ from the ordinary, a coupling coil only being required. It will be necessary, however, to work into a system which requires little excitation power and then into a larger system, using tubes of the smaller sizes in each case. A suggested arrangement is shown in Fig. 4.

Who says it can't be done?

A word of advice is in order. When tuning the monitor to a frequency for which you have set your receiver dial, say 4000 kc., the fourth harmonic of the crystal, tune the crystal monitor very carefully so that the beat notes coincide before using the intermediate beat notes to check a frequency meter. Why? Because if you are off 100 cycles at 4000 kc. you will be off 1000 cycles at the tenth beat note point. If the points are 30 kc. apart, for instance, then you are off 1000 cycles at 4300 kc., the actual frequency being 4301 or 4299 kc., depending on whether the 100 cycles was high or low. If you have worked carefully the difference in beat notes usually is only a few cycles and can be depended upon to stay constant. A little playing to get acquainted with the device is all one needs. It should make a very valuable addition to the amateur's outfit and it is hoped will help him to stay within the bands.

The writer wishes to thank F. D. Bliley of the Bliley Piezo-Electric Co., Erie, Pa., for furnishing test crystals so that he could be sure crystals of both the Y and X cut would function as described.

After being out of print for some time, I hope that this effort will meet with the approval of the newcomers as well as the old timers.



Bureau of Standards Research Paper No. 342, "Design of Standards of Inductance and the Proposed Use of Models in the Design of Air-Core and Iron-Core Reactors," contains a great deal of data on inductances, particularly the air-core type, which will be useful to engineers and experimenters. It can be obtained from the Superintendent of Documents, Washington, D. C., for fifteen cents per copy.

In the Field With IPH

By Bertram Sandham, W6VO*

WHAT a vicious look we gave those rugged and forbidding mountains that lay to the leeward of the French liner as its bow tossed the miles aside between Los Angeles harbor and El Salvador. Beautiful indeed with its cities buried in the mists of antiquity, but what an obstacle it all offered to the progress of our expedition! I chose to have my cabin on the weather side of the vessel.

The first expedition which set out last year to explore the tentative route for the International Pacific Highway, which will ultimately reach from Alaska to Buenos Aires in Argentine, had sufficient troubles making progress over the ox-cart trails and boulder strewn terrain, but it now seems a pleasant vacation trip when paralleled with the vicissitudes that the party encountered on the second expedition which began its trek from Mexico City January 25th and ended at La Libertad, El Salvador, May 1st.

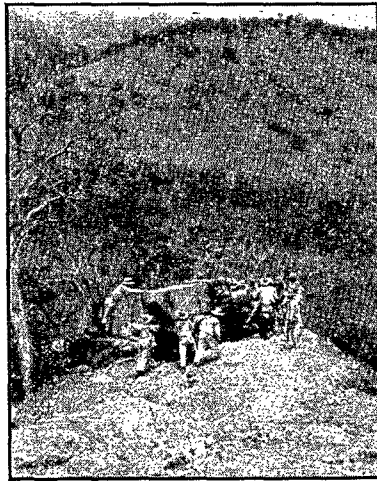
The radio layout on this second trip was a vast improvement over that of the first — at least in the physical make-up and added convenience. As was the case with the first expedition, little advance notice was given for preparation for the journey. The equipment was finished and installed only a few hours before the expedition departed, and IPH was not on the air until we were in the field. On the extreme right in the photograph is the transmitter, a 50-watt tube in a t.p.t.g. circuit. The power supply rests in its bin in the upper left hand corner and is one of the new products of Ralph Heintz' genius. This engine generator unit furnishes 52 volts at 350 cycles as well as 10 volts for the filament. This 400 watt machine is driven by a two cycle single cylinder engine and runs as high as 4000 r.p.m. The unit weighs but 31 pounds complete. Below the engine compartment is the frequency meter, and to the right of this the receiver using three N tubes. The other compartments carry coils, vibroplex and other parts. Forty and twenty meter Zepps were carried on a reel and hung to anything that offered a support. Sometimes a tall

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building in a city offered an almost vertical antenna while at other QRA's it was impossible to suspend it higher than ten feet above ground; but it seemed to get out just as well even so.

The infernal inquisitiveness of the natives is the biggest bugaboo for the operator on such a trip as this. The radio car must be near a street or road in the city and its array of instruments quickly gathers the dark-skinned lads and men who are nearby, while the racket made by the engine thoroughly advertises the QRA to those not

nearby and they come running like magic. At Tehuantepec, in southern Mexico, some ambitious fellow started the game of "tapping." This consisted of tapping someone else in the crowd and quickly withdrawing the hand while the victim looked around in amazement to learn who had struck him. The progress of this game grew like a sunflower with everyone tapping someone else harder as time progressed. In a few moments they were falling all over the radio car bumping against me as I was QSO a W9. A member of the party happened by and came to my assistance by rushing to the mayor's office and returning with soldiers. The excitement even brought the Mexican federal inspector to the



THE AUTHOR (EXTREME LEFT) KEEPING THE RADIO CAR FROM STARTING BACK DOWN THE MOUNTAIN AS A BUNCH OF INDIANS TURN IT AROUND

scene who asked to see my permit for using a radio transmitter in Mexico. Following the QSO I had to conduct him to our hotel where among a ream of permits for motion pictures, firearms and what not, I showed him the paper permitting the radio work. He read this and left in great disappointment thinking that he was indeed about to make a big haul.

While camped for the night in a dense jungle we had no other choice than to camp with a forest fire as our next door neighbor. This burned slowly however, consuming dried leaves and dead trees. A dead tree nearby was silently burning inside (unknown to us) and suddenly, as I was QSO W9EUV, the tree toppled over missing the radio car by several yards and filling the air with ashes and smoke that made the completion of the QSO a very difficult task.

After departing from the city of Juchitan, we were proceeding slowly over a narrow sunken ox-

cart trail that was grinding the rubber off the tires like an emery wheel. A guide whom we had employed in this city rode in the first car with the engineer. The cars were running about 300 feet apart due to the dense dust when suddenly the guide appeared through a dust cloud holding his revolver in his hand and running back toward the city as fast as his feet would carry him. He shouted "Hold-up" in Spanish as he passed our car. I stopped instantly and started to open a compartment for my pistol when my riding companion shouted to leave it there as we were covered. The brush along the road was filled with rebel bandits with rifles and bandoliers of ammunition. We were ordered to drive up to the other cars where the leader was ordering them looted. Our interpreter however, talked with the leader at length, and we were fortunate to lose only a few articles which the bandits were in immediate need of. These consisted of a case of sardines, flashlights, ammunition, cigarettes, matches, etc. I was thankful no part of the radio equipment was taken for the reason that I might have to remain behind to teach "his nibs" the code. Some of the members of the expedition were hazarding the thought that the bandits might follow us and attack again while we were in camp. I added that they surely would if they ate any of the sardines in the meantime. These we had purchased in Tehuantepec and they were terrible. Our camp that night was made with a minimum of equipment and we slept with our clothes on.

IPH was not on the air daily as on the first expedition. QSO's were had from the principal cities and camps, but more amateurs were con-

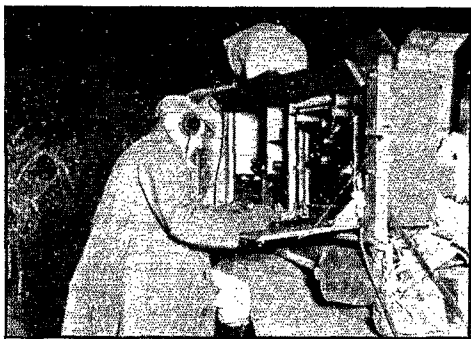


Photo by C. W. Martin, Los Angeles Times
LIKE SHELLING PEAS: WORKING A W9 WITH WOOLEN GLOVES IN EXTREME COLD AT AN ALTITUDE OF 10,000 FEET

tacted than on the previous trip. Very favorable signal reports were usually given, IPH being rarely less than R6, several adding that the sigs compared favorably with those of XDA. All districts except sixth and seventh were heard each time on the air. The hours available for radio

work seemed to be those when west coast signals were not coming through.

Operating a radio transmitter on this type of an expedition, where there is a different QRA nearly every day, is not what it is cracked up to be. In the jungle it is no easy task to keep the car near camp and also have the Zepp hanging in a reasonably clear space. The best tree was usually on the other side of the river, necessitating the use of hip boots. In the small villages there were but one story buildings. In the deep canyons, heavy mineralized cliffs reduced signals to a whisper. The exhaust of the engine usually prohibited



WEEKS WERE SPENT CUTTING TRACKS FOR THE EXPEDITION IN JUNGLES SUCH AS THIS

copying signals that were less than R5 although the engine was placed on the opposite side of the car at the end of a 25 foot cable. Added to this, the operator drove the radio car — I mean tried to drive it. Boulders half the size of the car covered the path, while the sides of mountains had to be scaled with 40 Indians pulling on a tow rope. Then we had to wash our own clothes, put up and dismantle camp, work on the cars, etc. A mosquito head net was necessary while QSO on the transmitter as well as oil being rubbed on the back of the hands and neck. A small fire was also kept running to keep the mosquitos, gnats and a thousand other varieties of bugs at bay.

Skip and fading were continuously bad. Daily business was left hanging on the hook many times due to this annoyance. One member of the expedition interested himself with this phenomena and concluded that if the flat top of the Zepp had an acute bend in it, the signals would be sent out in such a ghastly form that Mr. Skip would hide when he saw them coming. To keep peace in camp the Zepp was hung the following day with an acute hump in it, and lo! sigs were R8 and no skip. This was no break for me. I had to tell him that; it was worse than ever.

About 15 miles were driven along the railroad right of way over mahogany ties that were anything but straight. More than a dozen railroad

bridges were utilized to cross rivers too deep for fording. The brakes on one of the cars locked as it endeavored to climb up over the rails onto the bed with a train due in 15 minutes. The mechanic hurriedly disconnected all of the brake rods but not before the train came hustling down the line. It stopped within a few feet of the car while the engineer shook his fist from the cab window.

The passage of the cars from the city of Oaxaca to Tehuantepec, a distance of seventy miles, consumed fifty days, the party working every day including Sunday to move the cars over the 40 percent grades in the mountains. The Tehuantepec River was crossed 88 times in 17 miles, about every third crossing requiring block and tackle.

Rain governs the length of time that the expedition can remain in the field. Rains began falling when we entered the republic of El Salvador so we headed for the nearest port (La Libertad) and the cars were lightered out to the vessel and we headed for home. A torrential downpour caught us high in the mountains among the coffee plantations and, even though we used chains, the day will remain indelible in my memory. Using low gear as a brake down a steep grade the front wheels refused to respond to the steering wheel as I came to a curve. The front wheels went over the cliff while the right rear fender struck a coffee tree tearing the fender away from the running board but holding the car back from a 1500 foot dive down to the river.

The political situations in Honduras and Nicaragua will strongly govern the plans of the expedition for the third trip, which normally would depart again next January to pick up the thread of the trail at El Salvador and proceed to Panama if possible. Several hundred miles of jungle in Costa Rica must be progressed through which there is not a vestige of a trail today.

Radio conditions for short wave transmission and reception between southern Mexico or Central America and the Sixth U. S. District during our spring months is atrocious. It proved so on this trip. An occasional QSO of the usual variety was sandwiched in several times, but to get several hundred words of press for newspapers and other messages off the hook daily is out of the question. Several operators in the sixth district have related to me since my return to civilization that they had heard operators in the ninth district give IPH R7 and R8 copying me single, but the sixes in question were unable to hear my signals at all, hunt and twist the dial as they might even though they knew I was on the air at the moment. However, there was not a single exception encountered when an amateur was contacted that he did not stand ready to take press and other messages and forward them. Many, no doubt, did not handle traffic as a general rule but all were ready to help IPH. One cannot realize what this means until buried in the

jungles or high in the barren mountains in terrific heat and has the amateurs to depend upon to move the business. I want to offer my sincere thanks to all of them. Here are the stations with which successful contacts were made: W9BPL W6EW W6DK W4AEV W8BOJ W9UM W8BJX W9CES W5BOL W2AHZ W1KM W8BUM W1ZZ OA4V W4AEM W4AJD W4LM W8DNO W7AAT W5AB W6CYR W8ANO YN2XUF W5YW W6EPH W5AGG W4AEL W4ABS W4BC W2BO NJ2PA W4SR TI3XA W9YL W5CE W6BKL W6DZD W6AHP W5HA W5VQ CM1BY W9ID W4AKH W8BF W3JM W5QL W8BF W5LB W2BAK W2AHZ W9ETA W9EUU W4ALD W2DB W9DFT CM1EM.

Silent Keys

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

Earl M. Gue, W4AU, Atlanta, Ga.

John Hallein, W1QN, W. Springfield, Mass.

E. H. W. Jenkins, G6HJ, London, England.

John Lippert, ex-8AQ, Lakewood, Ohio.

W. C. Mock, Berkeley, Calif.

Harold M. Pfeil, W7ARJ, Billings, Mont.

Julius Poston, W4DP, Bay Harbor, Fla.

W. T. Watkins, VK7DX, Hobart, Tasmania.

C. J. Zum Brunner, W2BBL, Woodside, L. I.

Strays

The "9th District Barnyard Club" is progressing nicely, according to latest reports. The membership now includes W9COW, W9HAY, W9EGG, and W9HEN. Are there any more candidates?

Here's a QST overheard by W3QV one evening recently: "QST de W— Sept. — Will somebody please send me two good 45-volt "B" batteries on credit pay you after this world depression ——— Am anxious to resume my traffic skeds which I cannot until my receiver gets some B juice stop Hope I am not asking for much and thanking you in advance I am W——"

As QV says, something ought to be done about this!

W6RJ licked his pet power leak and QRN by adding another stage of a.f. to his receiver and copying with his cans on his cheek bones. Mac says, "Be kind to your ear drums!"

Good Insurance—S. F. Transmissions

OPERATOR'S License Suspended," "F. R. C. Revokes Amateur Station License," "More Amateur Station Licenses Revoked"—these are pregnant headings to terse tales of woe, reported almost monthly in *QST*'s Communications Department, probably overlooked by all but dyed-in-the-wool traffic handlers. Rude interruption to the activity of some careless amateur is the story behind each of these brief official reports, sometimes more than just temporary interruption, too. Although the reports cite various infractions of the regulations, *almost every one includes operation outside the amateur bands as a prime violation.* We quote from a typical example:

"FINED FOR OFF-FREQUENCY OPERATION"

"Harmon Ogden Winston (W1BCV) paid a fine of \$500 in the Federal Court at Boston, July 22, 1931, on his plea of guilty to operating amateur radio station W1BVC (New Bedford) outside the frequency band allocated to operators of amateur stations by the Washington Convention. On conviction of this violation of F. R. C. General Order No. 84 (the amateur regulations) Winston was not only assessed \$500 but the radio set located at 98 Austin St., New Bedford, Mass., was confiscated in accordance with the court decree."

Perhaps this case is extraordinary. Perhaps to be caught at all is unusual. But there are ten U. S. Department of Commerce Monitoring Stations continually combing the radio spectrum in general, and the territory outside the amateur bands in particular; and no band-jumper has any guarantee that he can go unheard. The best insurance is to do what these luckless fellows failed to do: Possess, as the most valued equipment in the station, a well-made frequency meter and monitor. Make regular calibrations from the standard frequency transmissions. Take no chance of losing your amateur privileges when to safeguard them is so easy. Here are the standard frequency schedules that wind up this year and give a good start on the next.

DATES OF TRANSMISSION

Dec. 4, Friday	BB	W6XK
	B	W1XP
	A	W9XAN
Dec. 6, Sunday	BB	W9XAN
	C	W6XK
Dec. 11, Friday	C	W6XK
Dec. 13, Sunday	C	W1XP
Dec. 18, Friday	A	W1XP
	B	W9XAN
	B	W6XK
Dec. 23, Wednesday	BB	W1XP
	B	W9XAN
	A	W6XK
Dec. 26, Saturday	BX	W6XK

Dec. 27, Sunday	C	W9XAN
Dec. 30, Wednesday	BB	W6XK
	B	W1XP
	A	W9XAN
Jan. 3, Sunday	BB	W9XAN
	C	W6XK
Jan. 8, Friday	C	W6XK
Jan. 10, Sunday	C	W1XP
Jan. 15, Friday	A	W1XP
	B	W9XAN
	B	W6XK
Jan. 22, Friday	BB	W1XP
	B	W9XAN
	A	W6XK
Jan. 23, Saturday	BX	W6XK
Jan. 24, Sunday	C	W9XAN
Jan. 29, Friday	BB	W6XK
	B	W1XP
	A	W9XAN
Jan. 31, Sunday	BB	W9XAN
	C	W6XK

STANDARD FREQUENCY SCHEDULES

Time (p.m.)	Friday Evenings Schedule and Frequency		Friday and Sunday Afternoons Schedule and Frequency		
	A	B	Time (p.m.)	BB	C
8:00	kc.	kc.	4:00	kc.	kc.
8:08	3500	7000	4:08	7000	14,000
8:16	3550	7100	4:16	7100	14,100
8:24	3600*	7200	4:24	7200	14,200
8:32	3700	7300	4:32	7300	14,300
8:40	3800				14,400
8:48	3900				
	4000				
Saturday Morning Schedule and Frequency					
Time (a.m.)	BX				
				kc.	
		4:00		7000	
		4:08		7100	
		4:16		7200	
		4:24		7300	

* W6XK transmits 3650 kc. instead because of local interference on 800 kc. from fourth harmonic of 800-kc. transmitter.

The time specified in the schedules is local standard time at the transmitting station. W1XP uses Eastern Standard Time, W9XAN, Central Standard Time, and W6XK, Pacific Standard Time. Schedule BB transmitted by W1XP is intended particularly for European amateurs and starts at 2100 G.C.T. Schedule BX is transmitted especially for amateurs in Oceania and the Far East. It is transmitted starting at 1200 G.C.T. by W6XK. Reports on these special schedules are particularly desired, not only from overseas hams but from those in the Americas.

Although the frequencies of the transmitting stations are not guaranteed as to accuracy, every effort is made to keep to within 0.01% of the announced frequencies.

(Continued on page 66)

EXPERIMENTERS' SECTION

A Winding Machine for Spaced-Turn Chokes

By W. H. Heathcote, ZT6X

SPACE-WOUND chokes are made easily if one has a screw-cutting lathe, but these expensive items seldom form part of a ham's equipment. The following description of a machine for winding spaced chokes will, I trust, be of assistance to hams not in possession of lathes. Most of the material will be found in the junk box of the average ham, but even if all the material has to be purchased the cost would be negligible. Since spacing the windings decreases the distributed capacity of a choke and — more important — raises the breakdown voltage at the end turns where the voltage per turn is always highest in a transmitter of any power, the time spent in making the machine is well worth while.

Referring to Fig. 1, it will be observed that a traverse motion of the choke form along the horizontal rod is obtained when the handle is

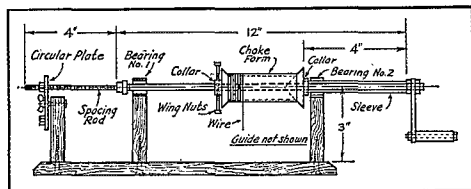


FIG. 1

turned in a clockwise direction. The nut soldered to the circular plate through which the threaded spacing rod screws moves the choke form along, the number of turns per inch being dependent upon the number of threads per inch on the spacing rod.

A piece of wood approximately 16" x 4" x 1" will serve nicely as a baseboard, and to this two blocks of wood to carry the bearings are screwed; these are 2 3/4" (in height) by 3" x 1 1/2". One is fixed about a half inch from the edge of the board and the other 8 inches away from the first one. Another block of wood 2 1/2 inches in height, also 3" x 1 1/2", is mounted 4 inches distant from the second block, and to this last block the circular plate is fixed. The main shaft is a piece of rod 12" in length threaded a half inch at one end and 1 1/2" at the other. The purpose of the sleeve (see Fig. 1) is to enable the choke form to be inserted and removed with a minimum of trouble. If the main shaft is released from the socket on

which the spacing rod is soldered, it is only necessary to unscrew the wing nuts on the collar and the main shaft can be instantly withdrawn,

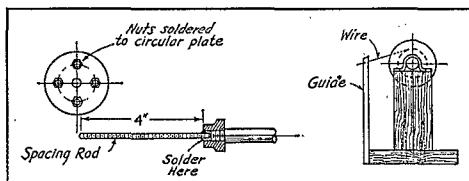


FIG. 2

thus releasing the choke form. The sleeve is 4" in length and of sufficient diameter to allow the main shaft to pass through freely. A collar about 3/8" in length is soldered over the end of the sleeve nearest the conical disc. Without this collar the tubing is likely to cut into the conical disc if it is made of hard rubber or other soft material, especially if a thin tube is used for the sleeve.

The bearings are both 1/2" in length. No. 1 can be a piece similar to that used for the sleeve. No. 2 will have to be large enough in diameter for the sleeve to pass through. The bearings are soldered to brass "saddles" and screwed to their respective bearing blocks.

The spacing rods are four inches in length. An assortment of rods with different thread pitches will allow a choice of different spacings between turns. One end of each rod is soldered to a socket (which may be made from an old binding post) as shown in Fig. 2. Care should be taken to see that sufficient space is left, after soldering the rods to the sockets, for the main bearing shaft to screw firmly in the socket. A simple way to insure this is to screw a piece of wood halfway through the socket, place it upright in a vise and after centering the spacing rod in the socket run the solder into the surrounding cavity.

The circular plate is a disc of 10 gauge brass 3" in diameter. Holes slightly larger in diameter than the spacing rods are bored a half inch from the center. Through the center bore a hole to enable the plate to be held in position by means of the small bolt and wing nut on the block of wood on the baseboard. Solder nuts corresponding to the gauges of the spacing rods over the holes already bored for that purpose.

The handle is very simple and needs little description. A nut is soldered on the side nearest

the sleeve. The one shown on the outer side acts as a locknut. The collar is about $\frac{1}{4}$ " in thickness with holes bored and tapped at opposite sides for the wingnuts. The guide (Fig. 2) can be made either of wood or hard rubber. Notches are made with a file every $\frac{1}{8}$ " or $\frac{1}{4}$ " along the top for holding the wire steady when the winder is in operation. The conical discs can be made of tin, hard rubber or wood.

The machine as described above will only make a winding 3" in length. Two chokes could be wound and placed in series if it were necessary to wind a choke on a form greater than two inches in diameter. Hard rubber or fibre tubing cut into 4-inch lengths is used by the writer as choke forms. After the shaft, discs and choke form have been placed in position the wing nuts on the collar are tightened up and on turning the handle pressure on the sleeve will center and tighten up the form, after which the locknut at the handle end of the rod can be fitted.

When winding chokes of say 100 turns, to decrease the distributed capacity it is a good idea to use a spacing rod with about 50 turns to the inch and after winding 25 turns remove the wire to the next notch cut on the top of the guide. The same procedure is followed after each 25 turns wound; the result being a spaced choke with additional spaces between sections.

A number of improvements will suggest themselves to hams; in fact I have made several myself, but to make things as clear as possible I have shown and described the machine originally built.

BETTER FILTERING

Many amateurs do not realize that there is often a real advantage in the use of tuned filter circuits for power supplies, since the amount of inductance and capacity necessary for a given degree of filtering is much less than that required in the more common filter arrangements. Here is some interesting information from Franklin Offner, W8AJZ-W9FTO:

"A few days ago I was working with W3AH, measuring the ripple voltage from various con-

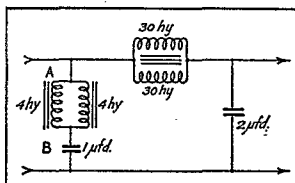


FIG. 3

denser-choke combinations. The ripple voltage was measured with a one-ma. rectifier-type voltmeter in series with a 2- μ fd. condenser. Our results, though only an indication of what can be

done, lead me to believe that hams can do a lot better than merely pile on the microfarads and henrys in single or multiple section filters.

"We tried various combinations of the following: a 1- μ fd. condenser, a 2- μ fd. condenser, an RCA double 30-henry 80-mil choke and a couple of Stromberg-Carlson 250-mil 4-henry chokes (43¢ each) all used simply because they were available. With the best combination of chokes in the brute-force arrangement using 1 μ fd. on the input and 2 on the output, the ripple was around 6 volts, from a 550-volt (each side) transformer, full wave, at 100-mil load. Then the circuit of Fig. 3 was hit upon, and the ripple voltage output from this combination was only 0.8 volts.

Evidently the two 4-henry chokes and the 1- μ fd. condenser were series resonant, since either adding to or subtracting from capacity or inductance caused a large increase in ripple output. It is probable that by varying the values of the condenser and choke in the series resonant

portion better filtering would be obtained and also by more careful adjustment of the inductance of the choke, "A," possibly by using one with variable air gap, in order to make the combination resonate at exactly 120 cycles. Obviously the choke used at "A" may be of low current-carrying capacity, since it carries no

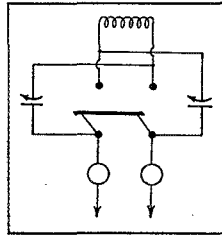


FIG. 4

d.c. This point is the big advantage of this circuit over one using tuned traps in series with the output — that is, the chokes carry no d.c. and therefore their inductance does not vary with the load drawn.

"We intend to do more work on this circuit, and would appreciate hearing from anyone else trying it."

FEEDER SWITCHING

In the October Experimenters' Section two diagrams were shown for switching feeder condensers from series to parallel, in one of which, Fig. 7, a connection was unfortunately omitted. The right-hand feeder should be connected to the right-hand switch blade; if this is not done the diagram will not work when the switch is thrown to the "parallel" position.

Several letters were received from readers who caught this mistake, with Clem Wolford, W8ENH, and Robert A. McConnell, W8FJ, both suggesting a switching arrangement which is quite the simplest we have seen. Fig. 4 is the diagram. The switch is a double-pole single-throw affair, the condensers being in series when it is open and in parallel when closed.

AMATEUR RADIO STATIONS

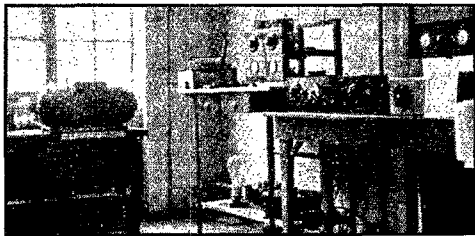
VE2CP—The McGill Radio Association, Montreal, P. Q.

By John Stadler, VE2AP

THE story of amateur radio at McGill University goes back nearly to the time when all of us were dressed in shorts and sailor hats. Rather than disturb the old records let us just mention that once upon a time the call was 10AU and then 2BJ. I have never known 10AU and neither have any of the present gang, but some of us are privileged to have known 2BJ. Suffice it to say that it was long ago.

VE2CP really has no complicated and extensive apparatus to boast about. A station description would be amazingly short when sticking to technical details, but the story of how the present outfit came to be would be very interesting were it possible to record the heart pangs and anxiety of the originators of the present station.

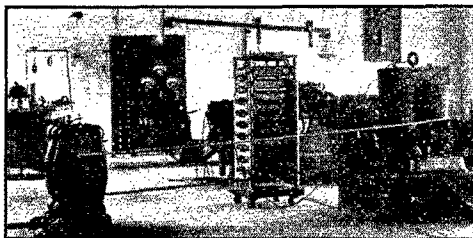
The location is in the d.c. lab of the Engineering Building. The partition separating the radio shack from the very "terre-à-terre" direct current equipment was donated by the Electrical Department. As a matter of fact, had no assistance been given by the Department in furnishing panels, rheostats, etc., possibly VE2CP could belong to somebody else. However, let us leave the "if" out of the picture, because "if" we had money, we would all own at least a pair of 861's.



GENERAL VIEW OF VE2CP AS SEEN BY THE OPERATORS SHOWING TRANSMITTER AND ANTENNA TUNING PANEL

The transmitter is of the tuned-plate tuned-grid type with a UX-852. The filament voltage is obtained from the 110 d.c. mains by a potentiometer arrangement. Although one tube was burnt out the method is the only one to be used in the present case. The plate voltage is obtained from

a 3-kw. street lighting d.c. generator. The rheostat mounted beside the switchboard on the operating position serves to control the output voltage within certain limits. The maximum obtainable is about 1500 volts, and we venture to say that the regulation is good! The driving



THE COLOSSAL 3KW PLATE SUPPLY GENERATOR (ON LEFT), ANTIQUATED DRIVING MOTOR (RIGHT), AND FORMIDABLE SLATE PANEL (REAR)

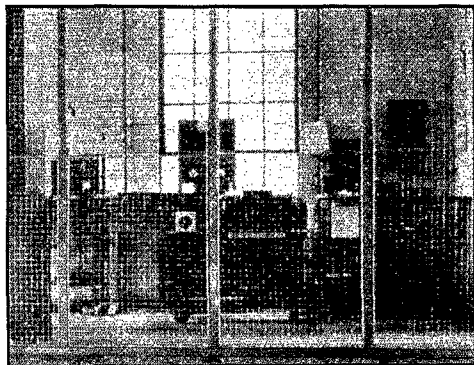
motor is somewhat antiquated, we will admit, and also imparts to the flooring a quite definite frequency (which we notice personally) but judicious use of rubber pads on the table and transmitter have removed all traces of oscillating coils in the emitted signal. Furthermore the use of such apparatus makes the station look the more formidable and it appears that the powers of amateur radio are thus magnified tremendously.

The receiver is a three-tube affair using a 224 as space charge detector and two 227's as amplifier. These are resistance and transformer coupled. With high voltage on the plate of the 224 a very good signal level is maintained. One drawback in reception at VE2CP is that the station is not over a quarter of a mile from a local broadcasting station. The result is that even with a wave trap some music at times filters along with the signals and makes operating more enjoyable — we don't think.

Back to the high voltage we go. The filtering scheme is very simple. Being strong minded, we immediately fell for the brute force idea. One-half microfarad each side of a 3-henry choke gives fine results and when the combination of radio frequency and floor frequency does not exist,

the note even locally is a very fine grade of pure d.c.

The erection of the apparatus in the station was carried out by VE2BH and VE2CP jointly. Jointly is the word, because wielding a heavy hammer and making holes in a sound brick wall requires a little bit of coöperation. By the way, drilling a marble panel even with a power-driven drill presents its difficulties to the inexperienced. As engineering students we are taught why the



GENERAL VIEW OF VE2CP AS SEEN BY THE ONLOOKERS

holes in the walls are drilled, what size they must be and how much permissible load can be carried, but of the delicate operation of actually drilling the hole we know little until the fingers are sore and arm well nigh out of joint.

The present gang of licensed calls operating at VE2CP are as follows: VE2CU, VE2CO, VE2BO, W8BOM, W6ARA and a whole lot of licensed operators whom we shall not mention. The station has been helping in traffic work by trying to pile up the high score for the VE2 district. They have done nobly and deserve our thanks.

Before we bring this description of VE2CP to an end, we want to justify our references to the gigantic expanse of apparatus. Remember that the shack is screened by a wire partition. Now this looks like a cage, and the first idea that springs in the mind of onlookers is that we are monkeys. That is, we are lowered in zoölogical scale, and since our feelings on the matter are very sensitive we have to destroy the impression by the process of neutralization. We feel that we have succeeded, as starting up VE2CP is no mean affair.

To begin with we enter the d.c. lab and proceed up to the large slate panel covered with powerful looking switches, meters and circuit breakers. We close the two 24-inch switches after closing the two-odd hundred-ampere circuit breakers. The "juice" is now running up to the secondary panel on the motor frame. To this panel we go, close the 6-inch switch and proceed to bring the

motor up to speed with the control resistance. Then we turn on the oil on the generator. A third panel on the wall behind the generator enables the power output to be sent either to the shack or to the radio lab upstairs. Well, we throw the switches to the right. Then we insert the wall plug that gives us 110 d.c. for the filament circuit and for the generator field circuit.

Here we are in the shack with the power arriving to our switchboard — just fancy, our own switchboards! Close the right hand switch and presto! the filament lights at 10 volts d.c. Close the large 6-inch top switch, then the left hand lower switch, and that's all. CQ CQ CQ de VE2CP!

Pacific Division Convention

CLIFT HOTEL, San Francisco, September 5th and 6th — no need to ask a Pacific Division ham what those words meant! For the others, we need only say that the occasion was the Twelfth Annual Convention of the Pacific Division, A.R.R.L. With 150 amateurs from all over the Division in attendance, a good two days of renewing acquaintances and hamfesting was assured.

The program arranged by the Convention Committee left no possibility of dull moments. At 10:30 Saturday morning the convention opened with Mr. A. H. Babcock, Division Director, welcoming the delegates. He was followed by John L. Stevens, Convention Chairman. Kenneth Clark, Assistant Supervisor of Radio for the Sixth District, then gave a short talk on the problems of an R. I., particularly those arising from amateur activities, and George Grammer, from A.R.R.L. Headquarters, finished the morning session with a few words of welcome.

The afternoon was devoted to a sight-seeing bus tour of San Francisco — an interesting feature of the convention for out-of-town visitors. Saturday evening found the gang assembled in the Lounge on the roof of the hotel for the stunts and contests. Several clubs put on sketches, Oakland being adjudged the winner. Then there were the Liars' Contest, the QLF Contest (it's surprising how well some of these hams can send CQ with the old left foot), a "most CQ's whistled with one breath" contest, and a brand-new contest for the 'phone men — for the best microphone voice. All were entered and judged with enthusiasm by the audience. And then the final feature — the smoker. All we'll say is that it was good!

Sunday morning saw the start of the technical session. Professor Terman of Stanford University led off with a talk on linear amplifiers which aroused so much interest that he was kept answering questions until noon, when the meeting ad-

(Continued on page 70)

THE COMMUNICATIONS DEPARTMENT

F. E. Handy, Communications Manager

E. L. Battey, Asst. Coms. Manager

Transcons!!

Two Ten Hour Relays Coming — Don't Miss the Chance to Take Part — Messages to Go via both 'Phone and C.W. Telegraph Stations

Dec. 5 (Saturday 4 p.m. to Sunday 4 a.m.) (local time) 1715-2000 kc. (160 m.)
Dec. 12 (Saturday 4 p.m. to Sunday 4 a.m.) (local time) 3500-4000 kc. (80 m.)

REMEMBER the big Transcon of last January?!*! Of course you do! If not just read the report of this exciting and amateur history-making event in April 1931 *QST*. You will hardly want to miss a chance to get in on the fun in the coming December relays.

How many miles can a message be relayed in ten hours? How fast can a coast to coast message be handled in relays? These and many other questions will be answered by the Relay. The first week the results will show what can be done using 160 meters exclusively. The next week operations will be confined to the 80-meter band. Obviously, the higher frequency bands are not suitable for a relay of this type since coast to coast work is more readily possible *direct*, so that *relaying* cannot play the important part it should in this test. The bands chosen are open to both phone and c.w. telegraph operators. Messages can travel all-phone and all-c.w. routes (or mixed 'phone — c.w. routes too). *Speed* is the main thing desired, not sacrificing accuracy. The *number of relays* will count for much on each message routing too, and it is likely that we shall have to use our old factor of MR²/T again in evaluating the best-message record.

Any and every amateur station that can work on 1750 kc. December 5, and 3500-4000 kc. December 12 is invited to take part. We shall try to file an equal number of official dispatches with stations on each coast to be started from unnamed stations. These stations will CQ promptly at 4 p.m. EST or PST for QSP WEST or QSP EAST as the case may be. Phone men may pass traffic to c.w. telegraph stations or vice versa in either relay — but messages must stay on the band on which they were started throughout the relay. The speed of the test will help show the relative efficiencies of the two bands, with perhaps some handicap granted to the 1.7 mc. participants depending on the number of stations taking part on both bands.

When a Transcon gets over before the closing time answers may be returned to keep the ball rolling and see *how far* and *how fast* a message can be relayed — and through *how many* stations — in one brief TEN HOUR period.

Volunteers for starting messages were asked to write Headquarters in the October O.R.S. Bulletin — stations bordering on either ocean, or at any rate located in states bordering on the Atlantic and Pacific coasts to be given preference. West coast 1750 kc. stations, either phone or c.w., seem to be scarcest. Get in touch with us very promptly, by wire if necessary, if you can start a Transcon.

Messages will be addressed to ANY WEST COAST AMATEUR and to ANY EAST COAST AMATEUR. When the messages get through, recipients located in states bordering on either ocean should immediately start messages of acknowledgment back to the *originating stations*, these bearing the same serial numbers to identify them in the final report. The special designating numbers which will be assigned by Headquarters for tracing purposes will be prefixed by the word TRANSCON. The texts will be in plain language in all cases and signed by the name and call of the operator who starts the

message (or returns an acknowledgment made up for the occasion).

At 4 a.m. Sunday all messages are to stop wherever they are, and let us know where they stopped, too, please, for purposes of record.

Logs — We do *not* want complete logs. Participating operators are requested to send us exact copies of the messages handled, each message on a separate sheet with the information showing the time it was received, from whom received, the time sent, whether E.S.T., C.S.T., M.S.T., P.S.T., etc., and to what station the message was sent. Comments concerning further routing that may be known to you should be sent in, but please keep the messages on individual sheets so we can pin all copies of the same message together in making up the record. Tracers may be sent out by mail following each message but we are depending on you to promptly get your report in the mail each Monday morning after the transcon. If you do get a tracer, fill out and send along promptly to the next station in line please — or back to Headquarters, if you had the message when the clock got around to 4 a.m. your local time.

Calling — Stations having messages should go on the air with a directional CQ, i.e., CQ EAST or CQ WEST as per standard A.R.R.L. practice. See the C.D.'s R. & R. or study page 178 the Radio Amateur's Handbook if you need to get more familiar with the most effective methods of CQing. Steady, even sending can be copied easily and correctly and the rate of moving traffic depends more on using this sort of sending than it does on the speed of transmission. The use of CQ should be limited to stations having traffic to dispatch and directional CQ's should save time if *only* stations that can QSP in the desired direction will answer the calling station. Listening periods will be more profitable than CQing periods if you haven't located any of the desired test messages east or west of your station. First find who has the ball, then get into the game and go after it. There is no excuse for any changes in the texts of messages during their transmission across the country — watch accuracy. For the 'phone men we suggest reference to the international radiotelephone procedure which is part of the supplementary regulations to the International Radiotelegraph Convention. Messages should be "repeated back" and OKed by the sending station to insure accuracy. (See page 191, Seventh Edition, The Radio Amateur's Handbook on "Phone Procedure.") The Western Union word list, or better, the list of names specified in the supplementary regulations should be used by 'phone operators in spelling out initials and words having phonetic similarity.

In general — Correct your timepieces so that all notations on messages check. Use your local standard time. Everybody report the day after each relay. Your reports must be in at Headquarters promptly to "make" the detailed story for *QST*. A copy of the messages handled by *each* station is necessary so that we may give the complete routing without any "gaps." All set? Mark the dates and get into the game both Saturday nights.

— F. E. H.

Traffic Briefs

W2BWF, Official Observer at Troy, N. Y., announces that he will be glad to check any 3.5-4 mc. amateurs' frequencies on Tuesday and Thursday evenings between 7:00 and 8:00 p.m. E.S.T. Give him a call, fellows, and take advantage of this offer.

Our Hobby

By Louis W. Moxey, 3rd*

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

In addition to publication of the best articles in *QST*, the author whose article appears to have greatest value of those received for consideration, has his choice of (1) a copy of *The Radio Amateur's Handbook* bound in leather cloth, (2) six pads of message blanks, or (3) six of the new type A.R.R.L. log books. This offer made for 1931 will continue in 1932 until further notice. The article presented herewith is the prize-winning article for this month.

—Communications Manager.

AMATEUR RADIO is an unique hobby. Here are thousands of persons who talk to one another every day, making numerous friendships, yet they seldom see each other. Amateur Radio is one of the most widespread hobbies, being followed in nearly every country; amateurs thus constituting an international group. As such, it promotes, in no small way, the cause of international peace. Amateur Radio often assumes a benevolent rôle, in the relaying of free messages, and especially in times of local and national emergency; nor must we forget the part played by Amateur Radio in the opening up of the short waves.

Amateur Radio has its ills since, as in any large group, there are those who do not work for the good of the whole. Improper operating practices are often due to carelessness, selfishness and inexperience or a lack of knowledge of what is best, on the part of the operator. We must teach beginning amateurs and educate or instruct those operators who can profit from constructive information and suggestions, for the good of our hobby. We must show by suggestion and example how the individual can be a *real radio amateur* and how, by working for the good of the game, he will get most pleasure and good from his hobby, at the same time he has a full measure of enjoyment.

The Standard Frequency Stations and Official Observers are carrying on an important work. The contests we have from time to time, the lists of well-operated stations and efficient traffic stations published in *QST*, and such things awaken in the amateur the desire to become a more accurate and efficient operator. The Handbook provides a means of guiding him both in the construction and operation of a high-grade station. In the front of the Handbook is the Amateurs' Code. It would be a great thing if we could keep this Code always in front of the operator.

Instead of this "WL NIL HR CUL" stuff, let us talk to the other operator. If his keying is bad or his signals wobble or have a poor tone, or he sends a long CQ, *tell* him (kindly and in a constructive manner) that his keying is bad, or that his note could be improved, or that he should not send such a long call, or whatever may be his trouble. Remind him

* W3BFL, 106 Roumfort Ave., Mt. Airy, Philadelphia, Pa.

how pleasing it is to copy a clean-cut signal or a steady note, and how many more contacts he can make if he operates properly. Help him to improve his signals by testing with him, or telling him what to do. I have done this often, and find that the other operator is always grateful for any constructive criticism or help one might be able to give, and will try to follow it.

This is something every one of us can do. It will not only benefit the poorer operator but the good operator as well, by establishing better conditions. I am not looking for any Utopia for Amateur Radio. It has its ills, and will have them, but we can lessen them. Only by doing so can we say that it is progressing. Amateur Radio is an unique hobby. This fact upholds my faith in the Amateur. He will progress.

More Re License Revocations

A bulletin from the Federal Radio Commission dated October 7, 1931 reports the revocation of amateur station license for W6CSM. Reasons given are: "License revoked because (1) licensee, Bernard F. Herzog, Marysville, Calif., permitted an unlicensed operator to use his call letters for period May 16th to July 16th, 1931, at a place other than that named in the license, without notification to the Radio Supervisor and (2) that licensee, by reason of misstatements, is not a proper person to operate an amateur station."

On October 13, 1931, the six months' suspension of the amateur operator's license of Mr. Roy A. Lundquist of Seattle, Washington, was ended. Mr. Lundquist, who formerly was assigned call letters W7ADZ was, some months ago, found guilty of operating an unlicensed radio-telephone transmitter in the broadcast band and announcing fictitious call letters. He admitted his guilt and furnished a sworn affidavit attesting to the violation. As a result the acting secretary of commerce, Gov. E. F. Morgan, on April 13, 1931, suspended Mr. Lundquist's amateur radio operator's license for a period of six months and directed that he return it to the Supervisor of Radio at Seattle, Washington.

Amateur Radio at the American Legion Convention

DETROIT, Michigan, was the seat of "big doings" in amateur radio throughout the period of the American Legion Convention held in that city. Approximately twenty amateurs took an active part in the operating of W8DYH's portable, W8BIN, installed on the 15th floor of the General Motors Building. The transmitter was loaned by Walter Williams, W8HP. A specially designed dugout was built on the street to represent a "wartime radio dugout," and it was at this dugout that the messages were filed by the Legionnaires. A buzzer line was run from the dugout to the station itself on the 15th floor, and several hundred messages were relayed via this line. Traffic was given Detroit and nearby stations during daylight hours when greater distance could not be worked, and reliable schedules were kept with numerous outside stations. An average of more than ten messages an hour was maintained. W8BIN was kept on the air 24 hours daily, and a total of 1608 messages (originated 1575, delivered 27, relayed 4) were handled in continuous operation from the morning of Monday, September 21st to Friday, September 25th at 11:00 p.m. Operators were W8EPI, W8BPL, W8CLL, W8DZ, W8DMS, W8AM, W8CAM, W8PQ, W8PY, W8BJ, W8HP, W8ARR, W8AKN, W8GA, W8LU, W8DYH, W8CAT, W8CYX, W8GX, W8DFE, W8BFH and W8EF. Coöperation of the United Motors must be gratefully acknowledged, for without their assistance the coöperation would not have been possible. They printed a quantity of message blanks, numerous 2 x 3 foot cards with advertising, and two large banners, one strung across West Grand Boulevard from the G. M. Building to the Fisher Bldg., and the other across Second Boulevard. They constructed the "dugout" built of heavy planking and covered with sand bags, this in turn covered with tree branches, etc., resembling the concealment used during the war. They also furnished pencils, tables and chairs in

front of the dugout, 'phones in the radio room and in the shack, as well as clerks to help in the detail work. The Detroit newspapers all carried stories of the service rendered by radio amateurs. An especially notable feature of this cooperation was that the general character of messages filed was "meaty" and not the usual run of "having a good time, wish you were here" type. The Detroit gang wishes to thank all amateurs outside the city who cooperated in relaying and delivering the Legion traffic.

— W8DMS, SCM Michigan

Traffic Summaries

(SEPTEMBER-OCTOBER)

	Total	M.P.S.	S.
Central led by Ohio (15,453) (238 m.p.s.)	28,707	128.1	
Pacific led by Los Angeles (7162) (130)	22,348	129.9	
Atlantic led by Eastern Pennsylvania (6648) (154)	12,222	117.5	
Hudson led by New York City and Long Island (5545) (178.5)	7277	105.2	
New England led by Maine (3292) (131.5)	6754	65.6	
Midwest led by Missouri (1450) (44)	4224	53.5	
West Gulf led by Oklahoma (1494) (106.7)	602	54.7	
Roanoke led by Virginia (876) (134)	2564	30.2	
Dakota led by Southern Minnesota (699) (84.9)	1640	35.7	
Quebec	1379	153.2	
Southeastern led by Eastern Florida (517) (23.5)	1214	19.6	
Northwestern led by Oregon (420) (32.3)	370	25.6	
Ontario	602	54.7	
Rocky Mountain led by Colorado (367) (28.2)	558	25.6	
Detailed by Tennessee (271) (27.1)	490	27.2	
Vanatta led by British Columbia (163) (20.3)	188	18.8	
Prairie led by Saskatchewan (31) (7.7)	34	5.6	
Maritime	33	11	
1047 stations originated 29,625; delivered 13,843; relayed 50,781; total 94,249 (46.7% del.) (90.2 messages per traffic station).			



This month we can announce with some pride an all-time high of 94,249 (message total) but with less pride we must state that it is no conclusion that deliveries make what may be called an all-time low of 46.7% simultaneously! Several Radio Show stations contributed largely to the originated total, and possibly neglected the necessity for organized distribution of this traffic through recognized and capable key-stations.

Of course the overloaded hooks of operators having limited operating time did the rest.

Ohio wins the banner—again, and with the better-than-average delivery figure of 62.1% and 238 messages per traffic reporting station—which means mighty good teamwork by 63 stations!

Deliveries will improve next month, with fewer show-stations contributing to the result, and we hope with a bigger part of the traffic handled through organized schedules of reliable stations. For a permanent improvement, volume will have to drop so there will be just comfortably filled, and not overloaded hooks. The rule, "don't accept a message unless you will agree to see it through promptly" is tacitly understood always, and attention is called to it now. Every amateur station is urged to handle traffic which "makes real operators" and keeps Uncle Sam the biggest champion of amateur rights—but every amateur will do the sender of message a real favor by frankly refusing messages when a station must be off the air and by fully living up to the rule quoted above whenever messages are accepted. Relay or deliver by mail in 48 hours!

In our approximately seventy A.R.R.L. Sections we have a bunch of "teams" working for supremacy. Since the teams vary considerably in size we are, beginning next month, going to award the Banner on the messages-per-traffic-reporting-station, which takes into consideration both the volume handled, and the size of the "team." To insure that no section with one high station can "steal the banner" unfairly we are ruling arbitrarily that a Section must have at least six traffic-reporting stations before it is eligible for banner awards. That is, a Section hasn't got a "team" until it has that much activity. All reports from all amateurs in a Section must be included in the S.C.M.'s summary of activity for QST, regardless of whether these reports cover experimenting, traffic, phone, dx, etc.; so whatever your main interest in amateur radio, send the S.C.M. (address on page 5 QST) a report on the 16th of each month for the preceding 30 days, and help him all you can by noting your traffic to add to the total.

The above summary shows the relative standing of all Divisions and the leading Section in each Division for the September-October reporting month. The total for each leading Section is shown in parenthesis, followed by the "messages per station handling traffic" figure for that Section; (also in parenthesis). The "messages per station" figure is also shown for each Division, following message total for the Division.

Traffic Brief

ZT6K, Johannesburg, South Africa, reports via WSAKV-WIMK the following calls heard on the 3.5 mc. band since July 30: W1BGW, W1BU, W1CFN, W1MK, W2AIF, W2CEF, W3FQ, W3IG, W3NY, W4ADN, W4LL, W6AP, W6BP, W6BE, W6CZZ, W6DW, W6EVD, W8AKV, W8BL, W8BME, W9CEN, W9ENH, W9EYP, W9ETQ, W9FAC.

O. R. S., Attention!

WHAT is the most recent date on your certificate of appointment? If dated over a year ago, the appointment is null and void . . . but it may be renewed for another year by endorsement of the SCM . . . provided qualifications are OK and reporting obligations will be observed.

Stations not holding Official Relay Station appointment are invited to find out all about it and get in line by making application to the S.C.M. (see addresses page 5, any issue QST). The report on our big exclusive O.R.S. QSO Party is being prepared for January QST. Another is planned for the evenings of January 23rd and 24th. O.R.S., please note. Don't miss it!

— F. E. H.

BRASS POUNDERS' LEAGUE

Call	Orig.	Del.	Rel.	Total
W2RU	2813	—	—	2813
W3BWO	2800	—	—	2800
KA1HR	411	490	1658	2559
W8DPS	502	338	1148	1988
W8LAT	1800	—	—	1800
W8PP	159	136	1366	1661
W8BLN	1575	27	4	1606
W6DWG	1595	—	—	1595
W8BAH	513	552	526	1591
W8DYL	92	62	1164	1318
W8CGS	340	211	745	1296
W8CNM	450	98	565	1113
W6AHP	1018	9	64	1091
W8BYD	435	188	407	1030
W8DYL	118	112	758	1016
W8ZB	73	31	810	914
W8DFR	315	210	418	943
W6DJF	16	83	792	891
W6BIF	19	19	847	885
W6RIP	6	20	816	842
W5AUV	6	52	792	760
W6DSZ	10	8	739	757
VE2CL	750	—	—	750
W3QL	139	69	521	729
W9BWJ	159	166	366	691
W8CCK	92	84	510	686
W6A0A	43	3	636	682
W8DFE	18	41	616	675
W8AXV	76	75	512	663
W8DES	143	173	324	640
W8CXL	50	153	454	637
W8ZB	73	5	500	615
W3BWT	149	115	350	614
W8DBX	20	49	532	601
W1CPT	57	23	510	590
W1CFG	79	46	424	549
W1MK	105	149	288	542
W3ARV	84	41	392	517
W6YU	5	19	490	514
W8BMG	26	117	370	513
W8BBH	110	167	232	509
W3YD	226	44	236	506
W3MT	371	64	67	502
W6ALU	89	179	222	490
W9BEX	94	104	246	444
W9BNU	23	104	290	417
W9BGW	58	134	208	400
W8APC	60	118	150	328
W2KG	83	104	198	388
W9NP	9	290	2	301
W3MC	47	174	61	282
W6BET	98	103	76	277
VE2CX	—	142	120	262
W6YU	64	138	33	235
W8BMX	83	112	62	237
W9BVI	11	100	7	182
W9GAI	3	124	6	133

Month of September 16th-October 15th above. Deliveries count! Note the stations responsible for over one hundred deliveries.

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

W9FYV's total of 550 was incorrectly credited to W8FYV in the B.P.L., October QST. W7ALM with a total of 151 (101 del.) and W7BGX with a total of 254 should have also been listed in the October QST B.P.L.

ELECTION NOTICES

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

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

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

Due to a resignation in the Virginia and Eastern Florida Sections, nominating petitions are hereby solicited for the office of Section Communications Manager in these Sections and the closing date for receipt of nominations at A.R.R.L. Headquarters is herewith specified as noon, December 15, 1931.

Section	Closing Date	Present SCM	Present Term of Office Ends
Philippines	Dec. 15, 1931	S. M. Mathes	Sept. 28, 1931
Alaska	Dec. 15, 1931	W. B. Wilson	Mar. 28, 1932
New Mexico	Dec. 15, 1931	LeRoy A. Wheeler, Jr.	Nov. 18, 1931
Virginia	Dec. 15, 1931	J. F. Wohlford (resigned)	.....
Eastern Florida	Dec. 15, 1931	E. M. Winter (resigned)	.....
Montana	Jan. 15, 1932	O. B. Hiers	Jan. 21, 1932
East Bay	Jan. 15, 1932	J. W. Frates	Jan. 21, 1932
Alberta*	Jan. 15, 1932	Fred Barron	Jan. 21, 1932
Quebec*	Jan. 15, 1932	Alphy Blais	Jan. 21, 1932
Louisiana	Jan. 15, 1932	F. M. Watts, Jr.	Jan. 21, 1932
North Dakota	April 15, 1932	Cuy L. Ostinger	April 25, 1932
Northern Texas	April 15, 1932	Roy Lee Taylor	April 25, 1932

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

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

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

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

(Place and date)

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

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

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

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

— F. B. Handy, Communications Manager

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed in a number of Sections on or before the closing dates that had been announced for receipt of such petitions. As provided by our Constitution and By-Laws, when but one candidate is named in one or more valid nominating petitions this candidate shall be declared elected. Accordingly, election certificates have been mailed to the following officials, the term of office starting on the dates given:

San Diego	Harry A. Ambler, W6EOP	Oct. 20, 1931
British Columbia	J. K. Cavalsky, VE3AL	Oct. 20, 1931
Vermont	Roy Gale, W1BD	Oct. 20, 1931

In the Eastern Massachusetts Section of the New England Division Joseph A. Mullen, W1AS1, and Frank E. England, W1WU, were nominated. Mr. Mullen received 70 votes and Mr. England 41 votes. Mr. Mullen's term of office began Sept. 16.

In the Ontario Section of the Ontario Division H. W. Bishop, VE3HB, and S. B. Trainer, Jr., VE3GT, were nominated. Mr. Bishop received 61 votes and Mr. Trainer 53 votes. Mr. Bishop's term of office began Sept. 15.

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

In the Oregon Section of the Northwestern Division Dr. Dolph L. Craig, W7ALO, and Frank L. Bernhardt, W7WJ, were nominated. Dr. Craig received 78 votes and Mr. Bernhardt 35 votes. Dr. Craig's term of office began Sept. 21.

In the Western New York Section of the Atlantic Division Don Farrell, W8DSP, and Robert F. Coushaine, W8CMH, were nominated. Mr. Farrell received 133 votes and Mr. Coushaine 51 votes. Mr. Farrell's term of office began November 4.

Traffic Briefs

W1MK's schedules and times of sending addressed transmissions to all members? See page 43, November, 1931, QST.

W1MK will be off the air on Friday, December 25th, and Thursday, December 31—Christmas, and New Year's Eve.

The Knights of the Kilocycles is an organization of Florida stations, mostly 'phones, with members in Georgia, Alabama, and South Carolina, who often sit in on our round table QSO parties. As more stations came on the air with 'phone in late 1930 the organization was given its name. In September, 1931, we elected a president, first and second vice-presidents, and a secretary and treasurer. The purpose of this organization is to promote interest, good fellowship, harmony and social entertainment in ham radio. Several committees have been appointed, a technical committee to give advice, and a frequency committee to check the frequencies of different stations as requested and to watch for stations beyond the limits of the bands. The Knights of the Kilocycles is open to the operators of both 'phone and c.w. telegraph stations and we solicit more telegraph stations to join in with us. It is not possible for every operator located in remote places to become a member of some radio club, but it is readily possible to join our round table talks from most every station that is on the air at that time. Our idea is that some hams should get rid of the notion of trying to tear down something just because it does not suit an individual idea. All should work together for the common cause — "HAM RADIO."

— B. G. Yancey, W4ATG

We recently heard that W4AVQ just about starved while working the Sandwich Islands. Poor soul! Something ought to be done about things like that.

W9FWW, Lincoln, Neb., took a message for his city from W7AKO, Billings, Mont. W7AKO stood by while W9FWW 'phoned the message to its destination and received a reply. It took just twenty minutes to complete the exchange of messages. It's this kind of work that reflects glory on our "amateur message service." FB, OMs.

W4RS reports an all-district 'phone hook-up consisting of stations W1ID, W2BAJ, W3AQR, W4RS, W5BKQ, W6CNE, W7SL, W8NXN and W9CJJ. The hook-up was formed without any previous notice in less than 45 minutes. W5BKQ was appointed toastmaster and called the roll. All districts answered when called and were heard by all other districts. FB.

W2BYX took a message from CM2PA for his brother-in-law in Plainfield, N. J., which is just a few miles from W2BYX. W2BYX asked CM2PA to QRX while he 'phoned the message. Being unable to get the party on the 'phone he made a schedule with the Cuban for two nights later. Next day he successfully reached the addressee by 'phone, delivered and arranged for him to sit in on the schedule. Both CM2PA and his brother-in-law got a great kick out of this contact via the ether, and a regular schedule was arranged to enable CM2PA to keep in touch with his relatives in the States.

Attention of beginners is called to the addition of a Code Practice Station. W2GL, Valley Stream, L. I., sends code practice on 1860 kc. at 10:30 p.m. E.S.T. each Friday. Complete and up-to-date lists of amateur stations transmitting code practice will be mailed all beginners requesting same.

Address Communications Department, A.R.R.L., West Hartford, Conn. Any amateur wishing to volunteer to send code lessons on the 1750-kc. band should write for free instruction book, stating the schedule to be used for the code practice transmissions and exact operating frequency in the 1750-kc. band.

In the 27 months that we have been giving the Traffic Banner to the Section having the highest traffic total, the Los Angeles Section has taken it 12 months, Ohio 8, East Bay 2, Michigan 2, San Francisco 1, Illinois 1 and Md.-Del.-D. C. 1.

Of interest to all sea-going hams is the following quotation from a recent bulletin issued by the U. S. Coast Guard in an effort to improve the rendering of assistance to vessels in distress: "Radio equipped vessels requiring assistance may obtain the assistance of the Coast Guard by transmitting a request on the international distress and calling frequency, 500 kilocycles (410 kilocycles on the Great Lakes), to "Any Coast Guard Unit" (Radio call NCU), or to any shore radio station addressed to "Coast Guard." Shore radio stations will forward to the Coast Guard all information regarding vessels requiring assistance unless such information is contained in a message specifically addressed elsewhere. In cases of extreme emergency when an "SOS" is broadcast it is requested that the following procedure be followed by the vessel in distress: Approximately ten minutes after transmission of the original distress message transmit slowly on the distress frequency "MO" and own radio call for three minutes. This will enable Coast Guard vessels and stations in the vicinity to obtain direction finder bearings and accurately plot the position of the distressed vessel."

Mark H. Churton, Auckland, New Zealand, and Harry W. Blue, Liverpool, New South Wales, report meeting Bill Crabbe, W6ESW, during his trip as radio operator on the yacht *Northern Light*, KGEK. Mr. Churton took W6ESW in hand and took him around to meet several of the local gang at Auckland. Mr. Blue went aboard the yacht to inspect KGEK. While he was looking at the equipment he noticed some water in the Pyrex lead-in bowl and asked W6ESW "how come." Crabbe said he had been too QRL to empty it and added that a couple of days previous a chap had asked him if it were to eliminate static! Well, we all must learn. Hi.

W9IH says "It's a good idea: (1) To protect innocent bystanders by building a box to inclose hi-voltage electrolytic and other condensers used in multiple in a medium or hi-power transmitter. (2) To use, whenever possible, and especially with self-excited transmitters, and on the 56-, 28-, 14- and 7-mc. bands, a solidly constructed pipe antenna (usually vertical) that cannot be easily blown about by the wind. (3) To use a large piece of wallboard material to park your QSL cards on in case the station walls have a hard plaster or otherwise unsuitable surface."

W7AZQ has been handling a considerable amount of Alaskan traffic. From May 1st until the middle of July, 1931, approximately 203 messages were routed via K7AIF, K7SO, K7ARS, K7AOA, K7AQC and others.

While working W8CGS, W8BAH experienced terrific QRM from local stations. As a remedy he took the antenna off and attached in its place a piece of wire about one foot long. By holding this wire in his hand he found that he could have sharp or broad tuning according to the pressure put on the wire when held between his fingers. He says this simple trick enabled him to continue the QSO without further trouble from the local QRM.

NAVY DAY

As this issue goes to press approximately 380 amateurs have submitted copies of the Navy Day messages transmitted from NAA, NPG and WIMK on October 27th. A complete report announcing the 25 winners of the Secretary of the Navy's letters of commendation, and the Honor Roll listing all participants in the order of accuracy of copies will appear in January QST.

The annual get-together and banquet of the Schenectady Amateur Radio Association was held Saturday, October 3, 1931. During the afternoon the gang visited the General Electric stations WGY and W2XAF. M. L. Prescott, engineer in charge of G. E. high frequency work gave a fine talk on "The Eccentricities of Short Waves." After the feed in the evening W. J. Purcell, engineer in charge of WGY, gave an interesting talk. This was followed by entertainment conducted by WGY artists, and Gordon Alexander, sleight of hand expert. A total of 143 hams attended and the usual "good time was had by all."

The Western Ontario Amateur Radio Association held its second annual Hamfest on October 14, 1931, with 41 members present. The afternoon technical session featured a talk on vacuum tubes by a representative of the Westinghouse Company, and a talk on modulation by a representative of the Northern Electric Co. Trips were made to the Bell Telephone repeater station and to the Department of Physics, University of Western Ontario, where VE9BY is located. A chicken banquet was served in the Hotel London, London, Ontario, after which prizes were drawn. One of the lucky winners was Mrs. VE3DW, the only lady present, who won a 750-watt bottle. After the awarding of prizes slides of the Marconi stations were shown and explained by a representative of that company. Then followed a long rag chewing session, which concluded activities.

The last Los Angeles quarterly section banquet was sponsored by the Associated Radio Amateurs of Long Beach, Calif., September 26, 1931, with 225 amateurs present. W6VH acted as master of ceremonies. Asst. R. I. Chapple gave a short speech containing much good advice. Short talks were given by Messrs. John and James Homsy regarding the monitoring station at San Pedro. W6DNF gave an account of the San Francisco convention. Hal Nahmens, W6HT, SCM, spoke on Section activities. Representatives from fourteen clubs were present. Three SCMs and KASAA were also "discovered." Director Babcock spoke on "56-mc. phone work in the Hawaiian Islands." In addition to club stunts, entertainment was provided by Jay Johnson of the KFOX staff. The "large" evening was brought to a close with the presentation of prizes, the value of which was well over 200 "seeds," and everybody went home happy.

A new radio club has been organized in Rochester, N. Y., with W8ABX as President; W8ALY, Vice-President; W8BGN, Secretary, and W8APD, Treasurer.

At Sunbury, Pa., the Tri-County Radio Amateur Club was recently organized. Membership is already in the neighborhood of fifty, and the officers prophesy a bright future for this organization.

E. W. Mayer, well known as K4KD, is now signing W9CCB at Mount Pulaski, Ill. Welcome back to the states, OM.

W8KN at the Eastern High School, Lansing, Mich., is looking for schedules with other high schools in the United States. The most suitable time would be between 4:00 and 5:00 p.m. E.S.T. W8KN's frequency is 7200 kc., although the 14-mc. band can be used, if required. The main purpose of the schedules would be to exchange messages and school news. Write W8AYV, H. R. Wilson, Box 226, R. 3, Lansing, Mich., if interested.

The North Shore of Massachusetts boasts of a very active gang of brasspounders organized into a chartered club under the name of "North Shore Amateur Radio Association." In a comparatively short time the membership has grown from six to eighty-five. The greatest aim of the club is to interest and bring together the gang on the outside and interest them in amateur radio, and to inform the people of the North Shore by newspaper articles and the like of the activities and existence of the "amateur." The association has its own club house with all improvements, including a station, which signs W1BEV.

Dayton, Ohio, has a real school for hams. The organization goes under the name "Air City Radio Association." Headquarters are in the Dayton Industries Building, and two steel towers atop the structure support the antenna of W8MK, official station. Beginners are encouraged to join this organization. Meetings are held on Monday nights. Wednesday nights are given over to beginners' code and theory classes instructed by W8DIJ, W8BUY and W8AZH. On Thursday night an advanced class is held. During the 1930-1931 season ten licensed hams were manufactured from the raw. This season W8MK and the association's portable, W8NI, hope to begin seriously the work of handling traffic. An abundance of ops will keep regular schedules each night of the week. The W8MK gang is developing into a bunch of "frequency hounds." Two dynatron meters have been built, one will grace the operating room, the other will be available to members seeking accurate adjustment of their transmitters. Officers are W8BUY, President; W8WI, Vice-President; W8DIJ, Secretary-Treasurer.

The following hams met at the shack of K6AJA for dinner on the night of September 3, 1931, and organized the Hilo Amateur Radio Club: K6BMY, K6FCX, K6ANA, K6EDH and K6AJA. Officers elected were K6AJA, President; K6BMY, Vice-President, and K6ANA, Secretary-Treasurer. The club has arranged for a class of beginners and will help in every way possible to get them on the air.

Word has been received of the organization of two new Indiana amateur radio clubs, the "Old Post Amateur Radio Club" of Vincennes and vicinity, and the "Evansville Amateur Radio Society." Officers of the first named are: President, W9DAN; Secretary, W9ELF; Treasurer, W9CNG; of the latter: President, W9CEA; Vice-President, W9BZF.

SCM Ginsberg, W3NY, advises: "In these days of many new stations and a considerable amount of borrowing of other fellows' calls, an accurate and frequently checked frequency meter or monitor in your shack will allow the R.I. to believe you were not the one found outside the bands when your call is heard there."

The Annual Radio Show in which A.R.R.L. members of the Quebec Division took part was held in Montreal from September 21 to 26, 1931. Our booth attracted the widest attention of all exhibits. CGM Alex Reid and SCM Alphy L. Blais were at the booth most of the time. On exhibition were the following: A 14-mc. radiophone transmitter and receiver belonging to VE2CA; a 56-mc. receiver furnished by VE2AC; a c.w. transmitter of modern design; and a direction finder, the latter two items being furnished by the Canadian Marconi Company. Messages were accepted for transmission, the greatest portion being handled directly from the booth. In the Oak Room of the Windsor Hotel the amateurs staged a real showing of television, which attracted large crowds. Everything went off splendidly and we wish to thank every amateur who assisted us in putting the thing over.

— VE8AC, SCM, Quebec

The Richmond Short Wave Club installed station W3AVU at Yorktown, Va., during the period of the Yorktown Sesquicentennial celebration, October 16, 17, 18, 19, 1931. W3AMB and W3ASA operated W3AVU, keeping schedules with W3AGH, W3ZU, W3CFL and W3AAJ. Over 100 important messages were handled. W3FJ loaned his equipment to the local scouts for use at their encampment during the sequi activities.

W4AV reports that the Bayou State Radio Club installed portable W4ZZA at the Baton Rouge (Louisiana) Community Club during the "Electric Show" held there October 21, 22 and 23, 1931. A 7-mc. crystal rig using an '03A in the final stage was used to handle the many messages filed. This transmitter was loaned by W6BRR. A 3.5-mc. 'phone transmitter was also on display. Hams in all parts of the U. S. as well as in Canada, Barbados and other countries were QSOed during the set-up. The amateur booth was of great interest to every one attending the show.

W8DME reports that Unit 7, Section 2, U.S.N.R., Third Naval District, will put A.R.R.L. code lessons on the air from WMBO, Auburn, N. Y. Beginners should take advantage of these broadcasts.

W3YD at Marine Barracks, Quantico, Va., maintains a schedule with C8YB and will relay traffic to Nicaragua, Haiti, Cuba, Porto Rico, the Virgin Islands, and the Canal Zone.

A letter from W9GV on October 21st announced that he had increased his number of contacts with VK5HG to over 600, and had hung up 500 contacts with VK3FP. Also, W9GV had more than 100 contacts with OH7NB, Norway, in the period April to September, inclusive. These contacts with OH7NB were made at about 7:00 a.m. each morning on the 14-mc. band. OH7NB uses a 7.5 watt. Complete reports from OH7NB show that W9GV was heard every morning that he was on the air.

A regular monthly QSO party has been organized for the Kentucky Section. It is held on the 14th of each month from 6:00 p.m. to midnight. The gang is requested to be on that evening and endeavor to QSO at least the Route Manager of their district. If sufficient interest is shown, prizes for the best showing will be given. Who can name this monthly get-together? W9BJW says call it "Taps." What have you to suggest?

W3ZK's schedule with K4RK makes an FB outlet for Cuban and Porto Rican traffic.

One of our readers suggests the use of the following "Press Schedules" by commercial operators and others interested: WNU, 3331 meters, 90.1 kc., daily, 8:30 a.m. E.S.T.; WNU, 44 meters, 6810 kc., daily, 8:30 a.m. E.S.T.; KUP, 36.5 meters, 8230 kc., and 28.9 meters, 11,170 kc., daily except Sunday, 10:00 p.m. E.S.T.; WPN, 35 meters, 8570 kc., and 46 meters, 6520 kc., 0300 G.C.T.; DIS, 29.54 meters, 10,155 kc., 2008 G.C.T. in English and German; NAA, 2650 meters, 113 kc., 1:30 a.m. E.S.T.

W1DBD, President of the Radio Club of Middleboro, Mass., stopped in at A.R.R.L. Headquarters on his way home from North Carolina. He visited in Durham, N. C., for a couple of days and met W4ALY, W4OC, W4TR and W4RV. He drove the 680 miles, from Durham to Hartford, without sleep, and made the trip in approximately 30 hours.

W8APQ is one of the stations attempting to get across the Atlantic on 1750 kc. He announces that he will send at very slow speed on 1800 kc. every Tuesday and Saturday morning at 2:30 a.m. E.S.T. (0730 G.C.T.). He solicits reports on his signals.

Official Broadcasting Stations

(CHANGES AND ADDITIONS)

(Local Standard Time)

W1AKY	3530 kc. ('phone) Wed., Fri., 6:15 p.m., Sun., 10:30 a.m.
W1BWY	3779 kc. Mon., 7:15 p.m. to 10:30 p.m.; Fri., 7:15 p.m. to 11:00 p.m.
W1YU	3700 kc. Mon., Fri., 9:00 p.m.; Wed., 8:00 p.m.
W2OP	3941 kc. Tues., Thurs., Sat., 7:30 p.m.
W2SC	3856 kc. Fri., Sat., 7:00 p.m. and 9:00 p.m.
W300	14,200 ('phone) Tues., Wed., Sat., 6:00 p.m.; midnight at convenient times.
W3QP	3700 kc. (CW) Tues., Fri., 9:00 p.m.
W4AIS	7280 kc. Tues., Fri., 9:15 p.m.
	7168 kc. Sat., 4:00 a.m.; Thurs., 12 noon.
W4NN	7250 kc. Sun., 3:00 p.m.
W4WN	3650 kc. (CW) Daily, 7:30 p.m.
W6AKW	3510 kc. ('phone) Mon., Wed., Fri., 6:00 a.m.
	7250 kc. Sun., 5:00 and 6:00 p.m.
	3880 kc. (approx.) Wed., 7:00 p.m.
W6DLV	7022 kc. Tues., Thurs., Sat., 5:00 p.m.
W9BBA	3750 kc. Mon., Wed., 7:30 p.m.
W9CSB	7025 kc. Mon., Fri., 7:00 p.m.; Sun., 11:00 a.m.
W9FAD	1870 kc. ('phone) Mon., Wed., 9:30 p.m.
W9FFD	3984.4 kc. (cc) Mon., Fri., 10:00 p.m.
	7150 kc. (cc) Wed., 10:00 p.m.
VE3ZZ	3985 kc. Mon., Wed., Fri., 7:45 p.m.
	7050 kc. Sun., 9:30 a.m.

DIVISIONAL REPORTS

ATLANTIC DIVISION

EASTERN PENNSYLVANIA—SCM, Jack Wagenseller, W3GS—The call W3BWO was used at the Philadelphia radio show, where a nice bunch of traffic was originated. The transmitter was in charge of W3ZF, while W3MC, W3BHB, W3AJV, W3QV and W3GS helped to send out the traffic. W3BWO and W3MG make the BPL. W3UX is out to get that prize next month. W3MC, our new RM, has arranged schedules with all ORS under his jurisdiction. W3AAD is still going strong. W3BBK is lining up some new ORS in Allentown. W3AKB has a new antenna and no longer uses loading coils. W3BHU will soon be an ORS. W3NA sends in another of those FB reports. The Chester Radio Club operates W3BKQ, which is another prospective ORS. W3AQN is in a route to Costa Rica. W3OK is now an Army Control station. W3EV is going to make the BPL soon. We are glad to hear W3CFI on the air again. W3FCB is also in line for an ORS. W3AFV is an old-timer getting started again. W3AJS, W3CL, and W3DZ are doing their bit to raise more ORS at the Western Radio Club. W3CWO is experimenting with 28 mc. The Reading Radio Club operates W3CBL. W3BOL is building a crystal rig. W3QP is going to QRO his 3500-ke. outfit. W3UB is QRMed by football. W3BET is now an ORS. W3AFG promises to report every month. W3DPQ now has an AC receiver. W3BDT and W3BRZ report for first time. W3ANZ and W3AFE are doing their best to stir up interest among the Lehigh Valley hams. W3AQQ is out of cold storage at last. WSDHT doesn't seem to get on the air enough. W3BTP sez he can't find any traffic. W3BRH has turned DX head. W3ADE can't seem to get out very well. W3EU used to be in the BPL. Now look at him! Hi. W3NF sure has plenty of YL QRM. Forty-two stations reported this month. Let's try to make it still more next month. Don't forget the prize offered for the highest total each month.

Traffic: W3BWO 2800, W3MG 502, W3GS 405, W3UX 304, W3MC 282, W3AAD 148, W3BBK 145, W3AKB 138, W3BHU 133, W3NA 133, W3ZF 125, W3BKQ 103, W3AQN 82, W3OK 78, W3VB 64, W3EV 66, W3CFI 61, W3FCB 35, W3AFV 34, W3AJS 21, W3CWO 21, W3CBL 20, W3BOL 20, W3QP 16, W3CL 15, W3UB 15, W3BET 14, W3AFG 12, W3DPQ 13, W3BDT 12, W3ANZ 12, W3AFE 12, W3AQQ 11, W3DZ 10, WSDHT 8, W3BTP 8, W3BRH 7, W3ADE 4, W3EU 2, W3BRZ 2, W3QV 64, W3NF 300, W3JR 396.

SOUTHERN NEW JERSEY—SCM, Robert Adams, 3rd, W3SM—W3QL, our energetic Route Manager, reports a fine total to make the BPL. He kept 28 schedules each week. What a man! W3ARV was right behind him and also qualified as a BPL. W3BUF in Atlantic City delivered his share of Philadelphia Radio Show traffic. W3ACJ, in Ocean City, is rebuilding. W3AWV reported 51 members of the Delaware Valley R. C. W3BEI blew his rectifiers. W3SY built a new receiver. W3ARN slowed up a little. W3AUI is working for ORS. W3BKM sailed to the West Coast. We welcome W3ASG back after a long visit to Chicago. W3BSC and W3AEJ were made ORS. W3KW is the OBS of the Section. Listen for his broadcasts. W3JL is having trouble getting out. W3SM managed to hook several Aussies. The Camden Units of the U.S.N.R. are meeting every Wednesday. For details call W3ACD. Atlantic County's unit is underway. See Carroll at WPG, or W3SM, who is the N. J. Commander. The Radio Association of Southern New Jersey will elect new officers next meeting. Where is the Salem County gang? Don't forget to send in your ORS certificates for renewal when one year old.

Traffic: W3BUF 68, W3ASG 32, W3BKM 146, W3ACJ 1, W3KW 35, W3BEI 20, W3SY 13, W3JL 27, W3AEJ 44, W3AUI 26, W3ARV 517, W3BFH 53, W3ARN 15, W3ANP 3, W3BSC 19, W3AWV 25, W3BIC 7, W3QL 729, W3SM 91, W3ZI 25.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA—SCM, Harry Ginsberg, W3NY—This month 19 ORS reported, and but 3 failed to handle traffic—a real improvement. We are still out for that 100% of ORS reporting and handling traffic. Boys, when things start hitting on all cylinders they won't be able to stop us. We are still out

after that total of at least 50 active ORS, and won't stop till we get 'em. Get busy and get one. Send in those applications. Seaton, W3BWL, now OA4U at Magnetic Observatory, Huancaya, Peru, reports all U. S. districts from 3:30 p.m. to 10 a.m. on 14 mc. He will be ready for traffic skeds by Jan. 1, 1932. Maryland: W3AOO devotes 80% of his time on the air to traffic. W3AFF is suspending schedules. W3BEG maintains a 7-mc. schedule every Sunday morning with YK7JK. W3DG is QRL with work. W3NY is just keeping schedules. W3ZK's new key-click filter enables him to work traffic at night. His schedule with K4RK makes a FB outlet for Cuban and Porto Rican traffic. W3BBW has an Extra First Amateur ticket. W3LA is back from New York City. W3VJ burned out his type '10s. With assistance of W3HU, W3AHG erected a new 40-ft. antenna. District of Columbia: W3CXL leads Section with nice total in spite of bad skip-distance. W3BWT follows closely in spite of visitors, hay fever and other maladies. W3ASO continues his nice, consistent work along QSP lines. W3CAB just got back from two weeks' active duty on U. S. S. *Wyoming's* U.S.N.R. cruise. W3IL was among the gang at Winston-Salem Convention. W3PN still copies FCC. W3CDQ is not pounding brass at her new QRA. W3LX, a non-ORS, is coming back to help out the old Section. W3PM will be back soon. Delaware: W3HC is back to normal operation. Reports FB visit of 3BBW. W3ALQ finds little time for brass-pounding due to BCL work. W3AJH also finds little spare time for operating.

Traffic: W3CXL 637, W3BWT 614, W3AOO 88, W3ASO 56, W3BEG 27, W3AFF 26, W3EC 22, W3IL 16, W3PN 15, W3LX 15, W3CDQ 12, W3LA 7, W3CAB 5, W3NY 5, W3AJH 5, W3ZK 5, W3ALQ 1, W3AHG 12.

WESTERN PENNSYLVANIA—SCM, R. M. Lloyd, W3CFR—Well, gang, the big traffic season is with us again, and I am glad to see a lot of new calls in the summary. W3CPE ran up his total with American Legion Convention traffic. W3EDG sends in a fine total with his first report; he also reports for W3DVA. We welcome W3DZP as an old-timer. W3CUG is under way again; Shorty is trying to organize his RM activities. W3DKL has a new crystal rig; he reports a new ham, W3FGL, in Erie. W3KD squeezes some schedules in with his school work. W3CTE is still on. W3DGW is lining up schedules. W3CQA is building a new PA for his set and reports W3BQB, W3DUL, and W3BOZ on from Warren. "When the snow falls I'll be running the ether ragged," says W3APQ. W3CXE, a pre-war and commercial op, sends in his first report. W3BUC's new job is keeping his traffic down. The ultra-highs still attract W3AGO. W3ECH is at Waynesburg College; he says W3CAF, W3EFZ, W3DDU, and W3FFR are filling the air in his neighborhood. W3AVY is after DX on 14 mc. As yet, W3CEO has no antenna at his new QRA. W3CMP promises some traffic next month. W3EEC has moved. W3FGO is a new ham in Pittsburgh. W3FMC has just completed his first transmitter. W3DLG will be with us again soon. W3CFR attended the Erie Amateur Radio Club's annual banquet. The banquet was one of the best ever, with Dr. Woodruff and many others presenting fine talks.

Traffic: W3CPE 184, W3EDG 97, W3DZP 93, W3CUG 92, W3DVA 90, W3DKL 47, W3KD 37, W3DUT 21, W3CTE 20, W3DGW 19, W3BUC 5, W3CQA 10, W3APQ 7, W3CXE 7, W3ECH 6, W3CFR 3, W3AVY 2, W3CAF 2, W3AGO 4.

WESTERN NEW YORK—SCM, John R. Blum, W3CKC—This report is being compiled at Headquarters. W3DES leads the traffic gang and makes BPL both ways. FB. W3DBX also makes the BPL with a splendid total. W3BWW reports a number of schedules. W3DME says Unit 7, Sec. 2, U.S.N.R., will put A.R.R.L. code lessons on air from WMBO, local BC station. Tell the beginners, fellows. W3AWM visited W3ECF at Watertown, and reports that he is still operating at W3ON.

Traffic: W3DES 640, W3DBX 601, W3BWW 74, W3DME 47.

CENTRAL DIVISION

MICHIGAN—SCM, Ralph J. Stephenson, W3DMS—Well, gang, with the Legion Convention and Hamfest, etc., over, we can get down to regular work. W3PP again

tops the list and, for a one-op. station, it's some total. Everyone worked hard with W8BIN (Temporary American Legion stn.) and we want to thank everyone concerned. Four stations land in the BPL under new requirements. MIM. Our Oct. 11 Hamfest at Ypsi hung up a record with 264 in attendance. Let's have some comments and ideas for improving the next one. *W8BMG comments re-clogged hooks: Traffic is f.b. when it's fun, but when the hook is piled it's work, so let's not take on more than we can move out in the next 48 hours. That will help keep down delays and non-deliveries.* W8CLN, W8DBB and W8BKA visited W8BMG. W8EGI and W8LU get ORS certificates and W8AYO is after one. W8BGY doesn't have time for traffic, and reports 111. W8EKZ is working hard on traffic. W8DFE (JO) and W8FX took a trip all over Michigan. W8FX is new R.M. in Detroit to help W8DYH. W8FP, also new R.M., will take care of eastern half of Lower Michigan. W8DU, ex-Ohio R.M., is now in Detroit. W9EGF is lining up Duluth-Mpls schedules. W8DYH acted as chf. op. at W8BIN, and remarks: "Not the usual 'Greetings' stuff, but unusual amount of 'meaty' stuff." W9CE reports still vacationing. W8CLL perks up again. W8COW is on with 250-watt S.G. in final stage of c.c. transmitter. WYE is back with call W8KY. W8MH (Ohio) says that message from there via W8DEH to Detroit Police was responsible for arrest of murder fugitive. With all the crystals being ground and equipment being acquired, there should be a lot of good notes on air here this winter. W9GXE is at Michigan Tech. at Houghton and ready for U.P. traffic. W9HK reports plenty of Michigan "nines" news. W9CWR, W9VL, W9CE, W9CSL, W9GKR and W9FPF are all set for a big season. W9HSQ is getting interested. W8MV expects resume in Royal Oak shortly. W8DCT is A.A. state net control station and wants active stations in net. W9FBC comes in with a report, as a result of W8FX and W8DFE's visit. W9GX is entertaining visitors occasionally. W8DED says no "depression" in QSL biz. He also gets W8BV's report. W8AUT reports traffic. W8AM remembered to report in time. W8AKN worked all districts in two hours on 7 mc. We need more reporting stations, fellows, and don't forget to mail your report on the 16th of each month. Also, when you work other Michigan hams about the middle of the month, ask him to report, too. Four consecutive reports qualifies the station for ORS application (Michigan policy). Stations reporting to SCGM but handling no traffic: W8GWK, W8MV, W8BJ, W8DNT, W8DQO, W9CE, W8BR, W8CKZ, W9EGF, W8BX.

Traffic: W8PP 1661, W8BIN 1606, W8DFE 675, W8BMG 513, W8AM 381, W8PQ 295, W8DEH 263, W8BGY 111, W8DMS 110, W9GJX 109, W8BTK 106, W8EGI 103, W8DED 92, W9HK 92, W8FX 77, W8BMZ 70, W8CST 63, W8CLL 52, W8DYH 51, W8EKZ 46, W8DXY 29, W8JX 27, W8DCT 26, W9VL 21, W8AFL 21, W8LU 13, W8GP 10, W8CAT 10, W8CKA 10, W8SWG 9, W8SWR 9, W8BNS 9, W9FBC 8, W8WO 8, W8BJW 7, W9CWR 7, W8AKN 6, W9CE 6, W8BV 5, W8COW 4, W8ESJ 3, W8DDO 2, W8GA 2, W8GY 2, W8AYO 1, W8AUT 7.

ILLINOIS — SCGM, F. J. Hinds, W9APY, RM E. A. Hubbell, W9ERU — W9GMU, a newcomer, is doing fine work in frequency measurements. W9CUX and W9GYO have consolidated and formed a busy station. W9BPU and W9CFV send in their first traffic reports. W9QI is battling off the traffic with W9DDE and a number of other fine schedules. Now that the farm work is depressed for the winter, W9AD is on with a gang again. W9ACU and W9FCW are doing splendid schedule work. W9CFN and W9ACU have scheduled for a year steadily. W9ABS is a new traffic man. W9ANQ gets many a good message through between classes at school. W9CGW has a new 50-watt. W9AAV and W9BBR and W9CNQ are busy 'phone men in Waukegan. W9DEU is building a 56-mc. transmitter and receiver. W9HPJ is proud possessor of a 2nd-class commercial ticket. W9DXK is building a '47 type MOPA a-la QST. W9GYK burns up the 3.5-mc 'phone band. W9EGY just received a big stack of QSL cards. W9EMH is a newcomer in Waukegan. W9BYL has the crystal rig going in fine shape. A nice new crystal is being built up at W9FAU. W9GAI worked all month on a new receiver. W9ERU was heard in Czechoslovakia and Poland, and has a new dynatron and monitor. W9ACP, W9HUL and W9EJG are new

arrivals in Rockford. W9AIC is building an MOPA. W9BRY has a new '52. W9FFQ and W9ERU have a DX race on the go. Hi. W9AAK is using two receiving tubes in push-pull for the transmitter. W9CGC decided to remain with us in Illinois and help our totals. The new sets at W9BEF will soon be poking holes in the heaviside layer on 28- and 14-mc. bands. W9BEF and VK3WL are testing on 28 mc. with 'phone to try to break through. The new crystal 500-watt outfit at W9CVM is a sight for sore eyes. W9VS is rebuilding into an MOPA with possibilities for crystal later. W9FDQ got his report in on time this month. Hi. W9CNY has a couple of telephone poles for masts. W9FYZ says his '10s with 300 volts on the plates have been kicking out nicely. A new Zepp is planned for W9FYZ. W9HNK did splendid traffic work this month, in spite of the battery on the receiver going haywire for a while. A new YL operator has appeared at W9WJ — congratulations, OM. W9DGZ is putting a new crystal outfit on the air. W9HYI and W9HYO are new stations in Cicero. Boy — look at the total of W9ALA — he did it with good schedules. W9AFN also did fine relay work, and took 21 messages in 58 minutes from W6AHP. W9EWU built a receiver as per June QST and it works "Hot," he says. W9DZG won the silver cup given by the Egyptian Radio Club in QSO contest. W9GIV has been getting all set for Navy Day. W9CKZ reports a new station in Decatur — W9AIK. Many schedules are also kept at W9ATS, hence the fine totals. W9GJJ is on again after his sojourn on the SS. *South American.* W9FHJ is doing fine work with traffic and schedules. W9GFW is out to knock them dead with schedules and traffic. W9DBE worked VO and VP. W9JO was QSO five times with VK5HG. W9HQQ blew out his rectifier. Back to low power, says W9KB. If someone wants to take lessons on how to handle lots of good traffic on schedule, look to W9FCW. Two new 50-watters are in use now at W9CZL. W9ACE is really an "ACE" when it comes to traffic and schedule work. A new MOPA is being built at W9AIC. W9FGD has the new set built, but it needs a little adjusting. W9AFB is now using 100 watts PP with new Rectobulbs and a Zepp. W9DYG worked X1AA twice in one hour. Hi. W9FO and W9ENH are doing fine work together. W9BIR was heard in U.S.S.R. W9FXE is sporting a new dynatron. W9FI has shifted to 3500 for winter traffic and is doing fine. W9FPN is looking for meters at depression prices. Hi. W9FTX does good traffic work. W9AMO certainly believes in good schedules for traffic. W9AVB says 'phone DX is good on 1750 kc. W9BVP worked X1AX. Our old reliable traffic ORS, W9CKM, is back with us again. W9DZU is experimenting with 1750 kc. with W9HVR. W9FRA has some choice schedules. W9CUH is trying out a new Zepp and voltage-fed Hertz. W9BSR has resumed schedule with W9ACU. A new 50-watt MOPA is being designed at W9BYZ for 3500-cc. band. W9NN had the car stolen, but it was recovered. The new dynatron is going strong at W9BRX. W9PK will have a '52 crystal rig on 7- and 14-mc. bands soon. W9DKF says DX and traffic "aint what they used to be." (He has two wats input. Hi.) W9BLI was "Cracked up" in an auto accident but is on the air again at home. W9ECR spends 100% time on CW.

Traffic: W9CTP 615, W9AMO 341, W9ACU 300, W9ALA 301, W9FCW 247, W9FXE 153, W9GAI 133, W9AFN 113, W9FI 105, W9ERU 102, W9PK 99, W9WJ 91, W9FAU 84, W9CYT 80, W9FHJ 80, W9ATS 78, W9CSB 66, W9HOY 57, W9DGZ 54, W9DYG 51, W9ACE 43, W9QI 43, W9ENH 35, W9AIC 32, W9CZL 30, W9CUH 23, W9APY 24, W9NN 24, W9FTX 22, W9AFB 21, W9BLI 21, W9VS 21, W9HNK 17, W9FO 15, W9DBE 15, W9BYL 14, W9GFU 14, W9ANQ 11, W9FYZ 10, W9AVB 9, W9CUX 8, W9DKF 7, W9DZG 7, W9KB 7, W9JO 5, W9VRX 4, W9CKZ 4, W9BPU 3, W9CNY 3, W9DDE 3, W9FDQ 3, W9GIV 3, W9ECR 2, W9FGD 2, W9GDI 2, W9BIR 1, W9BVP 1, W9ETQ 1, W9FPN 1, W9VH 1.

INDIANA — SCGM, George H. Graue, W9BKJ — W9AIN was married Oct. 3rd in Louisville. Congrats. W9A00 is making new receiver. W9FYB is back on the air. W9EFV is QRL. W9GJ is crystal-controlled. W9AEB has a few new wrinkles to try out. W9HHI has a new Pentode receiver. W9AKJ is putting in crystal for 14 mc. W9AXH is installing new rectifier tubes. W9CHA has an electric alarm clock as a schedule reminder. W9GYB is a full-

pledged ORS. W9FKE has a quarter kw on 'phone. W9CMQ also took on a better half. Congrats, OM. W9EWQ has pipe dreams of a 28-mc. MOPA. W9HZH is a new ham in Richmond. W9FXM has a new AC receiver. W9CWS hopes to be on with an '04A. W9FXO has changed QRA. W9HKZ is having receiver troubles. W9EPH is changing receiver over to AC. W9FRY is building an '03A MOPA. W9BZZ has his crystal about done. W9HIU's '45s are giving splendid results. W9HLF is a new station in Vincennes. W9AIP finally has the '04A working 100%. W9ABW is working plenty DX. W9DHJ QRO with an '52. W9GLF reports for the first time. W9AET is moaning the loss of a quarter kw tube which dropped. W9GJS has rebuilt. W9EGE has a modulated PDC note. W9BWI is experimenting with dynamic mikes. W9CKG was assigned W9QG and is attending Purdue Univ. W9BKJ fell heir to another '04A. W9GJG has another call, W9TE. W9VW has come back after an absence of three years.

Traffic: W9VW 115, W9BKJ 103, W9GJG 94, W9QG 67, W9AET 42, W9EGE 18, W9GJS 16, W9FKE 15, W9GLF 12, W9DHJ 10, W9ABW 9, W9AIP 8, W9EOC 8, W9HUI 7, W9GYB 6, W9CHA 7, W9AXH 6, W9AKJ 1, W9CLF 2.

KENTUCKY — SCM, J. B. Wathen, III, W9BAZ — Total dropped to 1693 this month. The ORS who "forgot" to report will find I forgot to renew their appointments. W9BWJ is working with Detroit Net 1. W9EDQ says skip-effects caused his lower totals. W9BAZ has finally started work on new transmitter. W9BTM got more traffic in six days than most of you did in the month. W9CNE don't say nuthin'. Ditto for W9OX. W9JL off to a late start. '66s are replacing '81s at W9GG. W9ALR is on at W9YB for the school year. A power leak is keeping W9DDQ off the air. W9GNV comes through with a nice letter every month. Give the welcoming palm to W9ABV, a promising addition to the Louisville gang. W9FZV ground his crystal. Won't you ever get your transmitter rebuilt, W9EYW? W9CDA has a complete station to install. Ole exW9DIT comes in with a chatty response to circular. The new 'phone at W9FRF is going good. And for a change, we have a report from W9BPB. Some one kindly (?) cut down the "etheric adornment" of W9AEN. Another active Westerner has been uncovered by the circular — W9GON. — W9CTZ gets 500 miles with his single '45. The Louisville gang had the usual booth-station at the Third Annual Radio Show, Oct. 12th-14th. Something over 2000 messages were accepted for transmission. Transmitters were donated by W9ZZQ and W9HXN. The latter belongs to Hdqs. Co. National Guard stationed at St. Matthews. W9AZY and W9FTV did most of the brass-pounding. Antenna installation bossed by W9EQO. W9CNE donated a receiver for the booth. W9BEW is established in Lexington. The following have been appointed acting RMs: W9BAN Western District, W9CNE Central. Give them your cooperation.

Traffic: W9BWJ 691, W9EDQ 399, W9BAZ 151, W9ZZQ 96, W9BTM 98, W9CNE 94, W9OX 79, W9JL 29, W9GGB 15, W9ALR 12, W9BAN 11, W9EQO 8, W9DDQ 4, W9GON 3, W9ABV 2, W9FZV 1.

OHIO — SCM, Harry A. Tummonds, W8BAH — Once upon a time (no, this is not a fairy tale), in fact it was just one year ago this month, Ohio's total was 848, and Ohio rested securely in thirteenth place. "Not so hot," said the gang. They got busy and put THIRTEEN in the new BFL, won a string of Banners the last few months and report a total of 15,453 this month. All sections take notice: "Ohio means business." Here are the lucky thirteen: W8DDS, W8CGS, W8CNM, W8BYD, W8DVL, W8BZB, W8DFR, W8CKX, W8ABW, W8BBH, W8APC, W8MBX, W8BAH. Also 76 stations reported. FB. District No. 1: W8AGF says better next time. W8EQU is a member of Garfield Heights Club. W8EBY reports for new Cleveland Heights High School Amateur Radio Club. Their call is W8FJE. W8CPS, W8EBY and W8FFR are members. W8EXA is rebuilding. W8CIO, Official Observer, has the best looking frequency meter we have ever seen. W8AXV wants to know why no requests have come in for 56-mc. tests. W8BYD: Welcome to Ohio ORS ranks, Storky, with that record total. FB. W8BMX says, "Please give the second op. a big hand." The Central Y. M. C. A. station at Cleveland is handling lots of traffic over W8FF. "Keep me listed, back soon," says

W8CIY. W8CCK schedules W8DES. W8EIL reports thirteen. W8RN is still riding KKUI. W8EBT handled American Legion traffic. The RM of this district, W8DVL, shoots in a record total. W8CTP telephoned his report. Report received from W8EGO, Lakewood Club station. Newly elected officers of this club are President, W8CUW; Vice-President, W8TH-BGZ; Secretary, W8EEW-EUD. W8DGG is President of the Garfield Heights Club. W8FGJ uses a TNT circuit. First report from W8CUW is FB. W8BNC is attending Case School. W8DYG, a disabled War veteran, is Secretary of the Garfield Heights Radio Club. W8EEW got his total with good schedules. W8BFA has a brand-new pole. W8DIH says Norwalk Amateur Radio Club held two big parties. W8TH is shifting long haul traffic to 14 mc. W8DDS leads the state with 1988. Congratulations, Russ. W8BAC is doing better. W8BON is a new reporter from Lakewood. W8AIR wants OBS appointment. W8BOT will have a '60 in last stage. District No. 2: RM W8BKM leads his district again. W8BCI reports on 14 mc. W8CEI will handle A.A. schedules. Sure pleased to hear from W8EJ again. District No. 3: RM W8APC leads his district, and is doing a good job as new RM replacing W8AND. W8BTM says see the gang at ORS party. W8CSB says better next time. Now using High C Hartley and FB says W8JR. District No. 4: W8DTW leads this district with FB total. Anybody see W8MH? W8ATV is now at Ohio Northern University. Look for him at W8ADT. First report from W8DIO, Lima, exW8BKV and W8CKH. Try to do better says W8HT. W8QQ is at W9HRM for commercial ticket. W8UW is now at University of Cincinnati, GRA Dorm 202, and operates W8CAU. W8QC burnt out power supply. Sure appreciate full report and letter from W8EEQ. Still trying to get a PDC note says W8OQ. District No. 5: W8BZB, the Chip and the Block, lead this district with 974. FB, OMs. W8NP's best DX was W7AWZ. W8DFR is new RM for this district. Congratulations, ROY. W8NP was forced to resign account of work. W8BSR reports. Having trouble with crystal oscillator reports W8DVE. W8LI had best rag chew in three years with W8DMJ. New ham in Akron, W8EXI, reports good total. W8BZL says going back to crystal. District No. 6: RM W8CNM leads his district, and says new 50-watter soon. Hi. W8BBH breaks all traffic records for his station. W8BYR is good 'phone traffic station. Going strong soon, says W8ARV. W2BMX is back at W8SG now. Rebuilding reports W8CFT. Remember those ORS certificates, gang. Look at the date and send them in to the SCM for renewal. Going again, reports W8GZ. Welcome to Ohio, W8FJN. He used to be W9CMJ and W8DGB. W8CXF is a new reporter from Utica, Ohio. FB. The SCM visited W8BYR while in Columbus. District No. 7: RM W8CKX leads the district this month. FB. This is one of the largest districts in Ohio. More ORS and reporters wanted. W8VP hits record total and has schedules lined up for west coast traffic. District No. 8: Again W8CGS leads his district and maintains schedules in ORS trancon chain. FB, CD. More Western Section stations needed for this chain. Please radio W8CGS, W8BAH, W9EDG, W9BWJ or W8BYD for information. W9DGS, please note. W8FA QRL school work. W8ENH schedules W8CIO and W8CGS. W8CUL, 'phone RM, has good report and asks that all 'phone stations interested in traffic get in touch with him. District No. 9: W8HH leads the district this month. W8TK QRL school studies. This is another large district needing a first-class man for RM, also new reporters and ORS wanted. Marietta and Athens amateurs take notice. New ORS this month are W8EBT of Cleveland and W8EFN of Canton. W8EFN reports new 200-watt 'phone on air. "Trying to encourage improvement in deliveries and relaying of messages and helping the new men to obtain that genuine interest in traffic work which the rest of us have," reports W8BAH. Report received from Air City Radio Club station W8MK, Dayton. W8BUY, Club President, says this station is out for traffic work. FB. Well, gang, thanks for that promised ten thousand total. I make no predictions for next month but let's stay with the leaders.

Traffic: W8DDS 1988, W8BAH 1691, W8CGS 1296, W8CNM 1113, W8BYD 1030, W8DVL 1018, W8BZB 974, W8DFR 943, W8CKX 686, W8AXV 663, W8BBH 509, W8NP 278, W8VP 485, W8CUL 340, W8APC 328, W8BMX

237, W8BKM 207, W8CIO 163, W8DTW 153, W8DYG 129, W8DVE 128, W8EBT 107, W8CCK 84, W8BAC 82, W8FF 82, W8AIR 77, W8ATV 68, W8CUW 62, W8B0T 48, W8E0G 47, W8EEW 46, W8BYR 38, W8EEQ 37, W8TH 35, W8EXI 33, W8FJN 32, W8EQU 31, W8ENH 25, W8GZ 25, W8DQG 25, W8JR 18, W8EXA 18, W8DIH 16, W8EL 13, W8DIO 12, W8BNC 10, W8BFA 10, W8CQ 10, W8HH 10, W8ARW 8, W8BTT 8, W8CTP 7, W8EY 7, W8BON 6, W8EJ 6, W8LI 6, W8HT 6, W8AGF 12, W8CXF 5, W8OQ 5, W8BZL 4, W8TK 4, W8CSB 4, W8FGJ 2, W8FA 2.

WISCONSIN — SCM, C. N. Crapo, W9VD — W9FAV is now on 3801-ke. crystal. W9EHD has 500 watts on 3748 and 3998 kc. W9ZY reports Northwest Wisconsin Radio Club has 20 members (W9GPQ is their call). W9BVR has schedules on 1743 with W9HVN and W6CXW. W9DIT reported via W9AZN. W9DKH is not going so hot this year. W9GKE is on 7000 early mornings. W9GYL is looking for schedules. W9ALX is putting up a 90-foot pole. W9SO schedules W9GYH and W9BQU. W9DTK is on 3750 crystal. W9HFH wants an ORS. W9EGZ is now located at Muscoda. W9WK is on again after silence of sixteen years. W9FSS has 50 watts TPTG and pentode receiver. W9DLQ reported via radio W8DEB. W9GFL is on again after long period in hospital. W8BIB is keeping Army schedules moving. W9CER has Dynatron working. W9ABM works W9FHU Mondays on Army schedule. W9HMS is building combined Monitor-Frequency meter. W9VD has new dynatron.

Traffic: W9FAV 140, W9EHD 78, W9ZY 68, W9FAA 14, W9GPQ 53, W9DIT 35, W9DKH 30, W9GKE 30, W9GYL 21, W9ALX 14, W9HFH 11, W9DTK 12, W9SO 13, W9EGZ 11, W9BVR 43, W9FSS 7, W9DLQ 6, W9VD 24.

DAKOTA DIVISION

SOUTH DAKOTA — Acting SCM, Stanway Gough, W9DNS — W9DKL leads the Section in traffic. W9FLI kept 5 schedules. W9BEX paid a long visit to W9FLI. W9TI is on 1750 kc. with M.O.P.A. 'phone. W9DGR has gone to Ann Arbor, Mich., to attend school. W9HAF is coming to life again. W9BAE is rebuilding. W9CFU is moving. W9DB is using Hartley with '52 and '66 rectifiers. W9DES spends his spare time chasing pheasants. W9HSH and W9DTZ are QRL school. W9DNS is still trying to get DC from a mercury arc.

Traffic: W9DKL 138, W9FLI 83, W9DNS 22, W9DB 15, W9HSH 5, W9CFU 2, W9DTZ 2, W9ALO 2.

SOUTHERN MINNESOTA — Acting SCM, Vic Schleuder, W9BKK. The Northern Minnesota vs. Southern Minnesota Traffic Contest is on!! W9EPJ wins the first Handbook by reason of the highest total. Who will get it next month? W9HCC relayed traffic to the South Seas. W9EPD wants to be counted in on the Intersectional Traffic Contest. W9DRG is getting spruced up for West Point. W9EHI reports assisting W9BIS in erecting a 30-ft. stick on the U.S.N.R. Armory. W9GCA, Marshal High School, will be active this season. W9BKK worked W7AWI with a '27 on 3.5 mc. W9HCW's receiver has a complaining audio amplifier. W9GUX is remodeling his shack. W9FNK is putting in crystal. W9FCC is op. at W9ERT, West High School. W9GLE got his blue ticket. W9GHP is new station at Minneapolis. W9EPD is changing to crystal. W9EXR has installed crystal. W9BNN visited W9BKK and W9HCW. W9BKK have received another '52 and will change to push-pull M.O.P.A. W9EVG is new station at Minneapolis. 'Jim' of W9BN visited Ill. hams on his vacation. W9EPJ is now crystal-controlled. W9COS is enjoying pheasant hunting. W9HOP and W9FJK are grinding crystals for their new rigs. W9DGH's new crystal is getting out fine. W9BED went hamming in Kansas. W9FUI has crystal now. W9EYL finished rebuilding. W9FLE is back on the air. W9FFY has at last received his license renewal.

Traffic: W9DGE 1, W9GUX 1, W9FNK 1, W9DRG 2, W9GHP 2, W9GLE 3, W9LS 3, W9AIR 5, W9EPD 3, W9CKU 13, W9EXR 14, W9HFF 19, W9BNN 20, W9FJK 21, W9HCC 33, W9ERT 36, W9BKK 101, W9BN 137, W9EPJ 267, W9COS 12.

NORTHERN MINNESOTA — SCM, Ray Weihe, W9CTW — Things have livened up quite a bit this month

with the result of lots of reports, and a member making the BPL with deliveries. Fine work, gang, but we need more than that to snow under that Husky Southern Minny gang. W9BVI makes the BPL, through his schedules West, and on 14 mc. W9CTW is going full blast now on 7 or 3.5 mc. W9ARE is busy with 3.5-mc. 'phone. W9HIB sends in his ORS application. W9FAQ is getting arranged for the winter. W9BBL is changing to crystal. W9FNQ says nil, as does W9GKM. W9HRB is also getting on with crystal. W9HDN reports W9YK getting on the air. W9AAN resigns his ORS, as he is no longer in this section. Sorry to lose you, OM. W9FNJ is still off the air. W9CWI is not very active yet. W9BGG operates a public address system. W9GWR has moved into this section and is located at Rush City. The RM, W9DOQ, is organizing a 'Traffic net in Minnesota, and wants every one to report to him. Help him along. The St. Paul Radio Club held their First Annual Banquet last month, and had a great time and turnout.

Traffic: W9BVI 182, W9BRA 80, W9CTW 40, W9ARE 19, W9HIB 13, W9FAQ 10, W9BBL 9, W9FNQ 7, W9GKM 4, W9HRB 4, W9HDN 2, W9BHH 1.

NORTH DAKOTA — SCM, Guy L. Ottinger, W9BVF — Don't forget the contest and the prize for the station that handles the most traffic every two months. W9IK has a 30-watt crystal-controlled 'phone on 1770. W9DGS handled traffic from American Legion Convention. W9DYA plans on a crystal soon. W9CRL handles a little traffic. W9EGI rebuilt receiver four times. W9DFF can only be on after 11 p.m. because of WDAY schedule. W9BVF wins the first two months prize of 100 QSL cards for highest traffic handled. W9BVF has been keeping AA schedules and working calculus.

Traffic: W9DGS 160, W9BVF 53, W9EGI 52, W9CRL 20, W9DFF 10, W9IK 6.

DELTA DIVISION

MISSISSIPPI — SCM, William G. Bodker, W5AZV — W5ANX turns in the highest traffic total. He has a portable call, W5AIX. W5AWP is installing another crystal for 3500 kc. W5AAY is a new 3500-ke. 'phone. W5BTL planned to enter the frequency-measuring contest. W5AAF is a new station. W5VJ is building a 3500-ke. TNT push-pull. W5ACS met with an unfortunate accident, getting three fingers of his right hand smashed. W5BUI is home from St. Louis. In a recent contest sponsored by the Jackson Amateur Radio Association, the winners were: W5AZV, first prize, QST for one year; W5AUF, second prize, 250 QSL cards. The objective was to see which station could first obtain QSL cards from all districts.

Traffic: W5ANX 68, W5AWP 18, W5AZV 16, W5BOT 15, W5VJ 8.

ARKANSAS — SCM, Henry E. Velte, W5ABI — There are many active stations in the state that are not reporting to the SCM and, therefore, are not reported in these reports. W5BMI won the recent A.A. contest. Congrats. W5ADT had the misfortune of blowing his plate transformer. W5JK reported by radio. W5CR is a new station in Fayetteville owned by Ex-W9FVM. W5MU is Assistant Operator at W5CR. W5FE at Hot Springs is using a type 10 tube. W5IQ is Editor of *Ye Arkansas Netter*, a little paper of A.A. activities. W5SI is using a type '50 and a type '10 in parallel. Hi. W5BRI is on with a pair of '03s in push-pull. W5LK is off the air due to a sore wrist. W5BLG is working nights. W5ABI is busy installing his equipment at his new location. Let's have more reports next month.

Traffic: W5BMI 68, W5JK 16, W5CR 10.

TENNESSEE — SCM, James B. Witt, W4SP — W4OI sent in the best report this month. W4AFM was second. We have our first report from W4ANM. W4AD has put up new antenna. W4MU will have 500-watt 'phone going soon, similar to W4AAD's. W4ACU is Net Control Station for Tennessee in A.A. net. W4PZ, W4LU, W4AD, W4AJA, W4AID, W4FK, W4MU and W4AAD take part. W4TM has three 212D tubes modulating one 212D with about 500 watts input. W4HK's antenna is located on the roof of a ten-story building. W4FX and W4SP are getting busy again.

Traffic: W4OI 65, W4AFM 61, W4OV 31, W4AAO 28, W4RO 26, W4AAD 20, W4AOI 20, W4AD 10, W4ABQ 8, W4ANM 2.

HUDSON DIVISION

NEW YORK CITY AND LONG ISLAND — Acting SCM, W. J. Warringer, W2BFP — Those of you who have not sent in your ORS tickets for reinforcement better do so soon, as they will be cancelled if not sent in. Traffic perking up due to N. Y. Radio Show and Mineola Fair. Phone men handling traffic or otherwise, please send in your reports. Manhattan: W2RU, station at Radio Show, leads with 2813 messages originated. W2SC took quite a bit of his traffic from W2RU. W2BNL says "Nothing new," meaning still traveling for NBC. W2BDJ is rebuilding receiver and freq. meter. ORS W2BBY is cancelled. W2ADI has a new 14-mc. 'phone rig. W2AVK has been laid up, but O.K. now. Long Island: W2CXR operated at Mineola Fair and handled about 500 messages. W2KG is sure doing fine work. W2BDN reports. W2AUS schedules Fort Sill, Okla., and wants West Coast and Orient traffic. W2BST now has a YL op. W2BWD and BET both working on 50-watt crystal jobs. W2CHK-CYZ and W2BFG live in houses back to back. W2BIY is back. W2AIQ is rarin' to go with five schedules. W2AVP-NO just kidding in under the wire with his report. W2BTE says nothing much new. W2BVB comes through with first report. W2LR has new 100-watt crystal on 3990 kc. for U.S.N.R. work. W2OB is rebuilding. W2AGL is now in the AA net. Brooklyn: W2AZV did fine work at Radio Show. W2DBQ is now an ORS. W2PF is using DeForest 566 rectifiers. W2BO is all set for fall season. W2AEN has a crystal job. W2CGD is building 3.5-mc. 'phone with '04A amp. and '04A mod. W2LB received a card from Germany. W2CAR sends in first report. W2BIV has been very busy. W2BRB reports on his FB QSL card, if you haven't seen it write for one. Bronx: W2BGO says more off-frequency stations should lose their licenses. W2CYX is very active in Naval Reserve. W2AFT handles all his traffic on AA net. W2FF worked ZL4BA. W2CIZ is operating his portable W2ZZW in the wilds of the Catskills at the Henry Morse Farm, Denver, N. Y. W2CBB has been laid up with the Flu. W2CWP just got a new job. W2CAP is new call of X2ANE. W2AQQ ORS cancelled. Staten Island: W2WP is sure keeping busy as ORS and AA. Reports new ham, W2DCW, Huguenot PK., S. I. W2DHK sends in his first traffic total. W2AHO, a new ham, sends in his first report. W2BUN Eagle Mills, N. Y. (near Troy), sent in report. In future send your reports to W2LU, Schenectady, N. Y., OM. You are in his Section.

Traffic: Manhattan — W2RU 2813, W2SC 466, W2BNL 4, W2BDJ 3. Staten Island — W2WP 109, W2DHK 26, W2AHO 35. Long Island — W2CXR 488, W2KG 328, W2BDN 119, W2AUS 71, W2BST 40, W2CHK 36, W2AIQ 35, W2AVP-NO 22, W2BTE 21, W2BFG 21, W2BVE 15. Brooklyn — W2AZV 454, W2DBQ 59, W2PF 43, W2BO 34, W2CCD 20, W2LB 13, W2CAR 7, W2BIV 3. Bronx — W2BGO 153, W2CYX 41, W2AFT 28, W2FF 28, W2CBB 10.

EASTERN NEW YORK — SCM, R. E. Haight, W2LU — W2BZZ, newly appointed ORS, leads with nice total. W2BJA, Route Manager, reports many schedules. W2DEL is operating on 17.7 and 3.5 mc. W2BLU heard several VKs and ZLs on 3.5-kc. band. W2ANV attended SARA Banquet. W2ACD with new Chevy made flying trip to SARA Banquet. W2BNA applied for portable license. W2BER qualified for ORS appointment. W2CL resigns as our OBS, OO and ORS. W2CTC reports tube trouble. W2CGO, chairman of SARA Banquet Committee, is to be congratulated on its splendid success. W2BTW says W2ATM and he are starting a club. W2OP as OBS tells the boys the latest. W2CBX is rebuilding using 2 '52s push-pull. W2ACY is on air from new QRA. W2UL is building transmitter for W2CQN in Schenectady. W2BSH is rebuilding. W2BLA brought his transmitter to SARA Banquet. W2ACB is still DXing around the country with the House of Magic. W2BWF, new OO, reports many off-frequency stations. W2SJ united with a wife. Congrats, Ray. W2AVS improved his remote control facilities. W2VO has worked all continents.

Traffic: W2BZZ 301, W2BJA 171, W2LU 167, W2DEL 102, W2BLU 54, W2ANV 44, W2ACD 43, W2BNA 34, W2BER 27, W2CL 25, W2CTC 24, W2CGO 13, W2BTW 11, W2OP 10, W2CJP 10, W2CBX 10, W2ACY 4, W2UL 1, W2AVS 29.

NORTHERN NEW JERSEY — SCM, A. G. Wester, Jr., W2WR — W2MQ has been appointed Route Manager, and all traffic stations are requested to give him the fullest coöperation. W2CVY and W2AH, our OOs, are on the job for violators. W2AH has now located in Lyndhurst. W2COG has applied for ORS. W2AOS is busy with NICG and W2CAN. W2CWK has resumed his traffic gait. W2AGX is going to scrap his high power. W2CJX has been enjoying a vacation. W2BPY is devoting all his time to traffic handling. W2CFY reported after a few months' silence. W2CEX continues to rebuild. W2CDQ is attending Union College. W2AIF has been very busy with his orchestra. W2AMT reports that the Northern Valley Radio Association going strong, and meets Tuesdays at Tenefy. W2AUP always has a fine report. W2BBU and W2CBY made their first traffic reports. W2ALD is desirous of getting amateurs into the U.S.N.R. W2CNL is on the road to an ORS. W2BSC at Stevens College is manned by 8 active ops. W2CHZ is installing a crystal. W2CCT is fooling with 56 mc. W2BWW and W2BSS live in the same house. W2AUB has plenty of visitors. W2BYD is a new ham in Elizabeth. W2BDX and W2ANJ have been off for the summer. W2CDR is getting out FB with his TNT '10. W2IY is chief op. for the National Guard. W2AGO is off the air due to transmitter failure. W2BCH has been on the sick list.

Traffic: W2AOS 23, W2CWK 42, W2AGX 8, W2CJX 28, W2BPY 94, W2MQ 171, W2CEX 35, W2AIF 7, W2AMT 5, W2COG 42, W2AUP 38, W2BBU 17, W2CBY 13, W2ALD 66, W2CNL 3, W2BSC 3, W2DCL 4, W2CHZ 14, W2AGO 39.

MIDWEST DIVISION

NEBRASKA — SCM, S. C. Wallace, W9FAM — W9BEX carries off the honors this time. W9DMY and W9GAS want more traffic. W9DI is the new RM for Nebraska. W9FAM is still having trouble with junk pile. W9FUW is going FB on 3.5 and 1.7 mc. W9DGL is a new ORS. W9DFR planned to take part in frequency tests. W9BQR says location not so hot for transmitting. W9DTH will be on 3.5 mc. soon. W9EEW is having trouble with transmitting location. W9GNZ, W9BHN and W9FWW report. W9EWO is rearing to buck.

Traffic: W9BEX 444, W9DMY 147, W9DI 130, W9FAM 76, W9FUW 46, W9FUW 18, W9DGL 15, W9DFR 10, W9BHN 2, W9BQR 1, W9GAS 14, W9EWO 63.

IOWA — SCM, George D. Hansen, W9FFD — Our RM, W9EJQ, this time leads the field. W9BPG says traffic has been picking up. W9FFD is gradually resuming schedules. W9FZO enjoyed the ORS Party. All ORS should mark the date of the next one on the calendar and be there. Good time assured. W9AWY gets his ORS ticket. Congrats. W9IO is resuming activities with the starting of school. W9ACL reports schedules being resumed and that new Radio Club going good. FB, luck to your club. W9FEB reports DX is nil in his hills. W9EIV radios in his report. W9BCA is resuming Navy work. W9FLK is working AA schedules. W9GWT has his cap set for ORS! How about some other aspirants? W9AHX is trying for WAC. W9CFB is a new reporter. W9FYC reports having won prizes in a Photo Contest. W9CWG is still working on the new transmitter. W9EST is back among the reporters after a long absence. W9DFZ QRX for his license. W9DIB does not seem able to land that DX. W9AYC wants to contact Iowa 'phone men. W9BFL reports good DX. W9BCL decided to stay with Iowa instead of going back to Kentucky. W9DNZ kicks through, and promises resumption of activities. Let us start the ball rolling, CLUBS. Hold that pep meeting, get all the kinks out and settle down to a WHALE of a season. W9GP reports some alterations to the attic window will add GP get that antenna efficiency he has been looking for.

Traffic: W9EJQ 116, W9BPG 30, W9FFD 61, W9FZO 51, W9AWY 41, W9IO 41, W9ACL 37, W9FEB 32, W9EIV 31, W9BCA 21, W9FLK 15, W9GWT 14, W9AHX 14, W9CFB 11, W9FYC 10, W9CWG 7, W9EST 6, W9DFZ 4, W9DIB 4, W9AYC 3, W9BFL 2, W9AEW 39.

MISSOURI — SCM, L. B. Lazure, W9RR — New ORS during the month: W9DHF-EYG-FSL. W9BJA has been appointed as Missouri Route Manager. St. Louis: Some sneak thief cleaned out W9ZK-AAU to the tune of about

\$250 worth of apparatus. W9DOE is on 7 mc. and also operating W9BC Wednesdays for U.S.N.R. W9ECI moved. W9FTA still thinks toboat oping is FB. W9GDU is home from Valp with comm. ticket. W9BAF is going with a pair of '52s. W9DZN says not much traffic. W9PW is trying east and west schedules. W9DYJ is another mover. State News: W9EPK tied up with W9BKG. W9FSL keeps 4 schedules. W9HNM is a new reporter from Marceline. W9DHF has been studying and rebuilding. W9DMO has been making improvements in his 'phone. W9BGW hit the BPL with 134 deliveries. FB. W9DHN QRT account school and auto crash. W9ASV just got new transmitter on air. W9AIJ reports one schedule working well and A. A. net FB. W9CJB is getting set for winter on 7 mc. W9CDU reports ready for traffic. W9HLP is a new Nevada station. W9GKJ is in hospital after operation. W9BMU is just back home from boats. W9GAR was QRX all summer building new house. W9CRM had to QRT when RR cut off his help to make better times (for the stock market). W9EYG is recovering from convention fever. W9BJA lost Dept. of Commerce job and is trying the radio service business. W9AJW reports expected activity. W9ENF was heard handling traffic but no report—how come? Kansas City: W9EQC is on regularly for traffic. W9AOG broke an ankle, and is laid up temporarily. AOG says there are the makings of a ham club at Central College with himself, W9CNU, W9DHN and W9FYF to start off. W9BMT says "Getting back on, hold ORS open." W9BMA says the same. W9CVP says crystal grinding QRM bad. W9CVT reports consistent DX on 3.5 mc. W9AKZ says the outfit is willing, but he has no time lately. W9AQX handled three Red Cross messages on emergency drill, and signed up eight fellows for U.S.N.R. unit at Parkville. W9DGN has again hooked up at new location. W9HRX is a new reporting station. W9FPI found time to handle traffic again. W9FLQ is ready for any traffic for K. C. W9ENU is back from Illinois. W9NP handled the usual wad of U.S.N.R. traffic. W9RR has been on more than usual the past month. A ham meeting was held at KWKC, Oct. 23rd, with talks by the representative of 1st National Television, the SCM, W9CFL and others; purpose was formation of a new ham club. Attendance about 75. Rumor says that the RI in KC has been instructed to proceed after various offenders. He was billed to talk at the meeting, but had to go to Oklahoma to pick up some ham for trying to be a broadcast station. A word to the wise—Watch out for record-playing 'phones! The license situation seems improved—W9ZZ got renewal of station license in 40 days.

Traffic: W9DOE 25, W9ECI 2, W9DZN 10, W9PW 17, W9FSL 63, W9HNM 3, W9BGW 400, W9AIJ 12, W9CJB 4, W9GAR 4, W9EYG 4, W9BJA 203, W9EQC 27, W9BMT 1, W9CVP 5, W9CVT 26, W9AQX 31, W9DQN 10, W9HRX 2, W9FPI 20, W9FLQ 18, W9ENU 15, W9NP 301, W9CFL 12, W9RR 110, W9ZZ 15, W9ENF 20, W9FEY 58, W9FVM 4, W9DUD 13, W9BC 2, W9BGN 7, W9FVM 1.

KANSAS—SCM, J. H. Amis, W9CET—W9CFN leads the Section with a total of 453 and a hot schedule with W5VQ. W9BNU, second high, reports by radio via W9FRC. W9FRC has a new receiver. W9ESL is building a crystal frequency standard. W9FLG has a new rig nearly complete. W9FMX' portable call is W9AUD. W9BNX handled all his traffic with 3500-kc. 'phone. W9HL is a regular reporter. W9CXW has a new portable under the call of W9FPL. W9GHI is going to school at Baker University. W9FRU reports for the first time. W9DVG promises more traffic on account of Army Amateur work starting again. W9JA is back in school at KSAC. W9BGL at KU has hopes for a live Radio Club there soon. W9CET is building a new AC receiver. A new club has just been organized at Hutchinson, "The Sunflower Amateur Radio Club." President, W9DSI; Vice-President, W9BSK; Secretary and Treasurer, W9FMX.

Traffic: W9CFN 452, W9BNU 417, W9FRC 67, W9ESL 58, W9FMX 36, W9NI 30, W9BNX 34, W9HL 16, W9CXW 12, W9GHI 10, W9FRU 8, W9DVG 28.

NEW ENGLAND DIVISION

VERMONT—SCM, Roy L. Gale, W1BD—Thanks for the honor of SCM office, gang. I consider it a worthwhile opportunity. W1CGX is busy with service work. W1BDX

would like to be with us, but doesn't dare, for one broadside from Old Ironsides would bring a swarm of angry BCLs on his neck. W1BMS is in New York City. W1ATF manages to do a little farming when radio weather is bad. Visitors at his place were W1SV, W1BGY and W2DCW. W1BD is building a 14-mc. crystal transmitter with a pair of '10s in the front end. Visitors at his shack were W1ACK, W1BGY and W1SZ. Two stations report hearing the call W1BBJ. W1BNS says there are several hams in his town, but some of them need waking up. Got any firecrackers, OM? W1BJP confesses that all is quiet in his section, yet we secretly suspect he's working on a new M.O.P.A. rig. Dunno where the rest of the gang is. Don't find them among the "Silent Keys."

Traffic: W1CGX 55, W1ATF 46, W1BJP 31, W1BNS 22, W1BD 20.

NEW HAMPSHIRE—SCM, V. W. Hodge, W1ATJ—W1APK has been assigned W1JB for his portable on 7200 kc. W1BLA is working on 7100. W1BJF has been busy on 3500. W1BAB is busy selling PHILCOS to the BCLs. W1AEF pounds brass for a few minutes every day. W1AXL is building a new transmitter using pentodes, and is also experimenting with crystal with W1CJO. W1BFT reports six stations on the air in Concord, with W1AVL, W1AVJ and W1BFT crystal-controlled. W1IP is enjoying himself at last as traffic is picking up again. MIM. W1AUU is getting out fine with his 'phone and keeps two schedules daily. W1CCM expects to be off the air for about six months. BCL service work keeps the SCM off the air.

Traffic: W1IP 206, W1BJF 20, W1BAB 13, W1APK 9, W1AEF 3, W1BLA 1, W1BAC 4.

MAINE—SCM, John W. Singleton, W1CDX—W1CPT and W1CFG make the BPL Congrats, OMs. W1BEZ is next with a fine total. W1ATO has his usual fine total. The SCM knocked out a few, too. W1BEU has been shining up his transmitter. W1BLI, RM, is right on the job. W1BOF says to shoot your Canadian traffic to him. W1CEQ is using remote control. W1AJC is still the champion rag chewer. Hi. W1AKR sends in his second report. W1BOZ sends in a nice report. W1APX is working on 14.7 and 3.5 mc. W1ABQ sends his first report. W1IR says he knows how to get crystal note without the crystal. W1BWB puts out a fine signal on 3500 kc. W1BUZ reports for the first time. W1BFA handles a few now and then. W1AQL reports lots of activity at the Queen City Radio Club. W1BWI handled a couple. We will start another State traffic contest in November, and it is hoped that many fine prizes will be available to the winners. This contest will continue for four months. W1COV is changing QRA. W1BUO reported.

Traffic: W1CFG 549, W1CPT 590, W1BEZ 297, W1ATO 244, W1CDX 226, W1BEU 224, W1BLI 182, W1BOF 161, W1CEQ 160, W1AJC 118, W1AKR 118, W1BOZ 94, W1APX 78, W1ABQ 47, W1IR 35, W1BWB 20, W1BUZ 16, W1BFA 6, W1AQL 4, W1BWI 2, W1KQ 48, W1ANH 20, W1QH 5, W1COV 23, W1BUO 25.

WESTERN MASSACHUSETTS—SCM, Leo R. Pelouin, W1JV—Western Massachusetts is well on its way to a season of unusual activity, judging by the enthusiasm of our ORS. Attention has been called to the fact that many stations in our Section handle traffic but do not bother to report. All stations handling traffic should report to the SCM on the 16th of each month, whether they hold an ORS certificate or not. W1ASY, our Route Manager, has schedules ready for those interested. W1OAF of W1AWW fame sports a new ORS certificate. C. E. Donaldson, W1BJT, has been made traffic manager at W1BWX. W1ATK has taken out a portable call, W1ZZD. W1BNL schedules W1VF and W1ASY. W1BCX is doing fine as a traffic station. W1BVX turns in a fine traffic report. W1AUU is a new ham in Worcester. W1BVR is keeping seven schedules weekly. W1AFI of Webster, Mass., reports for first time. W1BXF and W1CCH will soon sport ORS certificates. W1BVP is building a new M.O.P.A.

Traffic: W1ASY 132, W1BVR 106, W1BCX 68, W1AFI 59, W1CPG 36, W1CCH 36, W1BXF 33, W1BWX 19, W1AFI 19, W1OAF 18, W1BWX 28, W1AVQ 18, W1APL 12, W1ATK 4, W1BNL 70.

EASTERN MASSACHUSETTS—SCM, Joseph A. Mullen, W1AS1—Greetings, salutations and all that sort

of thing. Here is your first report from the new SCM. I am making a new traffic net to enable you all to clear your hooks systematically. WIABG is your new RM. Let him hear from you. WICCP reports W1CUO as a new ham in Norwood. W1WU is coming on with a new 75-watt job. W1ADK is very busy with a new job. W1LQ sends in his report from Bermuda. W1KH worked PAOEMD. W1WV reports W1KJ roaming our 14-mc. band. W1BZQ is busy with Police Radio. W1LM is laying out new schedules. W1ACH has new SW3 job on the way. W1CAW offers you positive delivery on Boston traffic. W1AFP now holds an extra first ham ticket. Congratulations. W1CHR is using new power supply. W1ATX is busy with school work. W1CQN has gone to 14 mc. W1ME has a new crystal job. W1BFR is moving. W1GH reports new Radio Club at Taunton High School. W1AAL worked Holland. The South Shore Amateur Radio Club put their last ham meeting on the air on 56 mc. All ORS please make an extra effort to listen in on the OB stations.

Traffic: W1AFP 186, W1CHR 98, W1CWP 71, W1ASI 56, W1KH 43, W1WV 40, W1ATX 36, W1BZQ 33, W1ACH 30, W1CAW 30, W1CQN 24, W1ME 24, W1LM 11, W1GH 17, W1AGA 10, W1BFR 17, W1AAL 23.

RHODE ISLAND — SCM, N. H. Miller, W1AWE — W1MO says this month was terrible for both DX and traffic. W1BML is back in school. W1CAB has his hands full with the Naval Reserve. W1ATM is high man this month. W1BCR QRMs the world with his high power 'phone. W1BUX chings to 14 mc. W1AQ is getting ready for the A.R.R.L. Convention at Providence next spring. W1ARK and Ex1AKK are now married men. W1EX is a hard-working service man. W1AWE is entering the hams' 4th stage (married) next January. W1AMU has been busy at WPRO. W1ID, W1CMG, W1AFO, W1GV, W1AFM, W1BLJ, W1BES, and W1BCR are all going strong with 'phone. W1BDQ works a few occasionally. W1BLV is still pounding out a good signal on 3.5 mc. W1BQD is going strong in Newport. W1MG likes 14 mc. as much as W1BQD. W1ASZ would like to start a contest for high schools. W1BTP, Pawtucket High, is raring to go in such a contest. W1CPV operates quite regularly. W1BGA has his transmitter remote controlled from three places. W1AAD is absorbing knowledge in school at Washington, D. C. W1AOP is having trouble with key clicks. W1PM is living in the house where W1AMJ formerly lived. W1DCR is a new ham in Pawtucket. His transmitter and receiver cost him just \$2.75, which puts him in the front rank of the order of chislers of Pawt. Keep up the good work, fellows, and be sure to send in your reports every month on the 16th.

Traffic: W1ATM 53, W1CAB 39, W1AWE 28, W1CPV 15, W1ASZ 7, W1MO 4, W1BQD 2.

CONNECTICUT — SCM, Fred A. Ellis, Jr., W1CTI — As usual, W1MK heads the list. W1BEO gets his total from six daily schedules. W1YU is back with us after the summer vacation. W1FL and W1CTI attended the banquet given by the Twin City Radio Club of New Haven. W1AOK wants schedules on Sunday morning. Sure glad to have W1AJB reporting again. W1AFB is still pounding 'em out. W1AVB operates week days around noon. W1BVV is running a code school at local National Guard. W1HD is building a 14-mc. 'phone. W1CBA has moved to new and larger quarters. They have three rooms, and are giving code instruction every Thursday night at 8. W1AMQ is studying for a commercial ticket. W1BNB reports a new station near him, W1DEF. W1CTC blew his '10. W1ES is back on 3910 kc. W1BDI reports traffic. W1UE blew a rectifier tube. W1AZG is rebuilding. W1ASF is getting crystal reports on his M.O.P.A. W1BHM is building the Nov. QST' CC transmitter. W1CTI is back on 3.5 mc. W1CNU QSOed W8EWT at noon with 9 watts input. W1BFS burned out his plate transformer. W1CDS has started up on 3589 kc. with crystal. W1AHC will have a crystal job on the air soon. W1TD, President of the TCRC, is adding a pentode to his AC receiver. W1AMG works nights. W1COJ reports for the Bristol Radio Club. Total membership of the Amateur Radio Research Club of New London (reported by P. S. Jewett, Comms. Mgr.) up to Oct. 19th is 28 members. W1DCM is building a push-pull amplifier. W1QV built an

M.O.P.A. and gave a talk on its construction at a recent meeting. W1ABN rebuilt his station. W1QV reported for twelve of New London Club members. Let's have full reports from each of the following: W1DBU, W1DCI, W1CTO, W1CKO, W1ANG, W1SY, W1AM, W1BFS, W1CNC, W1BXT. Come on, gang, let's see the show N. E. we know how to deliver traffic as well as originate it.

Traffic: W1MK 542, W1BEO 282, W1YU 184, W1AOK 66, W1AFB 52, W1AVB 53, W1BVV 32, W1HD 30, W1CBA 26, W1QZ 23, W1AMQ 21, W1BNB 20, W1CTC 19, W1ES 14, W1AZG 12, W1ASP 12, W1BHM 8, W1CTI 8, W1CNU 4, W1BFS 3, W1CDS 3, W1CWD 5, W1CDN 1, W1ANC 12, W1BDI 16, W1AJB 19, W1UE 10.

NORTHWESTERN DIVISION

OREGON — SCM, Dr. Dolph L. Craig, W7ALO — Thanks, fellows, for the election. I will do my best to keep Oregon leading the Division. All ORS: Send in your certificates for renewal. Also, applications for new appointments, if desired. W7ACH is our new RM. Write him for schedules. W7PE, the sage of Cloverdale, is our new OO. W7AJX is skipping the Coos Bay gang. W7ALM is installing '52s PP. W7AVT joined the Army Net. W7QY reports. W7ED now has 500 watts crystal. W7ZD sends in a FB report. W7AMM is handling lots of traffic. W7IF says everything lovely. Hi. W7AMF now has a crystal, also a new dynatron. W7SY lost his tonsils. W7AME handles traffic with OM and KA stations. W7AEM joined the Navy Net. W7ALO is busy with Army Net. W7ALA is new President of the Rose City Club. W7WL is putting in '60s crystal, and has resigned as RM. W7PL reports he soon will have 250 watts crystal. New officers of the Pendleton Club are: W7BEE, President; W7AIP, Vice-President; W7BKD, Secretary-Treasurer; W8BDN OO. Meetings every Wednesday night. W7MQ is rebuilding to '03A. W7AIP has just completed 250-watt crystal job. W7RR is blowing dust off his heap. W7BDN is moving transmitter to his home. W7AQX has a fifty on 'phone. W7BKD is rebuilding. W7BEE is active on 'phone. We need two good Official Broadcasting Stations. Who will they be?

Traffic: W7PE 5, W7AEM 11, W7AME 34, W7SY 25, W7AMF 35, W7PL 10, W7QY 19, W7IF 14, W7AMM 62, W7ZD 100, W7ED 80, W7AVT 23, W7ALM 2.

IDAHO — SCM, Oscar E. Johnson, W7AKZ — W7ANA has installed a new crystal outfit. W7AT says as soon as he gets his receiver fixed he will be back with us. W7AYH has a new dynatron frequency meter. W7ALY has entered the U. of I. W7ATN has new crystal outfit with two crystals. W7AJQ is back with us. W7BEO is having a lot of trouble with grid leaks. W7ACO is busy hunting. W7FB has joined the A.A.R.S. W7AOC is rebuilding his power supply. W7AII has new 50-watt crystal rig. W7AFT will soon have power all the time, whereupon he promises much activity. W7ALW wants to know where his summer's wages have gone. W7AKZ is rebuilding his receiver.

Traffic: W7AFT 7, W7AYH 23, W7ANA 14, W7AKZ 18. MONTANA — SCM, O. W. Viers, W7AAT — W7AHF works on 3.5 and 7 mc. W7CU is on 3900 kc. W7AFS wants lots of traffic. W7BFA is doing well on 7 and 14 mc. W7HP is back in Bozeman for another session of college, and plans to have W7XB on soon. F.B. W7AAT may be heard broadcasting from KGHL, at Billings, when not pounding the key on 7 mc.

Traffic: W7AHF 20, W7BFA 10, W7AFS 9, W7AAT 14, W7CU 17.

WASHINGTON — SCM, Eugene A. Pietry, W7ACS — Sorry to miss last report, gang. Cause was "moved to new QRA," which is 3750 No. 30th, Tacoma. W7RT is holding down three schedules. W7QI is in on a 3.5-mc. transcon route now. W7WY is a new ORS. In Olympia W7AIT and W7KZ manage to keep things going. W7BB and W7KT have combined. W7AG-SL still keeps his 'phone in good trim. W7LD reports for the Roosevelt High Radio Club and says that they now have nine operators, W7AEA, W7AHC, W7AQI, W7AUU, W7AUV, W7BHH, W7BKY, and the two W7LD brothers. Seattle High Schools have combined to form a League with W7RT as President. W7AAE is on the air with a '10. W7AVM has his crystal rig all built up. W7TZ is a new reporter from Hoquiam. W7AAX keeps his

'52 warmed up. W7AAE and W7RT are running for the office of SCM.

Traffic: W7RT 56, W7QI 55, W7KZ 45, W7AG 28, W7TX 27, W7AIT 27, W7WY 19, W7AVM 19, W7AAE 18, W7AAX 12, W7AVN 10, W7LD 2.

PACIFIC DIVISION

SAN FRANCISCO—SCM, C. F. Bane, W6WB—

Business is picking up! Nineteen men report. W6DHE leads the section with a darn good total. W6EKC sends in his usual good total. W6MV sends in big traffic—worked an African n'everything. W6DZZ is gosh awful busy with school. W6DFR reports as usual. W6ABB says all his traffic handled in one week. W6BNA keeps up the good work. W6DPF is back on the air with bigger and better power. W6BVL is increasing his traffic each month. W6FBO reports once again. W6ADK is getting to be a regular reporter. W6CAL had lots of fun during the ORS contest. W6DJI reports for the first time. W6ZS says he is busy making new transmitter. W6VK says going on a vacation. W6IU sends in another report. W6WB was busy building new ultra-ultra crystal rig. W6WC uses push-pull MOPA. W6CZK is about ready to come on the air with a new rig.

Traffic: W6DHE 224, W6EKC 201, W6MV 131, W6DZZ 100, W6DFR 73, W6ABB 69, W6BNA 57, W6BVL 43, W6FBO 28, W6ADK 19, W6CAL 14, W6DJI 11, W6ZS 10, W6VK 7, W6IU 7, W6WB 7, W6DPF 26.

LOS ANGELES—SCM, E. E. Nahmens, W6HT—

Los Angeles County Fair traffic put W6EAT, W6DWG and W6AEP in the BPL, all with totals over 1000. W6YAU, with FIFTY-FIVE schedules per week, made it on deliveries. With one op at W6AHP over 1000 messages were handled in ten days at the rate of 55 per hour! W6EGH WORKED France and England on 7 mc. W6CFN is busy setting up new business. W6CXW got a big bang out of ORS "party." School, traffic and gals keep W6FEW hopping. W6EBK, pounding out on 3.5 and 7 mc., wants schedules East. W6ETJ is very much pleased with his new MOPA. W6CZT has good Phoenix schedule. W6FEX has job that keeps him on road most of time. W6TE says 7 mc. "queer" lately. W6ACL has outfit on 56 mc. W6BUX is building crystal job. W6AEO has schedule with W1MK. W6AYL and W6BEE are working 56-mc. 'phone. W6BVZ works out fine when power leak cuts off. Business keeps W6UJ snowed under. W6DLV is getting a kick out of grinding crystals. W6DZF has crystalized his transmitter. W6ERL has schedule with VK5GK. W6ADH is mighty proud of the product of a couple months' labor: A new YL op, boys, and her call is W6EK. Power leak keeps W6ESA up 90% of time. The 'phone bug sure sunk its teeth deep in W6AVJ. W6EGW and W6ALQ are new ORS. W6BLS has hard time getting stations to take his traffic. The new bridge 6-phase plate supply at W6AM keys smoother and has smoother output than previous 6-phase star rectifier. W6DSP has new AC receiver. W6ANN is QRL at California Tech. W6BCK is now instructor at local radio school. Portable W6ZZA was QSO YF W6MA from Tacoma, Seattle and Spokane within 48 hours. W6DH has abandoned bread board for rack and panel job. W6DNA reports W6AIF another new ham in Lancaster. W6BPU reports for first time. A great batch of traffic was disposed of in short order when a blow torch exploded at W6ALQ. W6TN finds traffic scarce on 7 mc. W6DZI and W6ANH both shoved some of their traffic out on 3500-cc. 'phone. Hospital bills put a crimp in W6DWW's hope for an '52. W6BGF is too busy to get on air much. W6CVV was heard in Russia on 7 mc. W6BV still needs an African QSO. W6DVA is back on air after "large" summer. W6BFQ has returned from Texas. W6DEM is back on S.S. *City of Los Angeles*. W6MA was heard in Africa the wrong way around on 7200 kc. W6DLI is rebuilding. Junior College, a new Auburn and wimmin keep W6LN off air. The doc prescribed no ham radio for W6ABR until he recuperates. W6ON has new c.s. p.p. job on 3640 kc. W6HT is remodeling transmitter to take 212D in final stage. W6VH has to move QRA again account of power leak. W6WO is on air only on week-ends, due to school. W6CUH made W.A.C. W6ZBJ is trying to catch up to his business so he can get back on air. W6AKW, W6DEP, W6DGV and W6AOR send in fine reports. The Tri-County Radio Club members did

themselves proud by their excellent work during the L. A. County Fair at Pomona. Several thousand messages were efficiently dispatched by the following operators: W6AHP, W6ADH, W6ARY, W6BKP, W6CVV and W6ERC. At the last meeting of the Riverside Amateur Radio Club a talk was given by Mr. Hubert Woods. A piece of quartz was awarded E. S. Babcock for the best copy in code contest. The Santa Barbara Radio Club has the foundation for, and the possibilities of becoming the strongest, most ideal club in the section. The Associated Radio Amateurs of Long Beach are already hard at work laying plans for the Pacific Division Convention to be held in Long Beach in 1932. They certainly did a good job in sponsoring the last section banquet. The Pasadena Short Wave Club will sponsor the next banquet to be held in January. Contact W6ON, Secy., for full details.

Traffic: W6EAT 1800, W6DWG 1595, W6AHP 1091, W6CFN 264, W6YAU 255, W6EGH 228, W6CXW 188, W6FEW 157, W6ADX 154, W6EBK 133, W6ETJ 119, W6CZT 85, W6FEX 76, W6BP 66, W6TE 56, W6AKW 54, W6ACL 53, W6DEP 52, W6BUX 44, W6AEO 44, W6AYL 44, W6BVL 42, W6UJ 40, W6DLV 39, W6DGV 37, W6DZF 33, W6ERL 29, W6ADH 28, W6ESA 27, W6ERC 25, W6AVJ 22, W6EGW 22, W6BLS 21, W6AM 21, W6COP 20, W6DSP 17, W6ANN 16, W6AOR 13, W6BCK 13, W6ZZA 12, W6CUH 26, W6DH 11, W6DNA 11, W6BPU 10, W6ALQ 8, W6TN 8, W6DZI 8, W6DWW 7, W6BGF 7, W6CVV 6, W6BVC 5, W6ANH 4, W6DVA 4, W6MA 4, W6DLI 3.

HAWAII—SCM, L. A. Walworth, K6CIB—The McKinley HI School Club is sponsoring the Second Hawaiian Section Convention which was postponed from August to November 27th-28th. Hilo has organized the Hilo Amateur Radio Club with 100% membership of the available hams. FB. RM-K6AJA is president. AJA has just been appointed OBS with schedules at 6:00 p.m., Monday and Friday. The SCM is very much on the air these days, and get nearly all traffic reports by air this month. October 3rd, RM-SCM NITE, he worked nine consecutive hours. W6BKI and W6NO were Hu visitors. K6ELN and K6AYD are having lots of fun with 3500-cc. 'phone. K6AYD is the new RM for Maui to assist DYC. K6CRW has a 3500-cc. low-power 'phone. K6BAZ is very active. K6DVZ, the happy Texan of KGMB, turned in a good traffic total with his first report. K6ED reports a fine QSO with K6CFQ, former SCM, who is now in Seattle. K6DYC is preparing a new QRA book which will include the fine crop of newly assigned calls in Hawaii. Lt. B. J. Calidonna has been assigned to Army Amateur Net work in Hawaii and has developed a fine net which begins Monday, October 21st at 8:00 p.m., using a net control call of WLW. K6EXP is net control, with K6DV of Schofield as alternate. K6COG is the Pearl City Net Station. K6FCX, with K6EGD as alternate, handle the Hilo net station. K6ERO will be the Maui station, and the Hawaiian gang can get some fine code practice copying these stations at 8:00 p.m. each Monday night. They will work in the code part of the 3500-cc. band. K6ETF spent the entire summer in California. He attended the Pacific Division Convention and Oakland Section Get-together. K6DV is still working for RCA. K6ENE and K6BHL are looking for new positions since Libby Cannery shut down. K6ENE says he may become a Freshie at the University. K6COG, RM of Oahu, has been trying to enjoy Flu with his key at his bedside. Judging from all reports to the SCM, it's time for Hu hams to install effective key filtering devices. The SCM is undergoing the unpleasant task of removing dead timber from the ORS list.

Traffic: K6FCX 136, K6IR 64, K6AJA 58, K6BMY 54, K6COG 48, K6BHG 42, K6DVZ 37, K6AYD 19, K6BAZ 31, K6EDH 9, K6CRU 7, K6CCS 7, K6CIB 4.

EAST BAY—SCM, J. Walter Frates, W6CZR—W6ALX sprang into the lead of all the section traffic handlers this month. He has schedules with KA1HR, KA1CE, JOC, J3CR, and J3CT three mornings weekly. Under the leadership of old W6IP he has been working his students like commercial ops on all sets. W6ZX handled a bit of traffic from the L. A. Fair. W6AHW is working a crystal-controlled 'phone on 3510 kc. W6RJ has a series of schedules on

(Continued on page 72)

• I. A. R. U. NEWS •

Devoted to the interests and activities of the

INTERNATIONAL AMATEUR RADIO UNION

President: H. P. MAXIM

Vice-President: C. H. STEWART

Secretary: K. B. WARNER

Headquarters Society:

THE AMERICAN RADIO RELAY LEAGUE, West Hartford, Conn.

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ternationaal Radioamateurisme
New Zealand Association of Radio
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Norsk Radio Relæ Liga
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Rede dos Emissores Portugueses

Reseau Belge
Reseau Emetteurs Français
South African Radio Relay League
Sveriges Sandreamatorer
Union Schweiz Kurzwellen Amateure
Wireless Institute of Australia
Wireless Society of Ireland

Conducted by Clinton B. DeSoto

THE DX season has come to the northern hemisphere. Cold winter nights have subdued all but the last of the summer's crackling static. With the season come many problems affecting amateur radio both in the effecting of international contact, and in the carrying on of domestic communications within our various member-countries. Let us see how this old amateur radio picture has altered since this time last year and the many years before.

The trend of 3500-kc. work is increasingly toward moderate DX. Local work is restricted by the peculiar skip-distance and cut-off conditions now prevailing. This leaves only one low frequency band genuinely suitable for truly local work, that at 1715 kc. In those countries where this frequency range is available, it is quite probable that an increasingly large bulk of national domestic activity will be found in this ideal region of many uses and merely mechanical difficulties. In those countries where 1750-kc. operation is denied, it will be the job of the amateur representatives to secure permission for its use from the authorities, just as was necessary in so many lands with the 3.5-mc. range last season.

Interesting comments on conditions existing in the 3.5-mc. band during the past summer and fall have come in from a few of the member-societies. Interest in work on this band by British amateurs has been quite extensive, and is increasing rapidly, more than 50 G stations being in operation there at present. In the Netherlands, notwithstanding summer QRN, this band was in intensive use, especially by the 'phone men. Many of the latter are being heard nightly, using FB crystal-controlled speech. The Dutch rag-

chewers and DX-hunters moved to the higher frequencies for the summer months, but many of them are once more on 3500 kc. for the winter



WINNER FOR ITALY IN THE FOURTH INTERNATIONAL CONTEST

was IIER, owned by Ing. Mario Santangelli, of Milan.

season. In Germany, DX conditions in all bands are found to be steadily improving, W's being audible on 3500 kc. the whole night long.

The traffic department of the N.V.I.R. sends the following report on work in the higher frequency bands in that country:

"Conditions on 7-mc. for W QSO have been getting worse during the past few months, although an improvement was noted during the end of August. At the same time, the first VK stations in the evening and the first ZL's in the morning were heard and worked once more, after a two months' absence of QSO's with the Antipodes.

"On 14-mc. conditions are also improving, especially for U.S.A. QSO's, but Chinese and Japanese stations are difficult to work in contrast to the period during May and June when they came in remarkably well.

"We have only one station known to be experimenting with 28-mc. nowadays, and that is J. Adama, PA0FB. So far he has not had much luck.

"The traffic department is working out a plan to arrange a chain of local 56-mc. nets, combining all the experimenters in that band in the different localities. A number of PA stations are already able to work on that frequency, with many other stations making the necessary preparations."

An event of considerable interest to German amateurs was the annual wireless exhibition held in Berlin recently, which was attended by many amateurs from other countries. Attention among the transmitting members centered chiefly on the demonstration of tourmaline plates in controlling ultra-high frequency transmitters.

Dr. Curt Lamm, D4AFA, informs us that "by the application of tourmaline instead of quartz as piezo-electric oscillators, it is possible to grind crystals to as high a fundamental frequency as 150 mc. owing to the lower ratio between electrical axis and corresponding wavelength, and because much higher mechanical strain can be applied to tourmaline than to quartz plates. It has, by the way, lately become possible to grind quartz crystals with a fundamental of about 33 mc."

More than ordinary interest was shown in the Sixth Annual Convention of the R.S.G.B. held in London on September 25th and 26th, according to J. Clarricoats, Hon. Secretary of the R.S.G.B. The keynote of the convention was publicity. Arrangements were made to enlist the support of the best known British journalists at our convention dinner. Capt. P. P. Eckersley (late Chief Engineer of the B.B.C.) Mr. Hugh Pocock (editor of "Wireless World") and Mr. Herbert Watkins (wireless correspondent of the "Daily Mail") were present with many other journalists, all of whom have given their assurance that full publicity will be given on every possible occasion to the amateur cause.

The Convention lecture was delivered by Mr. R. A. Watson Watt, Superintendent of the Radio Research Board, Slough, on the subject of "Atmospherics."

The delegates meeting held on September 26th was attended by almost every D.R. in England and many useful suggestions for future working were adopted.

The business meeting was attended by nearly 200 members. During the meeting a handsome silver salver was presented to Mr. Gerald Marcuse (Past President) in recognition of his work

on behalf of amateur radio. The Society Trophies were also awarded whilst certificates of appointment were presented to the Empire Link Stations. A new form of coat badge bearing the letters "B.E.R.U.-E.L.S." has also been struck and is being presented to the E.L.S. at home and abroad. The background is red enamel. Convention decided that the 1932 B.E.R.U. contest should run during four consecutive weekends starting 1200 G.M.T. Saturdays and ending 2400 G.M.T. Sundays. The Convention dinner was again a great success. One of the surprises of the evening was the distribution of some £50 worth of radio material which had been donated by British Radio manufacturers. Captain Eckersley, in proposing the toast of the society, at home, offered to represent the amateurs of Great Britain at Madrid. This subject is one which is very much in our minds to-day and was discussed at length during Convention, and at many other meetings. The R.S.G.B. will definitely send at least one delegate to the Conference, but we do not yet know whether he will be permitted to take part in the actual business meetings. We hope, however, to cultivate the acquaintance of our leading Government officials prior to Madrid.

Membership is increasing very rapidly—the total new members since January 1, 1931, being 320. During the recent Radio Exhibition over 3000 copies of the Convention issue of the "Bulletin" were sold. Amateurs of all countries are invited to apply for membership to the Honorary Secretary, 53 Victoria Street, S.W. 1.

Some more informal tests also on 28-mc. are proposed by another Britisher, C. G. Phillips. Although he has not yet advised us of the call signal or dates of the transmissions, he states that they will occur presumably in the first weeks of December, and will run on regular schedule at 1200, 1500, and 1800 G.C.T. on weekdays, and 1130 G.C.T. on Saturdays. Each test will last for about twenty minutes and will consist of a number of code letters sent out for about one minute. Stations everywhere are requested to listen for these transmissions, and report signal strength on each of the code groups heard. Reports should be sent to Mr. Phillips, whose private call is G5PJ, c/o the Engineering Dept., Union Society, University College, Gower St., London, W.C.1.

Recent changes in the N.V.I.R. administrative body, as reported by the new assistant traffic manager, C. A. Gehrels, PA0QQ, include the exchange of positions between Wolf Tappenbeck, well known Dutch amateur of old PCII and PCTT fame, who has been acting as secretary, and J. R. LeTitre, PA0RO, formerly the vice-president. W. Keeman, PA0ZK, organizer of the Dutch T. D., was forced to resign his position as

(Continued on page 64)

• CALLS HEARD •

W8MY, A. W. Hirsimaki and F. J. Beechler,
608 West First St., Royal Oak, Mich.

(From October 8th to October 14th)

14,000-kc. band

cm2sv oa4u rx1aa w6afs w6iz

7000-ke. band

k2xx k4aop k6auq ex7e hi8x hh7e cm8yb cm2sv v1ba vp2pa
ve5wn vk2ax vk2gr vk2lw vk2lx vk2hm vk2qj vk2vs
vk2zz vk3hk vk3ml vk3rq vk3zz vk4wo vk5gk vk5jo
vk5ml vk5wr vk5yk vk6gf vk7jk w6aem w6afy w6ahp
w6alu w6ann w6apm w6aqo w6arp w6awo w6aww w6bax
w6bdp w6bfa w6bge w6bhy w6bkg w6bkm w6bkk w6bme
w6bvc w6bvq w6by w6caf w6cep w6ckh w6cob w6cgg
w6coy w6eri w6cxw w6czq w6dee w6dep w6dgm w6dpf
w6dpi w6ebg w6efn w6el w6ekp w6elu w6env w6esp w6ekw
w6exa w6exq w6exu w6eyc w6flc w6fdn w6mrv w6og w6oj
w6sf w6wx w7alm w7pk

14-mc. 'phone

w1asa w1ccz w2cp

I1ER, Via S. Eufemia N° 19, Milano, Italy

(September 29th-October 13th)

7000-ko. band

w1avl w1azy w1beu w1bcz w1cel w1ch w1ll w1si w1uf
w2ams w2aru w2axs w2bds w2brh w2bvy w2bwt w2cbv
w2cik w2clc w2lxx w2le w2aho w2bba w2brm w2btw
w2cbv w2dez w2we w4add w4ag w4ald w4ahf w4ajx
w4arv w4ayc w4to w8akn w8bal w8cbv w8gez ce3dg cm2fz
cm2gr hc1gf hj1ak k2st k4ac k4es k4ip k4ry i18a ve1bv
ve4ag vk2oc vk7jk z1iak z1iar z1lce z1zb z12ac z12aj
z12bg z12bi z12bc z12ce z13c z12cj z13ab z13ac z13ao z13aq
z13bj z13bn z13cb z13cc z13cm z13cv z14ao z14ap z14aw
z14bg z14ba z14bq z14bt z14xc z18ufm z18wq

14,000-ke. band

w1akr w1azy w1bhw w1bak w1bws w1ccz w1dby w1fh
w1lz w1vp w1yu w2adg w2adp w2agx w2ajj w2ask w2ayy
w2bh w2bhz w2bkt w2bot w2bpd w2btv w2buy w2bwp
w2bye w2byk w2cfc w2cfw w2cqx w2rs w3acx w3ahn
w3ahh w3arw w3bes w3bg w3bpg w3bpt w3chc w3cm w3fq
w3kj w3vd w4ab w4tr w8blp w8cfw cn8mi velab velbh
ve2bb ve5aj zc6om

Frank Raley, on board Pan-American Grace Air-
ways Sikorsky at St. Elena, Ecuador

7000-ke. band

cm2vd cm8by ex7c vk2br w1ahp w1bhw w1edo w1dnm
w1lh w1ph w2adq w2bjm w2bne w2bpa w2bwt w2cjj w2clz
w2dfu w3apn w3awt w3bfx w3bjz w3cxl w4agj w4ahc
w4amp w4anu w4aoe w4as w4ata w4fv w4gw w4pbo w4qj
w4vp w4zh w5aeb w5ahw w5auj w5bbc w5boi w5bsf w5buz
w5bzo w5mn w5rj w6awa w6awo w6awp w6bcy w6bvq
w6bzz w6ccx w6dai w6eug w8acq w8aem w8aqh w8awb
w8bid w8cfw w8cvi w8dd d8eor w8ewj w8fcb w8fcu
w8fjt w8lj w8qf w9aic w9bif w9bma w9cya w9eyt w9dft
w9dhh w9dje w9dnp w9do w9dyz w9gmu w9hci w9hwm
w9jt w9vm w9wk

W1RY, R. F. Hathaway, 23 West Weir St.,
Taunton, Mass.

14,000-ke. band

ce1aq ce3cr cm1by cm8yb cm8mp ep1b ct1cb ct2an ct2aw
cx1af cx2bt d4bbq d4brv d4jpo d4lrm d4mfm d4rhr d4wao
d4wer d4wum e18e ea3cx eu2bw f8aj f8jt f8ol f8st f8wok
fm8er fm8hs fn2o frear1 frear149 g2ay g2az g2dh g2ga
g2gm g2oi g2op g2ow g2xu g2qz g5f g5fl g5pj g5qa g5qf
g5sy g6bs g6co g6gx g6iz g6ii g6zs haf2d haf3d haf3qx
haf6d i2aa la1g l2bu lu2am lu2ca lu5dec lu8de oh7nb oh7ne
oh7nf ok1vp on4ja on4if on4or on4sd oz5a oz7t pa0an
pa0fb pa0jl pa0kw pa0ps pa0xf py1ba py2bf py3aj py9an
rx1aa sm7xe ti2fg ti2tao uo1jh uown v1ja vk2bn vu2ah
yl2bv yv3lo

W1ATT-W2CBB, H. J. Conti, 417 West 238th
St., Riverdale, N. Y.

7000-ke. band

cm1by cm2fn cm2jm cm2ra cm2wa cm2ww cm5ni cm8yb
ct2ae cx7 daiv dcl d4aez ear110 f8fke f8mfl f8puf
f8pz f8wkg f8xd hc1gf hr7c hl1da k4aan k4apf k6agi
k6aja k6cib k6cog k6erw lcpw n12pa nn1nc sp3mb tixxa
velal ve2aq ve2ar ve2bb ve2be ve2ca ve2cl ve2op ve2ou
ve2cx ve3ay ve3be ve3bk ve3bv ve3ca ve3cb ve3ce ve3ef
ve3da ve3gt ve3kp ve3rf ve3rs ve3wk ve3zz ve4db ve4fp
ve4gf ve4gt ve4ac ve9ai ve9cl vk2hb vk2lx vk2ns vk2oj
vk2sa vk2yj vk3bw vk3bz vk3hl vk3jj vk3ka vk3kv
vk3rj vk3tm vk3vp vk3wl vk3xi vk3xz vk4bs vk4ju vk4rw
vk5lx vk5yr vk6cb vk6vi vk7ch vk7hl vn2bg w6akw
w6alu w6am w6any w6ach w6aor w6awp w6bax w6bbq
w6bck w6bfa w6bfe w6bht w6bkm w6bqk w6bqz w6bss
w6bvq w6bvs w6by w6ceo w6cii w6cpe w6de w6dfb w6dhe
w6dtw w6dyn w6ebg w6ebn w6ec w6een w6egk w6ehy
w6emk w6ezg w6ft w6ma w6sc w6sf w6uh w6wb w6yu
w6za w6zza w6zzg w7aax w7acd w7ael w7aj w7arw w7ek
w7fd w7fu w7fv w7oj w7td w7jl wml wpn wsq wyy wwab
wwaq xba j x7c x1af x1g x4x x9a yslfm z1lar z12cb z12gq
z13as z13aw z13cc z13cx z14ao z1vaz ve3ha x1ax

Radio School, 65th C. A., Fort Amador, C. Z.

(October 1st-14th)

7-mc. band

w1aep w1aqh w1aze w1cae w1cek w1cee w1cga w1fh
w1jo w1lh w1ph w2arb w2bjw w2bml w2bti w2buy w2cno
w2dn w3afu w3bg w3bpd w3bwg w4aby w4abd w4agy
w4ajp w4afn w4ahz w4al w4amd w4aoh w4aom w4aqi
w4aqt w4ayf w4awe w4avr w4if w4jz w4kk w4nt w4nr
w4van w4we w4wm w4wg w5adn w5aea w5ah w5amk
w5aux w5bbw w5bzv w5bzat w5cbr w5ft w5nt w5tky
w6aag w6adx w6ahz w6ann w6awo w6bee w6cuu w6cxb
w6cyv w6cxw w6dva w6ebo w6eug w6cep w6fav w6sn
w7ait w7bjs w7aat w7aho w7au w7au w8aar w8azd w8azu
w8bgt w8ben w8bml w8oir w8ofi w8faa w8kcc w8ti w9aoc
w9bn w9ctw w9dfe w9elg w9eru w9ghi w9ghh w9hd w9pk
w9hk w9ux ow2wd cm8by hc1gf hh7c ka1fr ka1hr x1as
ve2cx vk2ax vk2hl z13cc k6cd

14-mc. band

w1aem w1ana w1arb w1azl w1bhq w1bei w1ccz w1cmx
w1cun w1fh w1gw w1lh w1ms w1zj w1uh w1vp w2afn
w2af w2aac w2ayy w2axs w2bxw w2bjf w2bak w2bbv
w2bhz w2blv w2bot w2byk w2bv f w2cix w2ccj w2ckr

• CORRESPONDENCE •

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

Power Supply Regulation

345 Roosevelt St., Pomona, Calif.

Editor, QST:

It seems that almost all the subjects in your correspondence columns are those discussing (or cussing, as the case might be) articles appearing in previous issues of QST. Being one of the common rabble myself, I'm taking time out to dish a little dirt on the recent article concerning voltage regulation by the Hon. W2BRB, which by the way is the best I have seen among your pages for many moons, in my opinion.

He did, however, start his discussion with the power transformer, which I can painfully testify is not the logical place to begin. Most medium-power transmitters require more power to operate than is necessary to light a small or average size house. Why, then, is it not reasonable to continue from the fuse block to the transmitter with very nearly the same size wire which the power company believes necessary to install in the service?

Some time ago I blew out a bridge rectifier of Type 66's and two 3500-volt filter condensers trying to get a full load voltage of 2400 volts. Needlessly I bought a 5000-volt filter condenser and a mercury arc to correct the trouble, but after a little thinking I replaced the long No. 14 wires that supplied the power for the transmitter with No. 6's. The voltage regulation was only a fraction of that previously recorded by the voltmeter and I was able to use much higher voltage safely.

Another point along this line I might add is that few hams realize the performance they can get out of the Type '52 tubes with high voltage d.c. I put 3200 volts at 300 mils on two '52's (figure the watts yourself), and the plates did not show color in keying. Later by accident, however, I learned that they are not as hard (refers to envelope and not vacuum) as the ordinary floor, which brings this little story to a bitter end.

—Harvey W. Ziegler, W6ARY

QRA Felix

S.S. Swiflight, 1495 Southwest New York

Editor, QST:

I wonder who in the amateur fraternity doesn't know Felix, who used to write the comic articles that QST favored us with? Most of us do, I am sure, but am also just as sure that if any of us were to work a station down in South America

signing FX that we wouldn't connect the two, although F and X are the first and last letters of our ex-author's name.

It is a small world after all. We were docked down in Caripito, Venezuela, and it happened that the Second Mate and I ventured four miles through the jungle (and I mean jungle) down a narrow gauge railroad track to the town. Caripito is the type of town that you read about but seldom see; mud houses, naked babies, et cetera, and Americans are seldom seen. Right down the middle of the street the mate and I go just looking at the sights when who should pop up in front of us but a sandy-headed American. Naturally we greeted each other as if we had known each other for years. I noticed from his belt buckle that he was from a Texas school in Denton and I exclaimed, "Felix." "Right," he said, making a gracious bow.

Upon Felix's suggestion we hunted out a place where we could imbibe of the cup that cheers if taken in moderation but inebriates if taken otherwise, and we spent a pleasant evening together partaking mostly "otherwise" of the cup. Late that evening we returned down that self-same railroad track through the self-same jungle and saw everything from a tiger to a boa constrictor. (The mate said we didn't, but Felix and I agreed that we did.)

Next day when I woke up I found lying on my desk in the radio shack the following: "FX-m.o.p.a. on 20 and 40; 7½ watts; H-C Hartley on 40. Felix Salty Johnson, Jr., W5LS, and Jess J. Sexton, W5JR, Oprs. Hours intermittent. Power — 550 volts of run-down 'B' batts. Also 50-watt Heinz-Kaufmann. We will be shut down for three or four months because of Venezuelan Government getting too strict on regulations. Address all correspondence in envelopes to J. C. Johnson, Box 284, Port of Spain, Trinidad, B. W. I."

I am sure that Felix would be glad to hear from any of the gang who will write to him.

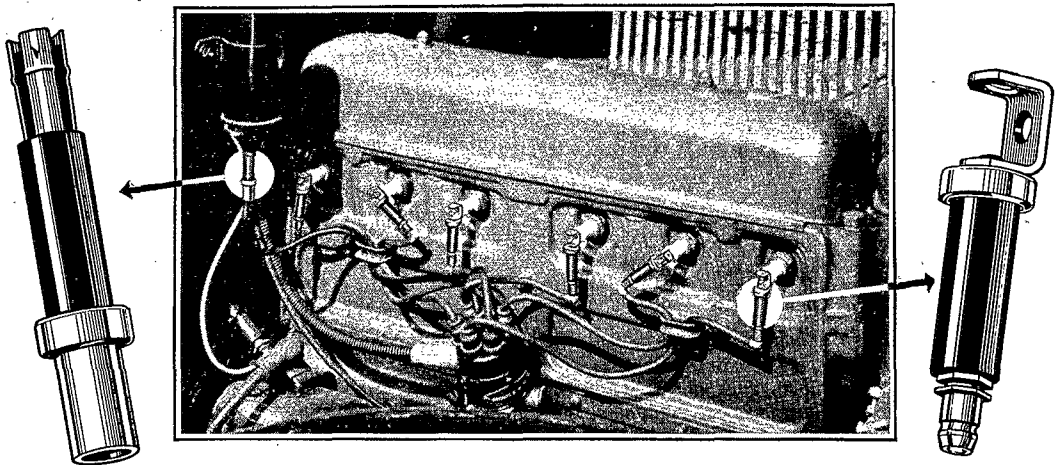
—Dick T. Parks, Jr., W5AB-BBY, KDSA

R.S.G.B. Contact Bureau

La Cotte, La Moye, Jersey, C. I.

Editor, QST:

Regarding my old friend T. P. Allen's letter in September's QST, I am glad he has corrected me regarding the Contact Bureau, for while I knew I erred in coupling it with the A.R.R.L. Com-



Stop Interference on Radio-Equipped Cars With Bradley Suppressors

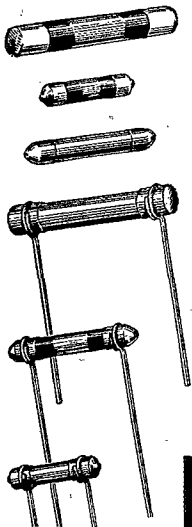
No Shielded Ignition Cable Needed

Bradley Suppressors are special solid molded resistors used by prominent car manufacturers to provide individual resistors for each spark plug and for the common cable to the distributor on radio-equipped cars.

They increase the resistance of the high tension ignition system and minimize the disturbing oscillations in the ignition circuit which interfere with the radio receiver in the car. When used

with suitable by-pass condensers in other parts of the circuit, shielded ignition cables are unnecessary.

They do not affect the operation of the motor. The sturdy construction of Bradley Suppressors adapts them for the severe service in which they are used. Heat and moisture and age have no effect upon their performance. They are the last word for motor-car radio.



Bradleyunits

Bradleyunits are solid molded resistors unaffected by temperature, moisture or age.

Their accurate calibration, great mechanical strength and performance make them ideal for providing correct C-bias, plate voltage, screen grid voltage and for use as grid-leaks and as fixed resistors in resistance-coupled circuits.

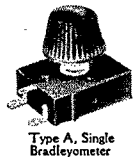
All units are color-coded to meet any radio set manufacturer's specifications.

Bradleyometers

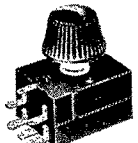
The Bradleyometer is a potentiometer with approximately fifty solid resistance discs interleaved between metal discs.

The total number of discs can be arranged in accordance with any resistance-rotation curve.

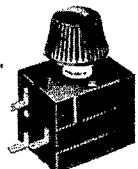
One or more Bradleyometers can be arranged to operate with one knob. Mixer controls, T-pad and H-pad attenuators and other complex controls can be provided.



Type A, Single Bradleyometer



Type AA, Double Bradleyometer



Type AAA, Triple Bradleyometer

ALLEN-BRADLEY CO.

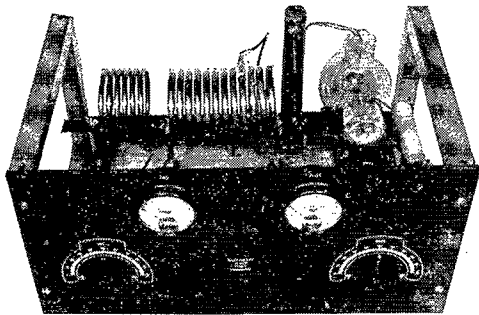
108 W. Greenfield Avenue, Milwaukee, Wisconsin

ALLEN-BRADLEY RESISTORS

Produced by the makers of Allen-Bradley Control Apparatus

BEAT THE DEMAND!

Get your order in early for this NEW



75 WATT TRANSMITTER New more expensive layout at No Increase in Price: The price is outstandingly low for a 75 watt transmitter of this design and construction. Same well known parts used as in popular layout set shown in last month's QST. Cardwell condensers, Jewell meters, etc. Coils can be supplied for 20, 40 or 80 meters. *Specify choice when ordering.*

Watts	Price Assembled Kits	Wired and Tested
75 watt.....	\$52.50	\$65.00
75-watt Push Pull	65.00	80.00
15-watt Push Pull	37.50	45.00
7.5 watt.....	32.50	40.00

CRYSTAL CONTROLLED UNITS See Nov. QST for pictures
Comprising: Crystal oscillator, doubler or amplifier, output amplifier stages for coupling to the antenna. Component parts of each unit are best quality available, carefully designed and constructed. Coils can be supplied for 20, 40 or 80 meters. *Specify choice when ordering.*

Unit	Price Assembled Kits	Wired and Tested
Xtall. Oscillator, uses 210 tube.....	\$23.50	\$28.50
Amp. or Doubler, uses 210 tube.....	23.50	28.50
Output Stage (with Ant. coil and Ant. meter), uses 210 tube ..	40.00	47.50
Output 50 W. stage (with Ant. coil and Ant. meter).....	52.50	65.00
Output 75 W. stage (with Ant. coil and Ant. meter).....	57.50	70.00

Units may be purchased separately

NEW!

RELAYS

operated on two dry cells, compact, can be built right into the set.

Size 2 3/4" x 2" x 3/4"

Prices: Single pole type

\$4.50

(for keying)

Double pole double throw.....\$4.50
(for break in and many other uses)
Time delay type.....\$9.00
(for use with Mercury Rectifier power supplies)

Plug-in CRYSTAL HOLDERS

(DUST PROOF)

PRICE
\$2.25

Accommodates crystals up to 1 1/4" square. Perfectly lapped plates. Size 2 3/4" x 1 1/2" x 9/16" overall. This holder will satisfy the most exacting user.

QUARTZ CRYSTALS. 80-meter band. Guaranteed accurately ground on precision equipment. Prices.....\$4.95
40-meter band....\$9.95. All Guaranteed.

ALL NEW NATIONAL S. W. RECEIVERS IN STOCK

Get Our Price! Don't be fooled by receivers using untuned screen grid. National sets employ the tuned R. F. Stage.

ALSO NEW 3" NATIONAL VERNIER DIAL IN STOCK

REMEMBER THE NAME



WRITE NOW RIGHT NOW!



COMPLETE LINE OF STANDARD AND "HARD TO GET" PARTS

FREE ADVICE ON RADIO

Write or drop in to Jerry's Place, that "different" kind of a ham store, one block west of City Hall.

FLECHTHEIM CONDENSERS

Such opportunities come once only. High voltage condensers — at such prices, 60% off list.

Type	Mfds	Rating	List	Special
TH-200	2	2000 V.D.C.	\$15.00	\$ 6.00
HP-200	2	3000 V.D.C.	32.50	13.00

Any one of these condensers can be bought with a purchase of any other kind of material amounting to \$5.00. At Jerry's bargain prices this should not be difficult.

Without purchase of other material the discount is 50 % of List

ALUMINUM SHIELD CANS

assembled with slotted corner pieces. Special sizes to order

Height	Width	Length	Price
5"	5"	5"	\$1.00
6"	5"	9"	1.85
6"	7"	9"	2.25
7"	6"	10"	2.45
7"	8"	12"	2.75
7"	6"	14"	3.25
7"	7"	12"	2.95
7"	8"	14"	3.95

SHEET ALUMINUM

cut absolutely square to any size specified.

Thickness	Price
1/32"	.6/10c per sq. in.
1/16"	.7/10c per sq. in.
3/32"	3/4c per sq. in.
1/8"	1c per sq. in.
3/16"	1 1/2c per sq. in.
1/4"	2c per sq. in.

MONITORS (Gross)

Gives foolproof check on note and stability. Hear your signal as the other fellow does. Aluminum case, completely shielded and self-contained batteries. With A and B batteries for 230 or 199 tubes. Price (Tube included).....\$10.50

COPPER TUBING inductances

Wound and ends drilled FREE

Inside dia.	3/16"	1/4"	5/16"
1 1/2"	8c turn	9c turn	12c turn
2 1/2"	9c turn	10c turn	15c turn
3 3/8"	9c turn	10c turn	15c turn
3 3/8"	10c turn	12c turn	17c turn

SOME BUYS!

Antenna kits, consisting of 200 ft. of No. 12 solid enamel wire, four 3" Flexon porcelain insulators and two Flexon porcelain adjustable lead-in bushings. Special price, \$3.90. 50-watt socket, beautiful job, porcelain base, side wiping contacts. Satisfaction guaranteed. Price, \$1.50. Aerovox Electrolytic condensers, capacity 3-8 mfd—450 volts (Only four to a customer). Extra special, \$1.35. R. F. Transmitter chokes, \$6.00. Bakelite tubing, 2" diameter, 2 1/2" long. Price, \$1.10. Honey comb COILS. All sizes in stock. Write for prices. Special: 2.5-volt filament transformers, 10-, 000-volt insulation for 2-866's, \$4.35. Gross 866's Rectifiers, Unconditional guarantee, \$4.75. All parts for 5 meter work in stock. Special: Ward Leonard 200-watt 20,000-ohm grid leaks, \$2.85. Special: Ward Leonard 200-watt 100,000-ohm Bleeder, double unit, \$5.25. Many other sizes stocked. Write for prices. Sangamo 5000-volt blocking condensers, .002—.001—.00025, \$1.10. Stand off insulators, best quality, 2 for 25c. Eiseeman 2200-ohm headphones, real phones. Pair, \$1.45. Soldering iron, Esico, \$1.95.

SAVE TIME AND MONEY

Order from Jerry. Just deduct an additional 2% for cash from our competitors' lowest quotations on standard merchandise and shoot the order in to Jerry.

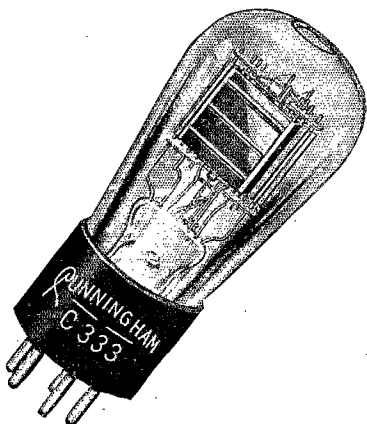
FREE CODE CLASS

Every Wednesday evening from 6:00 to 7:30 p.m. at Jerry's place. Here's your chance to learn the code or speed up. Bring your phones.

25 WARREN STREET, NEW YORK TELEPHONE BARCLAY 7-6698

Cunningham RADIO TUBES

RADIO'S MOTIVE POWER
SINCE 1915



C-333

Two Volt Filament
Power Amplifier Pentode

Operating Voltages

Ef — 2.0 Volts

Eb — 135 Volts

Ec — -13.5 Volts

Ed — 135 Volts

A new output pentode tube developed for use in battery and other D.C. receivers especially designed for it. The C-333 is capable of delivering a large power output for relatively small input signal voltages. The small filament current of 0.26 amperes, required makes it especially suited for use in combination with the CX-332 and CX-330 — two volt filament tubes.

The undistorted power output of the C-333 is 700 milliwatts which is greater than that obtained from three-electrode tubes of the same plate voltage requirements.

E. T. CUNNINGHAM, INC.

A subsidiary of Radio Corporation of America

New York / Chicago / San Francisco

Dallas / Atlanta

For the benefit of some other poor unsophisticated and unsuspecting ham let me say that after four years of having one set after another refuse to perk at various times, I have just found out that that nice rubber-ended and mounted choke coil I wound years ago isn't worth a whoop on 4000 kc.

Now can you beat it, I've wrecked and rebuilt a half-dozen rigs and each time used that nice "purty" choke coil in it (to give it that finished and workmanlike appearance), and each time the darned set wouldn't work. And now tonight another m.o.p.a. (a hundred watts worth of p.a.) and it starts to cut up in the same old way only Ah-HAAAAA! I'm getting wise, and for no good reason except that I did have some new chokes in the rig that I suspected. It finally simmered down to that old and trusted choke that's been stickin' me in the — amplifier in so many sets.

"Now all young hams take warning and take a tip from me; don't ever let —" a choke deceive you more than once. If that set seems to oscillate perfectly good on one frequency and acts dizzy, and the plate current won't come down where it belongs on another frequency, build some bigger and rounder chokes and do some swappin' until the thing is tame and can be handled normal-like. Chances are you'll find it's an unfaithful choke, too.

— W2KH

P.S.: Say, Eddie — I mean Mr. Editor — I hope you'll pardon my enthusiasm at locating this trouble. You see I've only been building these wireless outfits since 1914 and I haven't really had time to learn all about 'em yet.

A Visit to Japanese and Hawaiian Amateur Stations

13901 Avalon Blvd., Los Angeles, Calif.

Editor, *QST*:

This Spring I had quite a time in being able to make a trip to my mother land, Japan, and to visit many Japanese amateur stations that are breaking up the ether on this side of the pond. Out of a possible seven or eight districts in Japan I had visited J1, J2, J3, J4, and J6, and let me tell you I surely enjoyed it greatly, due entirely to the help and hospitality the Japanese amateurs showed me.

My arrival there being just when cherry blossoms were in full blossom, I certainly got the taste of beauty of the country. However, I guess this will be of no interest to hams, so going on further I do want to state many of the things that we, the W hams, must know in order not to have any misunderstanding when we are in contact with Japanese stations.

"J" stations, unlike our stations here, do not have the liberty we do, and hence many of the things they want to say over the air comes under "Illegal Operation." Anything coming under the meaning of test is OK, but in short it is almost illegal to say "GM OM es tnx for dope." I guess one can understand the situation clearly now

UNCLE DAVE

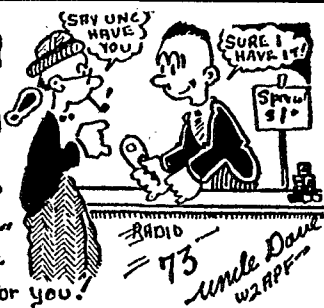
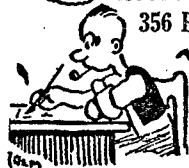
356 Broadway

Albany New York

We buy, sell and trade Ham stuff!

24 HOUR SERVICE SHIP ANY PLACE

If we have not got it we will get it for you!



RCA 85 millihenry r.f. unmted. chokes, pie wound.....	\$.25		
RCA 250 millihenry r.f. unmted. chokes, pie wound.....	.39		
Silver-Marshall r.f. 277 chokes.....	.65		
Arco Transmuting Condensers. 1 Year Uncond. Guar.			
1500 volt	2000 volt	3000 volt	3500 volt
1 mfd. \$1.95	1 mfd. \$6.50	1 mfd. \$8.50	1 mfd. 9.50
2 mfd. 3.50	2 mfd. 9.50	2 mfd. 12.50	2 mfd. 14.00
4 mfd. 5.25	4 mfd. 12.50	4 mfd. 22.00	4 mfd. 26.00
Very sturdily built, finest material. All cont. working d.c. voltage.			
600 volt	800 volt	1000 volt	
1 mfd. \$.20	1 mfd. \$.30	2 mfd. \$.70	
2 mfd. .25	2 mfd. .40	3 1/2 mfd. .90	
3 1/2 mfd. .35	3 1/2 mfd. .50	4 mfd. 1.00	
4 mfd. .40	4 mfd. .60	2 mfd. 1.150 volt	1.50
Jewell 10-25-50-100-200-300-500 milliammeters, each			
10-25-50-100-200-300-500	milliammeters,		5.40
each			5.80
Jewell or Weston r.f. thermocoupled meters all sizes.			9.75
Sangamo .0001, .00025, .0005, .001, .002, 5000 volt cond.			1.10
Aluminum Panel	Cardwell 3000 volt trans. cond.		
1/16" thick, 1/2 sq. in.	Type 147-B 00044		6.25
3/32" thick, 7/16 sq. in.	Type 147-C 00023		6.25
1/8" thick, 9/16 sq. in.	Type 123-B 0005 rec. cond.		2.90
3/16" thick, 1.1c sq. in.	All other Cardwells in stock.		
Get our low prices.			
Two gang .00035 variable condensers, real job.....			1.20
Best grade No. 12 solid enameled aerial wire, 100 ft., 300 ft.			1.50
Best grade No. 10 solid enameled aerial wire, 100 ft., \$1.25, 200 ft.			1.95
Crystals, specify anywhere in the 80 meter band.....			4.75
Crystal blanks, finished and oscillating.....			2.75
Crystal blanks, unfinished.....			1.75

Special this Month Only. Dustproof Bakelite Crystal Holder with Each \$4.75 Crystal Purchased.

This Month's Special — Plug-in Dustproof Bakelite Crystal Holder with G.R. Plugs.....	
Arco 10,000 ohm, 100 watt transmitting leaks, tapped	.69
Arco 35,000 ohm, 100 watt bleeder resistors.....	.95
Arco 50,000 ohm, 100 watt tapped trans. leaks.....	.50
G.E. 3 henry, 300 mill, 20 ohm resistor chokes, special	1.75
Arco UX852 sockets.....	1.35
Mershon 8 mfd, electrolytic condensers, each.....	.69
Thoradson 2 1/2 volt, 16 amp trans. mfrs, model	3.75
Hardwick-Hindle 10,000 ohm, 60 watt trans. grid leak	.60
Arco new UX 866's, guaran. uncond. 1000 hours.....	3.35
Arco calibrated monitors with batteries, three coils individual calibrated charts, for 20-40-80 meter band.....	9.35
Arco calibrated wave meters.....	6.25
Arco 50 watt sockets.....	.95
Arco 75 watt sockets.....	1.35
Arco 204-A sockets.....	1.95
Arco sockets for the 212-A or D tubes.....	3.50
Universal Microphones, model BB.....	14.50
Universal Microphones, model KK.....	28.00
Universal Microphones, model LL.....	40.00
Universal Baby Mikes, QRO.....	2.85
Universal Baby Mikes with switch, 25 ft. cord.....	4.35
Universal hand-mike single button.....	3.85
Universal hand-mikes double button.....	8.85

What better way have we of showing our appreciation of your past relations with us than by giving you the greatest value for your money and to show you we mean it? LOOK AT OUR SPECIALS THIS MONTH

FELLOWS — We are not exaggerating. We carry the largest, complete and most diversified stock in the country. We specialize on the hard-to-get parts. Try to be convinced! This is a real ham who has you who have your requirements. Orders filled same day. **WHAT ELSE CAN WE SAY?** But, A MERRY XMAS, HAPPY NEW YEAR, MAMMY! 73, cul

Samson Pam Amplifiers. New and in original cartons.	
Pam 19-20 uses two 281, two UX250, two UY227 tubes, list \$175, net price.....	\$46.50
Pam 16-17 uses one 281, two 210, one 227, list \$125.....	35.00
Genuine RCA UX852 tubes, new original cartons.....	24.00
G.E. five watt 1162 navy tubes, new original cartons.....	.50
UX230 or 231 non-microphonic RCA licensed tubes.....	.90
UX232 screen grid tubes.....	1.25
Baldwin type G phones, list \$12.00, net.....	4.95
UX or UV sockets, each.....	.12
Weston new type three No. 566 set analyzer. Special.....	80.00
One only new UX851 tube, guar.....	250.00
Slightly used 860 tubes.....	22.00
Zenith thirty henry 85 mill chokes.....	.89
W.E. single button microphone trans. Head only.....	1.95
R.E.L. plug-in coil forms \$1.50. Base.....	1.50
G.E. 1/2 watt neon bulbs \$.55, two watt.....	.75
20-40-80 meter band spread coils for the National sets, per set, special.....	3.82
Victor A.B.C. power transformers for Nov. 1930 transmitter.....	2.45
Latest amateur call book.....	.85
Soldering irons \$90, heavy duty type.....	1.65
W.E. D starard R-4 rectobulbs for high power, prepaid \$10.00, New.....	15.00
W.E. 212-D slightly used \$35.00. New ones.....	50.00
G.E. used oil immersed condensers	
.2 mfd 25,000 volt, 2 mfd 4000 volt, 3 mfd 3500 volt,	
5 mfd 3300 volt, 10 mfd 3000 volt, 40 mfd 2000 volt,	
each.....	20.00
Arco 1/2 mfd 500 volt d.c. small replacement condensers	.25
RCA licensed 15 day guar. only, 199's, W.D. 11, 12, 201-A, 171-A, 112-A, 226, 227, 280, 245, 224, each.....	.39
RCA licensed UX210, \$1.20, guar. 15 days, UX281's, UX250.....	.85
Slightly used \$51 tube. Special.....	125.00
Slightly used RCA 204-A each.....	50.00
Slightly used RCA UX211 tubes.....	17.00
Slightly used W.E. 211-E in original cartons.....	15.00
Weston 0-50 mills, d.c.....	4.00
Weston new 0-150 volts a.c. meter, original cartons.....	5.00
Mercury vapor R-4 rectobulbs for high power, prepaid	
New type R-3 rectobulbs, each.....	6.95
New type R-81 rectobulbs, each.....	3.50
RCA licensed 233 d.c. pentode.....	1.49
RCA licensed 247 a.c. pentode.....	.84
RCA two henry 300 mill 20 ohm key click and filter chokes, w/d 44 pounds, Special.....	1.75
RCA UX210 new, original cartons.....	4.00
RCA UX250 new, original cartons.....	3.40
Genuine DeForest 510 tubes.....	5.20
RCA UX240 hi-mu tubes, new.....	1.00
National .0005 23 plate var. condensers, list \$5.00.....	1.65
Todd 1500 volt c.c. and two 7 1/2 volt c.t. fil. and power trans. special fully mtd.....	5.95
Complete auto. stop. turn table, Gen. Elec. phono. motor.....	10.00
250 watt Clarostat primary rheostat, all ranges.....	3.50
Weston Photonic electric cells.....	7.25
West. Elec. 1 mfd 1000 volt d.c. condensers.....	.49
RCA 1 1/2 mfd 800 volt rep. cond. flat metal can.....	.75
New National d.c. short wave five, a.c. short wave five, new short wave three and other national parts in stock. Lowest prices. Write for quotations.....	
Five dial omnigraphs.....	11.00

Uncle Dave Marks

OPEN EVENINGS

Write for FREE HAM Sheet

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

UNCLE DAVE'S RADIO SHACK

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

QUALITY APPARATUS

Sold with a Money-Back Guarantee!

ROYAL HEAVY DUTY TRANSFORMERS

Powerful and sturdy! Carefully constructed of the highest grade materials. Heavy duty windings and large, heavy silicon steel core give excellent regulation. Completely mounted. Guaranteed for one year against any defect. Expressly designed for transmitters and high-power amplifiers. Insulated for 10,000 volts. *It pays to buy the best!*

Type	Watts	Lbs.	Price
A 2500-1500-0-1500-2500.....	375	29	\$14.50
B 2000-1500-0-1500-2000.....	300	28 1/2	12.75
C 1500-1000-0-1000-1500.....	875	19	9.25
F 750-0-750, 7 1/2 ct. & 7 1/2 ct.....	375	18	7.35

The following are supplied in a neat metal casing.

G 1500 ct, 7 1/2 ct, 7 1/2, & 2 1/2 ct.....	275	14	6.45
H 1200 ct, 7 1/2 ct, 7 1/2, & 1 1/2 ct.....	200	11	4.95
I 800 ct, 5, 2 1/2 ct, & 2 1/2 ct.....	150	9	3.90
K 700 ct, 5, 2 1/2 ct, & 2 1/2 ct.....	150	9	3.70
L 750 ct, 5, & 2 1/2 ct.....	100	6	3.45

(Note: We can save you postage by shipping the above transformers direct from the factory near Chicago.)
FILAMENT In neat compound fitted metal cases with large porcelain stand-off insulators, 10,000 volt insulation.
 2 1/2 Volt at 6 Amperes. For 866 tubes. \$3.10. c.t..... \$3.45
 7 1/2 Volt at 6 Amperes. For 210's, etc. \$3.10. c.t..... \$3.45
 10 Volt at 8 Amperes. \$3.45. Center-tapped..... \$3.95

ROYAL TRANSMITTING FILTER CONDENSER
 The new, improved models are now ready! More conservative ratings, higher test voltages, large porcelain insulators, neat metal cases, and an unconditional replacement guarantee make these products bigger bargains than ever before! These condensers are superior to others selling for higher prices.

Capacity	1000	1500	2000	3000	3500
1 Mfd.	\$2.25	\$2.65	\$3.05	\$3.20	\$9.25
2 Mfd.	2.65	4.00	6.45	13.25	15.25
4 Mfd.	4.25	5.75	10.95	24.05	28.35

ROYAL 30-Henry, 300 Milliamperes Extra Heavy Chokes. 80 Ohms, 18 lbs. — \$8.65. 15 H. 300 MA. 75 Ohms, 7 1/2 lbs. \$4.15

DECEMBER SUPER-SPECIALS

One of each to a customer This month only
ZENITH ZE-7 High Voltage Power Pack. Delivers 500 volts of completely rectified AC at 80 MA. all ready for filtering and filament for 210, 227's or 245's. Just the thing for a 210 Xmitter. Neat metal case. Uses a UX-281 tube. Brand new original cartons. QNY like.
 See what a real high grade porcelain stand-off insulator looks like!
 Order ROYAL and compare the quality! **FOUR for 25c**

ACME Chokes. New Open frame mounting. Very neat. 30 Henry, 200 MA. — \$3.95. 20 Henry, 300 MA. — \$3.95.
THORPARSON 30 H, 200 MA Power chokes. Completely shielded. 250 Ohms, 2000-Volt insulation. 6 lbs. \$2.70
GENERAL ELECTRIC 5 H, 1000 MA, in metal case, 500 Volt insulation. 25 Ohm. 11 lbs. Three for \$7.25. Each..... \$2.65
RCA Double. Two 30 H, 125 MA. Heavy metal case..... \$1.85
RCA 2-Henry, 300 Mill, 20 ohm choke, 14 lbs..... \$1.70
GREBE Xmitting RF Chokes, 300 MA. 1 1/2 x 4..... 25c
 We make immediate shipment at lowest prices of:
 Cardwell Condensers, Jewell Meters, Weston Meters, DeForest Transmitting Tubes, Signal Keys, Parcon Filter Condensers, Flechtheim Condensers, ROYAL Quality Apparatus, "Littelfuses," Akra-Ohm Resistors, RCA Tubes, etc.

NEW VARIABLE CONDENSERS! Maximum Cap. — .0005 Mfd. Breakdown Voltage — 3000 Volts. Porcelain insulator mounting..... \$4.75
SANGAMO 5000-volt mica condensers. All capacities..... \$1.12
ROYAL Stand-off Insulators, Black or white, 10c. Doz. 99c
8 MFD. Electrolytics, 500 volt. Metal cased. 12c. 4 for \$2.60

ROYAL SHORT-WAVE RECEIVERS

Model RF. Uses a two-volt screen-grid and a pentode tube. Plug-in coils for "Ham" bands or for 14-200 meters. World-wide reception with amazing volume! Completely assembled, wired and tested in neat cabinet. Cadmium plated chassis. Guaranteed to outperform many higher priced sets, \$13.95. Also in KIT form for those who prefer to "Roll Their Own."
 All necessary parts, including directions, \$10.95
 Many other models of Receivers, Transmitters, and Power Supplies.

FREE Send NOW for our new BARGAIN BULLETIN

100-WATT BLEEDERS. Mounted and center-tapped. 9 1/2" long. 5000, 10000 or 20000 ohms — \$1.45. 30000 or 100000..... \$2.95

ACME No. 12 Enameled Wire..... 100' — 70c. 200' — \$1.50.
RCA LICENSED TUBES. 90-Day FREE Replacement! Get a new set of these high-grade tubes while these low prices last! Every one tested before shipment.
UX-201A, 220 Ohms, 250 — 40c. 112A, 171A, 224 — 50c.
UV-199, UX-199, 120, 230, 231, 237 — 70c. 222 — \$1.05.
281 — \$1.20. 232, 233, 235, 236, 238, 240, 247 — 85c. 210, 250 — \$1.30.

BEST QUALITY UX-866 TUBES. Wire mesh filament, etc. All tested before shipment. Guaranteed..... \$4.50
ROYAL Code Practice Phonograph Records. 5, 10, 15, 20, 25 or 30 words per minute speed. 2 1/2 minute record — \$1.50. 5 Min. — \$2.50.

TELEPLEX with ten tapes. Used. Excellent condition... \$16.00
Five dial ORNGRAPH. Used. Perfect Condition... \$32.00
 We now buy, sell, and trade used apparatus. ORU? Write your offerings and wants to "Used Dep't!"

Because of the high cost of handling we cannot accept orders under \$2.50. 20% Deposit required. Postage extra.

HARRISON RADIO CO.
 189 Franklin Street Dept. T. New York City

why so many "J" stations fail to answer a question shot at them. We that do not know of this may think that: "Well that big cheese high-hatted me," or something to that order, and hence create bad feeling instead of good will. How can we help it, gang, if they are prohibited from saying all of these things by government order? It is more than natural that they are absolutely prohibited from handling traffic. If they are caught in act of doing this — why figure it out for yourself.

Now in regard to the time of operation in Japan. It is illegal for them to operate at other than the following hours: 2 to 4 a.m., 6 to 8 a.m., 10 to 12 a.m., 2 to 3 p.m., 4 to 6 p.m., and 10 to 12 a.m. Any station operating outside of the hours does so at his own risk. Also, any calls such as J3PX, J1UP, J1IP, etc., are all unlicensed stations, and in most instances they are short-lived, although many of them do get away fine. As to the power, they are limited to about 20 watts input to the last stage. Even at this low power they seem to break through very FB, and on 20 meters many of them have been able to penetrate as far as east coast U. S.

On the way back from Japan, I also had a nice time with the K6 gang. During my very short stay there I had visited nearly a dozen ham shacks and they, too, treated me very FB. Unlike "J" stations, these stations seem to be all high power, so no wonder they disturb us so much along this Pacific coast.

Now in closing, I want to express my appreciation and thanks through courtesy of QST to all "J" hams and the K6 bunch that helped make my trip a successful and enjoyable one. "Go west you 'W' hams — Go east you 'J' hams" — and let's create good will and friendly feeling over the air and on the land.

— Henry Y. Sasaki, W6CXW

I. A. R. U. News

(Continued from page 66)

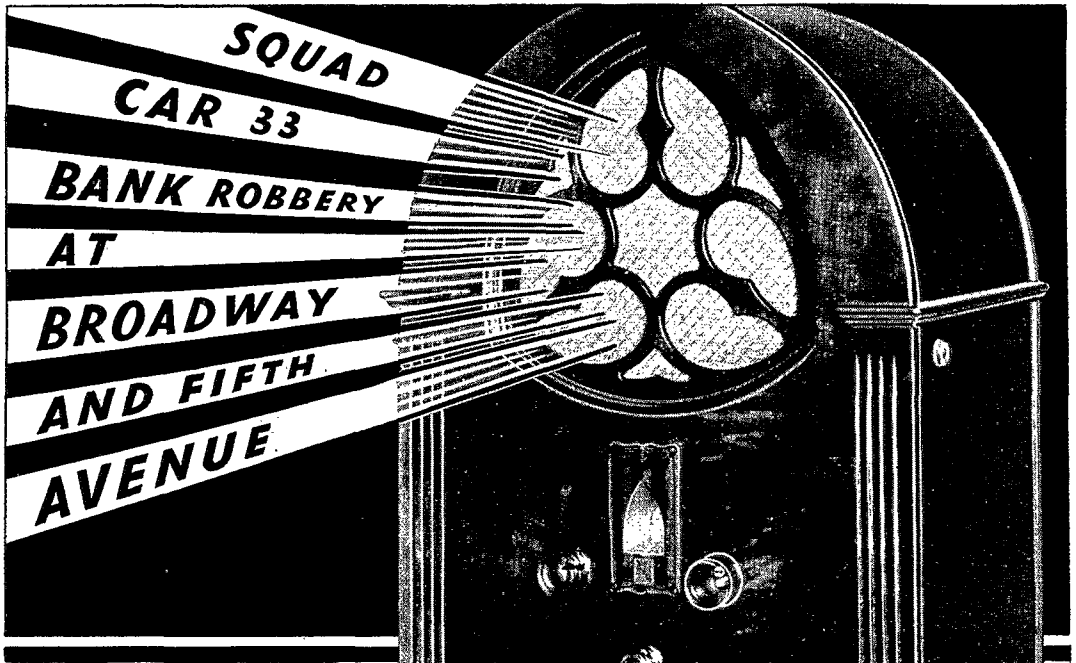
traffic manager, owing to the difficulty of his chemical studies. His place was taken by Snyders van Wissenkerke, with PA0NF, N. Fonderie, and PA0QQ, as assistants.

Says PA0QQ of Keeman and his work: "We will miss his pithy criticism and advice on how to make Dutch operating hamworthy and ideal." A good adjective that — "hamworthy."

The struggle over restriction of 3.5-mc. 'phone in New Zealand has at last resulted in the isolation of 'phones to that portion of the band lying between 3750 and 4000 kc. This solution of the problem seems to be fairly satisfactory to all concerned, if we are to judge by the tone of the editorial by S. H. Perry, ZL2BC, in the September issue of "Break-In."

Brief items of gossip from the month's mail:

M. S. Urquhart, VK6MU, report commercial interference in the amateur bands to be still troublesome. "I might mention that although



Twenty-six progressive American cities speed up the apprehension of crime with modern Delco police

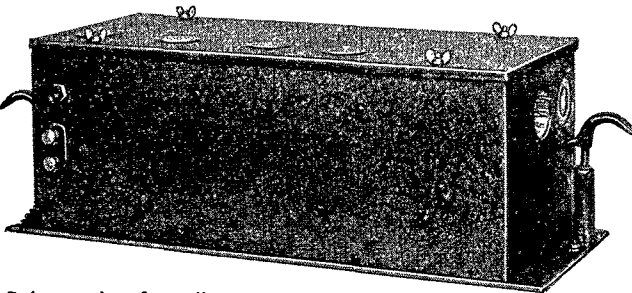
radio equipment operating on short wave—the majority of operators are ARRL members, who recognize efficient short wave equipment, and endorse Delco police radio.

Delco police station receiver, equipped with power dynamic speaker and static filter.

UNITED MOTORS SERVICE • INC.

Full details can be obtained from the following United Motors Branches:

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Delco receiver for police cars, equipped with a Pentode tube.

This Issue Completes the 1931 Series of QST

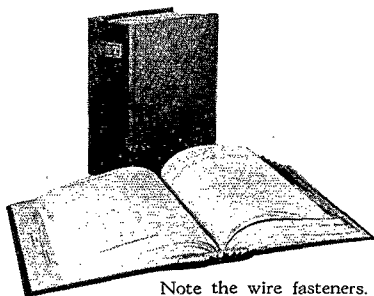
You'll want to keep these
copies as a unit

A few years from now *QST* copies of to-day no doubt will be scarce. Every reader of *QST* appreciates its reference value. We are daily reminded of this fact by the many requests we get for back copies, many of which we cannot supply.

Next year you will be looking for a certain 1931 issue of *QST*. You had better resolve right now to keep your copies in a

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(Holds 12 issues of *QST*)



Note the wire fasteners. Unnecessary to mutilate copies. Opens and lies flat in any position.

**\$1.50 each
postpaid**

A binder will keep your *QST*s always together and protect them for future use. And it's a good-looking binder, too.

A. R. R. L.
38 LaSalle Road

West Hartford Connecticut

QRM from Japanese commercials has almost entirely disappeared, we are not yet without severe interference from other commercial stations." That's not a proper condition. Something should, and *can*, be done about it. Amateurs have rights — results of the United States protest to Japan on their operation of their stations proves that these rights can be protected. Amateurs in other countries should take the same steps with offending nationalities. . . . A correspondent in the I.A.R.A.C.'s "QSO" also reports Japanese observance of the protest. . . . The first QSO between Hungary and the west coast of the United States is claimed by Joe Szandovics, HAF8B, and Leslie Rosenblatt, W6QW. Made on April 16th, 1931, they have carefully confirmed and investigated, and find no previous work. . . . An interesting bit of the enormous message traffic between the U. S. west coast and the Philippine Islands, is the relaying by Bruce Stone, W6AMM, to I. S. Liner, KA1SL, of the "Manila Daily Bulletin" staff, of the A.R.R.L. publicity department's weekly news releases for publication in the "Bulletin" a day or so after they are released. . . . K. E. Brian-Jay points out that the frequent two- and three-pences G amateurs are at present forced to disburse on "postage due" QSL cards and letters as a result of the newly revised postal rate schedule, could much better be spent by them for apparatus and equipment. His asperity is doubtless justified, and we emphasize once again the new rates, which were given in detail in the *Stray* in the November issue of *QST*.

Good Insurance—S. F. Transmissions

(Continued from page 56)

TRANSMITTING PROCEDURE

The time allotted to each transmission is 8 minutes, divided as follows:

2 minutes — QST QST QST de (station call letters).

3 minutes — Characteristic letter of station followed by call letters and statement of frequency. The characteristic letter of W1XP is "G"; that of W9XAN is "O"; and that of W6XX is "M."

1 minute — Statement of frequency in kilocycles and announcement of next frequency.

2 minutes — Time allowed to change to next frequency.

THE TRANSMITTING STATIONS

W1XP: Massachusetts Institute of Technology, Round Hill Research, South Dartmouth, Mass., Howard A. Chinn in charge.

W9XAN: Elgin Observatory, Elgin National Watch Company, Elgin, Ill., Frank D. Urie in charge.

W6XX: Don Lee Broadcasting System, Los Angeles, Calif., Harold Peery in charge.

REPORT AND TEST BLANKS

Blanks for reporting on the regular S.F. transmissions will be sent postpaid upon request. Just

866

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\$2.95

RCA LICENSED TUBES

UY227's	\$.35
UX245's, each	\$.55
UX171A's	\$.45
UX226, UY224, UX280, UX201A, each	\$.65
UX230, UX231, UX232, 335, 551, each	.....	\$ .75
THE NEW POWER PENTODE U247	.....	\$ .95
236, 237, 238, automobile d.c. tubes, each	.....	\$ 1.00
233, 2 volt pentode. UY222, d.c. screen grid, each	.....	\$ 1.00
UX210's, extra large plate, 15 watt rating	.....	\$ 1.50
UX281's, 110 mil. output rating	.....	\$ 1.50
UX250's, for your modulators	.....	\$ 1.50

CG1162, GE 5 watter, a transmitting tube. All new and in original boxes..... \$.45
Filament Transformers..... \$ 1.00
 18 watts, 7.5 volt center tapped, weight 2 lbs. Just the thing for your 210's, 281's, 250's or CG1162's.
 Neon tubes for wavemeter in handy carrying case..... \$.50
 Hard rubber panels 7 x 10 or 7 x 12, \$.55. 7 x 14..... \$.60
 UX or UY sockets, heavy spring contacts..... \$.10
 Subpanel wafer sockets, UX or UY..... \$.05
 Odd lot, 00025 and .00035 variable condensers, each..... \$.50
 Grid leaks, 1/4 to 10 megohms, each..... \$.15
 Stand-off insulators, similar to GR, each..... \$.09
 Genuine Mershon 8 mfd. 430 volt condensers..... \$.95
 1500 volt Dubilier mica condensers, capacities .0001 to .02. All new, each..... \$.25
 800 volt mica condensers, .0001 to .006, each..... \$.15
 Radiobuilders chokes, completely shielded, with large stand-off insulators, 30 henrys, 250 mils., weight 12 lbs..... \$ 3.25
 30 henrys 400 mils., weight 18 lbs..... \$ 3.95
 Push back hook up wire, 25' roll..... \$.20
 2 watt resistors, non-inductive, 10,000, 20,000, 50,000 ohm, each..... \$.15
 85 watt transmitting grid leaks, 10,000, 12,500, 15,000 ohm, each..... \$.65
 Power transformers, 1500-0-1500, 7.5 CT, 7.5-15 2.5, 300 watts..... \$ 6.50
 Western Electric single button mikes..... \$ 1.00
 RCA Power Chokes, 30 henry 125 mil. each..... \$ 1.20
 RCA Audio Transformers, 3 to 1, each..... \$.75
 20 ohm CT resistors, \$.15 200 ohm CT..... \$.20
 20,000, 50,000 and 100,000 ohm volume controls, each..... \$.50
 Pilot plug-in coil form, complete..... \$.39
 Air King short wave plug-in coils, set of four..... \$ 1.75
 .0001 midget condensers for above, each..... \$.45
 Genuine Mesco transmitting keys, all new..... \$ 1.25

RADIOBUILDERS CONDENSERS

Mfd.	800v.	1000v.	1500v.	2000v.	3000v.
1	\$1.10	\$2.00	\$2.95	\$4.75	\$6.95
2	\$1.55	\$3.00	\$3.95	\$8.00	\$12.50
4	\$2.75	\$4.00	\$5.50	\$14.00	\$19.95

Above condensers tested at 40% overload.

RADIOBUILDERS (self-healing puncture proof) CONDENSERS

Mfd.	800v.	1200v.	1600v.	2000v.	2800v.	3200v.
1	.....	.....	.....	\$3.95	\$6.00	\$7.50
2	.....	\$3.00	\$3.35	\$6.00	\$9.25	\$13.00
4	\$2.50	\$4.25	\$4.20	\$8.50	\$16.00	\$22.00

All condensers in heavy metal containers with large terminal insulators. Above ratings actual DC working voltages. All guaranteed.

Milliammeters 0-15, 0-25, 0-50, 0-100, 0-150, 0-200, 0-300, 0-400, each..... \$ 1.00

A. C. Voltmeters 0-6, 0-10, 0-15..... \$ 2.50

D. C. Voltmeters 0-100 — \$1.25. 0-300 — \$3.00 0-500 — \$4.00, and 0-750 — \$5.00.

Electric soldering irons..... \$ 1.00

7 x 18 x 7 solid walnut cabinets. Special..... \$ 1.00

5" dials for transmitter..... \$.20

20 ohm Kurz-Kasch rheostats for all new 2 volt tubes, knob included..... \$.20

Rubber covered wire, 50' roll..... \$.25

2000 ohm head phones, pair..... \$ 1.20

Filament transformers for 866's, 2.5 volts, 10 amperes, 15,000 volt insulation..... \$ 2.75

Filament transformers for —72's, 5 volts, 20 amperes, 20,000 volt insulation..... \$ 4.50

For all 50 watt tubes, 11 volts, 10 amperes..... \$ 5.50

For all 250 watters, 12.5 volts, 10 amperes..... \$ 6.00

All transformers center tapped and completely shielded.

Finest Brazilian Quartz 1" square cut crystals. Accuracy guaranteed 1-10 of 1% in 3500-4000 Kc band, each..... \$ 4.40

Plug-in crystal holders for above, each..... \$ 2.50

Copper coil 2 1/4" diameter, 3/4" tubing, turn..... \$.08 1/2

Above are equipped with mounting lugs at each end.

Any size copper lugs up to 5-16" each..... \$.05

Universal double button handy mike microphone..... \$ 8.82

Radiobuilders transmitter RF chokes..... \$.50

Give specification for above when ordering.

85 milhenry RF chokes..... \$.15

Tube shields..... \$.20

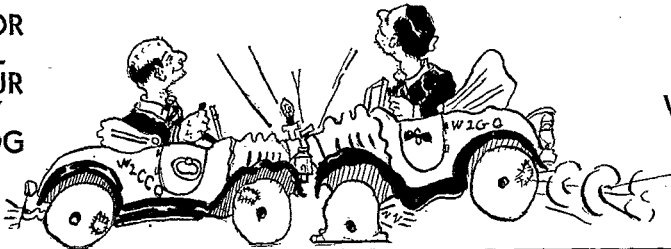
Latest Amateur Call Books..... \$.82

LAST MINUTE SPECIAL

RCA UV211 50 WATTERS, all new and in original boxes..... \$ 16.95

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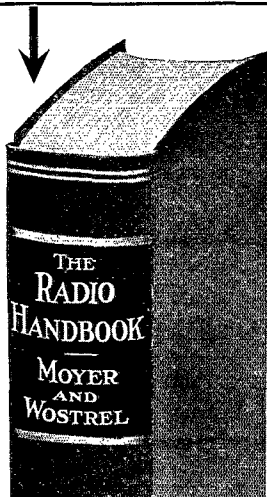
THE RADIO HANDBOOK

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Pictures

by James A. Moyer
and John F. Wostrel

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Department of Education; Au-
thors of *Radio Receiving Tubes*,
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650 illustrations,
flexible, \$5.00



HERE at last is a handbook that meets the need for a complete digest of authoritative radio data, both theoretical and practical, in one logically arranged and thoroughly indexed volume. From the fundamentals of electricity, magnetism and electron theory right down to full details on latest commercial and industrial applications, this book covers the whole field of radio, with descriptions, definitions, design data, practical methods, tables and illustrations in profusion.

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send a card or message to the Standard Frequency System, QST, West Hartford, Conn., asking for S.F. blanks.

WWV 5000-KC. TRANSMISSIONS

The Bureau of Standards Station WWV will transmit calibration signals on 5000 kc., accurate to within one part in a million, between 2.00 and 4.00 p.m. and between 8.00 and 10.00 p.m., E.S.T., every Tuesday in December excepting the 29th. These transmissions are particularly suitable for calibrating frequency standards, such as 100-kc. crystal oscillators, having a harmonic on 5000 kc. Reports on these transmissions will be appreciated. They may be sent direct to the Bureau of Standards, Washington, D. C., or via A.R.R.L.

— J. J. L.

Northwestern Division Convention

(Continued from page 22)

through the courtesy of the Bell Laboratories, on "Sound Filters." And then came the event of the day — the trip to Keyport aboard the Naval Reserve ship No. 32. A two and one-half hour sail on Puget Sound was enjoyed before reaching the Naval Radio Station at Keyport, where everyone had an opportunity to inspect the station. The Yakima delegation acted as host on board. Well done, Yakima, and our thanks to you.

No set speeches had been arranged for the banquet and in this way the representatives of the clubs in attendance were given an opportunity to say a few words. Tom Baird of Spokane spoke for the Spokane Radio Club; Arthur Clayton, Yakima Radio Club; Hoffman, Seattle Radio Club; Bill Rowan, British Columbia Amateur Radio Association; Cliff Brunk, Coos Bay Amateur Radio Club; Don Wallace, Associated Radio Amateurs, Long Beach. The Rose City, the Idaho and Pullman Radio Clubs also had

(Continued on page 72)

West Gulf Division Convention

(Continued from page 23)

the winners awarded prizes at the banquet. Louis Falconi, W5ZA, the winner of the first Hoover Cup, and his OW; SCM Taylor from Fort Worth and Mr. and Mrs. Henderson of Corpus Christi were present. The Naval Reserve enrolled 15 men and Lieut. Ehret was kept busy helping the Medical Examiner.

Director Corlett acted as toastmaster and the guests were well entertained during the banquet. The main speakers of the evening were Mr. Ed. F. McKay, Manager, Oklahoma Utilities Association, who kept the crowd in good humor with his stories and Fieldman Hebert from A.R.R.L. Headquarters. With the distribution of prizes, for which the thanks of all goes to the manufacturers who so generously contributed, the two days of real "ham" jollification came to a close shortly after midnight. The next convention at Fort Worth, Texas. Look forward to it fellows.

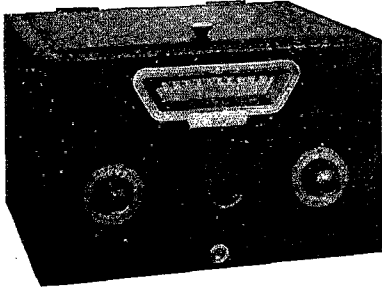
— A. A. H.

HOLIDAY GREETINGS, "GANG"

From the Boys Here at "WHOLESALE"

Here is the place to get the most out of that Xmas money. Drop us one of our QSL cards for our 1932 10th Anniversary 144-page catalog. It's a "wow"!!

EVERYTHING NOW IN STOCK — RUSH MAIL ORDER SERVICE

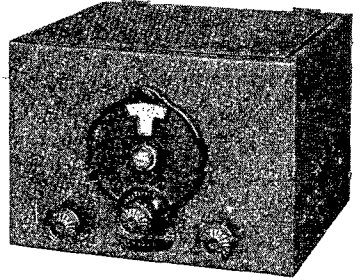


The new R.E.L. 278 Band Spread Receiver employing two type '36 Screen Grid Tubes as R.F. and detector with the type '38 pentode audio also available for AC operation, using two type '35 tubes and one type '27. Calibrated volume control, has a kick like a mule and is fully guaranteed. It doesn't pay to build your own set any more when you can buy this swell ear drum wrecker for **\$28.50**. Send for bulletin No. 209 for a full description of this set

A complete stock of the following manufacturers' products always on hand

- Allen Bradley
- Aerovox
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- National
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- Pyrex
- R.E.L.
- Sangamo
- Signal
- Vibroplex
- Weston

And a host of others



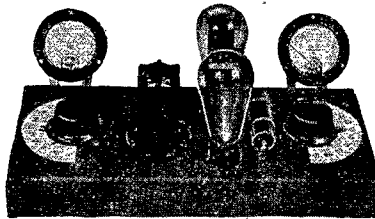
National SW3, the set described in September issue of "QST" uses the new 6-volt heater type No. 236 and 237 tubes for battery operation or type 235 and 227 in the AC model. Calibrated attenuation control and a smooth sensitivity control are some of its many features. **\$32.34 — "But We Have It in Stock"** Power supply for AC model... **\$20.28**

THE R.E.L. 271 GLOBE GIRDLER TRANSMITTER

Here is the Perk-o-lator you have been looking for and **boy, how it perks!**

Just the outfit for 20 meters; puts 30 watts into the antenna when two DeForest 510's are used. Push-Pull T.P.T.G. circuit used, completely built and ready for the juice.

Coils for any band. Specify what band you want when ordering. Coils supplied for one band. Additional coils **\$2.35** per band.



\$15.50 — less meters

All the essential parts for the power supply to operate the 271, consisting of Thordarson Power Transformer, Double Filter Choke, three G.E. 4 mfd. 800-volt Filter Condensers, 50,000-watt Bleeder and Eby Isolantite Tube Sockets. Delivers 650 volts pure DC at 150 M.A. and all filament supply. **\$9.75**

- Crystals, 160-80 meters, 1% of 1% accuracy. **\$5.00**
- Crystal Holder, dust proof, nickel plated..... **2.50**
- Truest filament transformers:
- 2.5 volts at 10 amps **4.35**
- 7.5 volts at 5 amps **4.35**
- 2-7.5 volts at 4 amps **6.15**
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- 10 volts at 7 amps **5.85**
- 12 volts at 6 amps **6.35**
- 14 volts at 6 amps **6.65**

- 5 volts at 20 amps **\$12.50**
- The new R.E.L. 50-watt socket **1.62**
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- Perryman 588 mercury vapor 280..... **1.50**
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The PURADYNE plate supply transformers have been designed so that they may be adapted to the most common applications in rectifying and transmitting circuits. The primary windings are designed for operation from a 60-cycle 110-115-volt supply. All units are designed for continuous operation at full load. The insulation test at a potential of 10,000 volts insures satisfactory operation under all possible conditions.

No.	Out Put Voltage	Filament Voltages	Wattage	Price
80	2500-0-2500		850	\$13.00
	1500-0-1500			
	1500-0-1500		500	9.00
50	1500-0-1500			
	750-0-750			
10	750-0-750	7½V. c.t.-7½V. c.t.	325	5.00
10A	600-0-600	7½V. c.t.-7½V. c.t.		4.50
45	375-0-375	2½V. c.t.-2½V. c.t. 5V.	100	3.50
71	300-0-300	2½V. 5V. c.t. 5 c.t.	100	3.00

PURADYNE 250 mil choke 30 henrys 110 ohms d.c. resistance in metal case with stand-off insulators...\$3.00

PURADYNE 30 Henry 125-mil choke 260 ohms d.c. resistance.....\$1.00

PURADYNE 30 Henry 300-ohm choke.....\$1.75

PURADYNE filament transformer, 10,000V., insulation in metal cases with stand-off insulators: All guaranteed for one year against any defects. ALL CENTER TAPPED.

2½V. — 12 amps. for 866s.....3.50

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PURADYNE special filament transformers, 2-7½V. c.t. at 4 amps. each winding.....\$4.00

PURADYNE .001, .002, .006-volt plate-blocking condensers with stand-off insulators.....\$.75

PURADYNE guaranteed transmitting filter condensers, metal cases with stand-off insulators. All condensers rated at continuous working voltage.

Capacity 1000 Volts 1500 Volts 2000 Volts 3000 Volts

1 mfd. \$1.25 \$2.00 \$3.00 \$6.00

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3 mfd. 2.50 3.50 6.50 28.00

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PURADYNE 200-watt center-tapped transmitting grid-leaks in metal cases with stand-off insulators:

5,000 ohms.....\$1.75 20,000 ohms.....\$2.50

10,000.....2.00 30,000.....2.75

15,000.....2.25 50,000.....3.75

OHMITE 150-watt gridleaks—5000; 10,000; 11,000; 16,000; 17,000; 21,000; 100,000 ohms, each.....\$1.75

PURADYNE microphone transformer in neat shielded cases, single button \$1.75—double button \$3.50. Mike stands, table model \$2.00; floor model adjustable to eighty inches, staturary bronze finish.....\$3.50

PURADYNE double button microphones, 200 ohms each button.....\$14.00

THORDARSON Filament Transformer 1½V. 2½V. 5V.....\$1.25

NOTE: JEWELL carries the most complete line of power amplifiers and PA systems in the city. Send for literature.

PURADYNE Microphone Pre-Amplifiers using two No. 230 tubes in neat metal cases.....\$7.50

PURADYNE heavy duty 50 watt sockets, porcelain base, metal shell. Very Special.....\$1.00

Mercury Vapor heavy duty 866 Tubes.....\$4.50

R.C.A. sockets model U P 542......45

TGRAD 4-1 block condensers, 600V. working......40

FERRANTI (Made in England) P.P. Power Transformer 750-0-750—2-7½V. c.t., 350 Watts, heavy duty, in metal case, not pitched. Weight 25 lbs.....\$9.50

SAMSON PAM AMPLIFIERS. NEW: PAM 19 uses 2-281, 2-250, 2-22T. List \$175.00.....\$49.50

LAST MINUTE SPECIALS

R.C.A. Photophone speakers 14", new, in cartons.....\$12.50

R.C.A. 2 Henry 300 mils., 20-ohm key click and filter chokes.....\$1.25

W.E. shielded 3-wire cable, cloth covered, per foot......66

Enamelled aerial wire No. 10, 100 feet, solid......90

PURADYNE Bee Hive Insulators \$1.10 each, a dozen......75

MAGNAVOX single button microphones.....1.25

DONGAN double chokes, 200 mils each, 30 Henrys, in metal case.....\$3.50

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Compare the Prices
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Pacific Division Convention

(Continued from page 40)

journed for lunch. After lunch the program was resumed with George Grammer speaking on the subject of amplifier excitation; and then Ralph Heintz of Heintz & Kaufmann caught the fancy of the gang with a talk on antennas. This completed the technical talks and the political meeting opened. Arguments not having been completed by scheduled time, it was necessary to adjourn temporarily so those interested could participate in the code contests.

At eight o'clock the banquet got under way under the leadership of Toastmaster Jack Stevens. The speakers included Mr. Clark, Mr. Linden, Supervisor of Radio for the Sixth District, Mr. Babcock, Mr. Grammer and the S.C.M.'s for the various C.D. sections in the Division. There was also the awarding of prizes to the winners of the contests and distribution of door prizes to the holders of the lucky numbers. Manufacturers of ham apparatus contributed generously and the prizes are being put to good use in the stations of the lucky hams.

The Associated Radio Amateurs of San Francisco are to be congratulated on the fine job they made of the Convention. Particular credit is due the Convention Committee, which worked hard and long preparing for the big event, and the ladies who assisted them. The Convention can be summed up in a much-worn phrase — "a good time was had by all."

CU in Long Beach — 1932!

— G. G.

The Missouri-Midwest Division Convention

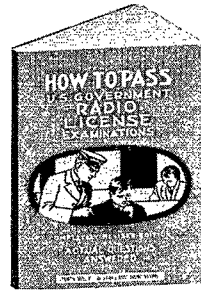
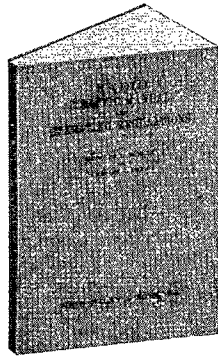
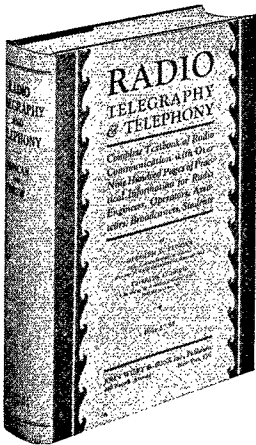
"THE Biggest Little Convention" ever held in the Midwest Division is how one delegate described the First Annual Missouri Section-Midwest Division Convention held at Rolla, Missouri, September 11th and 12th under the auspices of the South Missouri Association of Radio Amateurs.

The convention was opened with a word of welcome by L. G. Call, W9EBE, Pres. S.M.A.R.A. The traffic meeting at the Missouri School of Mines, where all sessions were held, conducted by E. L. Battay, Asst. Comms. Mgr., A.R.R.L., was participated in by all present, and the various discussions lasted until late afternoon of the first day. W9FFW conducted the delegates on an interesting tour of the School, which was enjoyed by all. The evening session featured talks by H. W. Kerr, W9GP-DZW, Midwest Division Director, A.R.R.L., Lt. (jg) L. B. Laizure, U.S.N.R., S.C.M. Missouri, and contests under the supervision of F. M. Davis, W9FVM.

The morning of the 12th found a large percentage of the gang delving into the questions on the R.L.s license exam, and the balance "gab-festing" and visiting "all around town." The afternoon technical meeting proved of real interest and much good dope was brought the assembly by J. Doug Martin, W9FFW, W. E. Mans-

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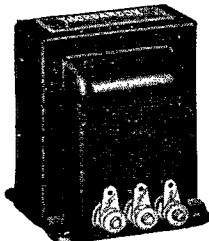
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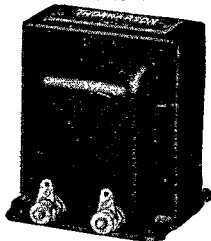
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field, Engineer KMOX, and Prof. G. O. Ranes of the School of Mines. An interesting paper on antennas by R. S. Kruse, former editor of *QST*, was read by L. B. Laizure.

When a bunch of hams get together at a banquet "a good time is had by all" and the feed at Rolla was no exception. Toastmaster Kerr introduced Mr. Allison of the Rolla Chamber of Commerce, F. M. Davis, W9FVM, Radio Inspector McDonell, Prof. Ranes, SCM Laizure, Col. Woods of the *Rolla Herald*, E. L. Battey, and before the evening was over practically every one had an opportunity to say a few words. The awarding of prizes met with much enthusiasm and nearly every delegate carried away something to remember the occasion by.

The convention committee, W9EYG, W9FFW, W9CLU, W9FVM, W9FUM and W9EBE, received a hearty ovation for their efforts, and the convention came to an end with every one hoping to get together again in 1932. — E. L. B.

Northwestern Division Convention

(Continued from page 68)

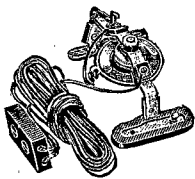
delegations present. The best entertainment of the evening was furnished by the Yakima Radio Club's own orchestra under the leadership of Arthur Clayton. With the distribution of prizes came the close of the most successful convention held in the division and a unanimous vote in favor of Yakima for next year's convention; and if what that gang did is any criterion of what may be expected next year, begin to save up the pennies, fellows; their convention should prove a "humdinger." It goes without saying that the sincere thanks of every one goes to the Tacoma Radio Club for the very fine time given everybody. — A. A. H.

Communications Department

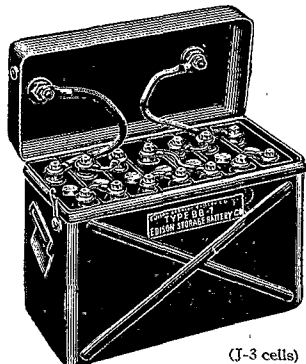
(Continued from page 54)

7000 and 3500 kc. that makes one dizzy to look at. W6ATJ worked KGEK in the Tasmanian Sea and handled some of the Olympic Games traffic from L. A. W6CTX is starting to roll the traffic in again. W6BKM landed among the leaders in traffic work this month. W6CDP is another of the boys who is handling a handsome fist full of traffic. W6BTZ, in spite of National Guard work, and new ops and so forth, managed to make that big '52 grinder of his saw off a chunk of traffic. W6BZU reports there isn't much new in his balliwick except the arrival of the autumnal rains. W6BPC is still trying to compete with NPG at Mare Island for output and results. W6BSB, new prexy of the Oakland Radio Club, went up to Paradise, Calif., for his health, and while up there used a portable transmitter and receiver built by W6CUG. He used his portable call of W6SS. W6BI has just finished playing out the U.S.N.R. schedules for the winter, and expects to have a busy time on the air during the big rains. W6AF, who used to be old W6CGM, recently hooked a group of sea-going Sixes at a VS station in Singapore. W6EGM handled some traffic and worked ZL stations and BAM during the month. W6DLT says he is still working on W6DOS for an ORS. W6CBE recently cracked a crystal. W6DQH has a new antenna and counterpoise, and reports W6ADO as a new ham. W6BBJ has decreased the coupling to antenna on the 'phone set to cut down local QRM. W6BQB is one of the three fellows who handled exactly thirteen messages this month. Hope they are not superstitious. The other two are W6PB and W6YM. The last station is not a "fellow," but one of the local schools. W6FBH phoned in his report this month, as did W6CBH. W6ZM clouted out a few he had hanging around his shack. W6CDA says there is nothing new except a power supply. W6BTW handled a message, and W6BS reported plans to participate in the frequency tests.

BARGAINS ARMY AND NAVY RADIO SURPLUS

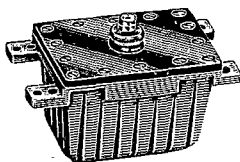


Magnavox anti-noise microphone, good for home broadcasting \$1.50

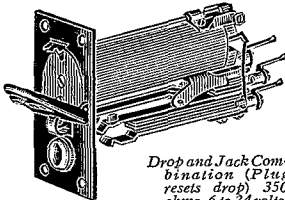


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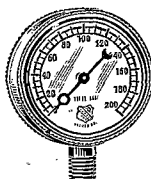


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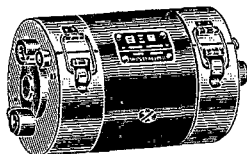
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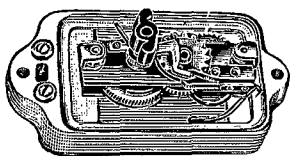
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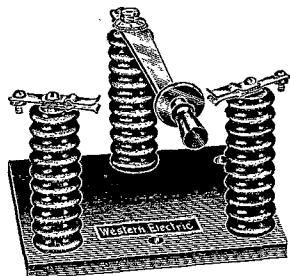


Holtzer-Cabot "Mike," Utah type, carbon granular transmitter, \$1.50

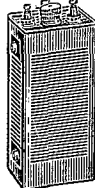


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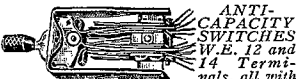


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- Western Electric Switchboard C.W. 928. Control board for Dynamo motor C.W. 927. Consists of starting switches, fuses, 0-50-500 volt voltmeter with switches for testing main lines and output. Also contains complete filter system. Very special. \$8.00
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Can be used with the new Vacuum Contact when operated on 45 volts. Western Electric Signal "Drops," 1000 ohm, type D-12. \$1.00

- 500 cycle Motor Generator, U. S. Navy type, 1/2 KW, 120 volt DC input, 240 volt AC output, new, \$75.00. Slightly used. \$50.00
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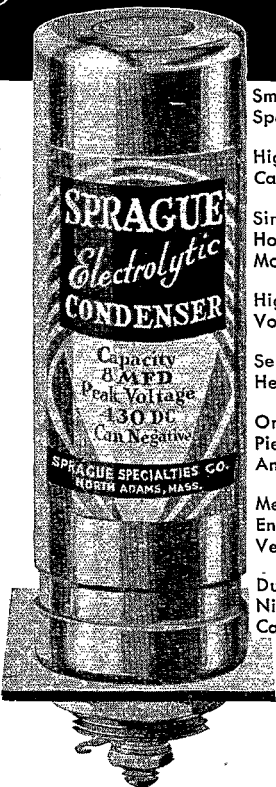
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MOST of these names—most of the outstanding radio manufacturers—use the Sprague Electrolytic Condenser as standard equipment because in efficiency, economy and absolute uniformity, the Sprague Condenser gives greatest satisfaction.

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North Adams, Mass.



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- High Capacity
- Single Hole Mounting
- High Voltage
- Self Healing
- One Piece Anode
- Metal Enclosed Vent
- Dull Nickel Can

Traffic: W6ALX 440, W6ZX 275, W6AHW 272, W6RJ 269, W6ATJ 237, W6CTX 230, W6BKM 135, W6CDF 121, W6BTZ 117, W6BZU 58, W6BPC 52, W6SS 52, W6BI 41, W6AF 41, W6EGM 29, W6DLT 24, W6CBE 20, W6DQH 19, W6BBJ 13, W6BQB 13, W6YM 13, W6PB 13, W6FBH 11, W6CBH 6, W6ZM 5, W6CDA 5, W6BTW 1.

SANTA CLARA VALLEY—SCM, F. J. Quement, W6NX—Another record month—congratulations are certainly in order to the brass pounders of the section. With W6DSZ, a newcomer, handling 757, and W6YU back again with 514 and the old reliables W6BET, W6YG, W6FEY and W6AMM turning in nice totals, an all-time record was established. W6DCP was the high man from the Watsonville district followed by W6DBQ, W6EEH, W6DDS. W6DBB has MOPA. W6FBW is active in traffic. W6BAX made WAC in nine hours. W6EI is new ORS. W6BHY had narrow escape in auto wreck. W6ALW will have 250 watts soon. The PI schedules continue to function, and PI messages should be sent to W6NX for distribution. The splendid cooperation of the brass pounders is very encouraging and, if we continue to gain, it won't be long until the white flag is won.

Traffic: W6DSZ 757, W6YU 514, W6BET 277, W6YG 229, W6DCP 221, W6FEY 168, W6AMM 128, W6ALW 37, W6DBQ 13, W6EEH 17, W6DDS 30, W6DBB 15, W6FBW 8.

SAN JOAQUIN—SCM, E. J. Beall, W6BVY—My prediction last month proved correct. The gang was too busy rebuilding to report. We now have in operation a 1750-kc. band schedule made up of W6FFU, W6DQV, W6AHO, W6BVY, W6BUZ and W6KU. Our motto is "When Skip on 3.5 mc. is bad, use 1.7 mc." and, believe us, we will have the whole section on 1.7 if you give us time. W6FFU is using a matched impedance P.P. antenna. W6AOA kept schedules with the station at Pomona Fair. W6BUZ has a nice 'phone on 1750 and 3500. W6CLP handled some official traffic between the Governor of Arizona and the Governor of California. W6CXT reports by W. U. telegram. W6BIP has a nice report and also reported by telegram. W6BQC has been busy at college, but not too busy to turn in a nice report (Att: you fellows who NO GOT TIME) . . . Very sorry to hear our YL op., W6BBS, has moved to Berkeley. W6SF is sure on the job this month with a report for his part of the territory. W6EFV left Stockton and is now in Fresno. W6BBC threatens to grab his MOPA by the horns and make her work if it takes all winter. W6CNF gathered all his traffic on his portable transmitter. W6BFH has a pair of '52s in P.P. W6DTJ relieved W6EFV at KWG. W6AOZ, an old-timer, is on again with a 50 in final stage of MOPA. W6BRJ, with a National '45 P.P., is on again. W6AME displayed a nice outfit at the MAR Club meeting. Take a look at your ORS ticket and see if it needs the SCM renewal sig. If so, send it along and I will fix her up for another year.

Traffic: W6FFU 47, W6AOA 682, W6DQV 77, W6BUZ 5, W6CLP 35, W6CXT 83, W6MU 148, W6BIP 842, W6DFJ 891, W6EJU 31, W6YB 9, W6BQC 46, W6DZN 106, W6SF 71, W6CNF 24, W6BBC 5, W6AME 25, W6BVY 91.

NEVADA—SCM, Keston L. Ramsey, W6EAD—W6AJP has a new receiver. W6BYR has a new Super Converter. W6YAR is on the air with crystal-controlled rig on 7 and 3.5 mc. W6CRF is building a new high-power 'phone. W6BTJ has moved to Santa Cruz, Calif. W6EAD is rebuilding.

Traffic: W6UO 32, W6AJP 16, W6BYR 6.

ARIZONA—SCM, Ernest Mendoza, W6BJF—Two men make the BPL this month, W6BJF on totals and W6ALU on deliveries. W6CDU is again operating W6ALU, the National Guard Armory station at Phoenix. W6BJF and W6ES visited W6EUT and W6CPF. W6EUT has a portable call now, W6CZA. W6CPF is experimenting with a '10 in TPTG. W6CEC is rebuilding into crystal 'phone and CW rig. W6BVN (Mrs. W6CEC) is heard daily in the early morning at the mike, a member of the "Breakfast Club." It is rumored that W6FAI is to be transferred from Ft. Huachuca to Ft. Sill soon. W6BLP has one transmitter used exclusively for 14 mc. W6CFT is a new man from Oregon. W6BCD is making a real super-het out of his folks' tuned r.f. BC receiver. W6EFN is using a 211D. W6CKW is building a new crystal 'phone. W6CBA is waiting for a new receiver. W6EFC has a 211 in the final amplifier of his three-tube crystal. W6AND's '03A went soft. W6CQF in Tucson works Canada and Hawaii, but cannot get into Phoenix! W6COI is teaching a code class in Junior

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Class "B"

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Special Class B Input Audio Transformer

Special Class B Modulation Transformer

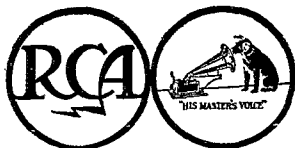
(with two secondaries capable of modulating either
1,000 volt or 2,000 volt Class C RF tubes)

Two matched Radiotrons, Type UV-203-A

Net Price—\$74.25

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* The Class B Push-Pull Modulator—L. E. Barton



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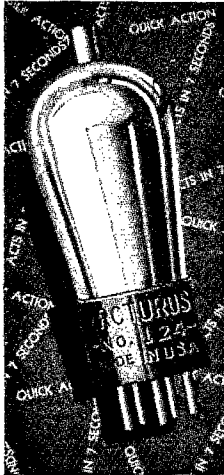
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The old slow-heater type has now been relegated to an inferior classification and must of necessity be priced appreciably lower. This difference in list price is evidence that the superior merits of the quick-heater are fully appreciated.

A lower price for slow-heaters is unimportant to set users. They will not sacrifice efficiency for price. So they demand quick-acting tubes. Arcturus Blue Tubes are all quick-acting. They have become the standard of the industry.

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"The TUBE with the LIFE-LIKE TONE"

QST Oscillating Crystals

"Superior by Comparison"

New Price List Effective Immediately

New prices for grinding power crystals in the various frequency bands, said crystals ground to an accuracy of plus or minus .03% mounted:—

Frequency range	New list
100 to 1500 Kc.	\$40.00
1501 to 3000 Kc.	\$45.00
3001 to 4000 Kc.	\$50.00
4001 to 6000 Kc.	\$60.00

Above prices include holder of our Standard design. If crystal is wanted unmounted deduct \$5.00 from the above prices. Deliveries can be made within two days after receipt of order. In ordering please specify type tube, plate voltage and operating temperature. *Special prices will be quoted in quantities of ten or more.*

POWER CRYSTALS FOR AMATEUR USE

The prices below are for grinding a crystal to a frequency selected by us unmounted (if wanted mounted add \$5.00 to the price list) with a calibration accurate to BETTER than a tenth of one per cent. Immediate shipments can be made and all crystals guaranteed.

1715 to 2000 Kc. band	\$12.00 each
3500 to 4000 Kc. band	\$15.00 each

LOW FREQUENCY STANDARD CRYSTALS AND HEATER UNITS

We have stock available for crystals as low as 13 Kc. Prices upon receipt of specifications. Heater units for temperature control of crystals \$300.00 less crystals. Description upon request.

SCIENTIFIC RADIO SERVICE

124 Jackson Ave., University Park
HYATTSVILLE, MD.

"The crystal specialists"

College, where he is a student, as is W6CWL. W6HS works all he hears, with a '52 TPTG on 7 mc. W6AWG, from California, is an operator at BC station KOY. W6ERJ is a new man in Phoenix. W6BYD is rebuilding his 'phone. W6BRI (Mrs. W6CDU) is always present at Radio Club meetings. W6EEB is spending a well-earned vacation in California. W6AMV has moved closer in to Phoenix. W6EKP is getting out consistently on low power with his nice DC note. The SCM was over to see W6AEK's 'phone layout, and he is to be complimented upon his neat shipshape arrangement of all apparatus. W6DIE is back with us again. W6CVR and W6CAP manage to help each other stay on the air. W6AYW gets out good with his low-powered P.P. TNT using '45s. W6DXC is now working as a radio service man. W6CGL is a Department of Commerce airport radio opr. in Yuma. This is the lineup so far of this winter's Army-Amateur activity: W6ALU, NCS; W6BJF, A.S. N.C., W6HS, W6CPF, W6EUT, W6CUG and W6EPN, D. and L. NCS. Practically every 'phone man in the state is a member of the "Arizona Supper Club," a daily get-together, at 5 p.m., for the purpose of quickly clearing all traffic to any part of the state. This is a fine idea, and should be of much value to all stations receiving interstate traffic. The "Arizona Short Wave Radio Club," only eleven weeks old, is progressing in fine shape, its average number present every meeting being 14. Its 39 members are scattered all over the state, and regularly receive their copies of the club paper, the *ASWR News*. W5AHI, SCM of New Mexico, was met on the train at Phoenix by W6BJF, W6CDU and W6BVN, when he passed through on his way to Bard, Calif., where he is to live now.

Traffic: W6BJF 885, W6ALU 490, W6EUT 279, W6CPF 254, W6CEC 165, W6BLP 69, W6CKW 49, W6CFT 43, W6BCD 29, W6EEN 29, W6EJN 25, W6CQF 10, W6COI 10, W6EFC 9, W6HS 8.

SAN DIEGO — SCM, H. A. Ambler, W6EOP — W6CTP leads the section this month. W6BGL is building a new set. W6AXN is now an ORS. W6BKX worked Japan. W6BAM is QRL harvesting walnuts. W6AKY is up early trying for DX. W6EOH expects to become an ORS soon. W6AYK has a new AC receiver. W6EPF has been on the sick list. W6AXV has moved. The Pi Alpha Tau Fraternity held an open meeting, on October 13th, and about 40 A.R.R.L. members were present. Col. Clair Foster gave a very interesting talk, also W6EC, Dr. Waters from Orange, gave a very good talk. Before the meeting the Pi Alpha Tau members held a banquet and had as guest Col. Clair Foster. W6QY has a new Hertz antenna. W6EOP built a new transmitter and burnt out antenna meter. HI. W6DNW has two transmitters on the air now. W6AJM is back on the air. W6DNS is QRL building radio sets for autos. W6EOL has a new antenna. W6CTR built a 'phone on the 1750-kc. band, and is getting out FB. W6BOW rebuilt his transmitter. W6DNI has been out to sea. W6BFB has a new transmitter. W6VQ is all set to go at new QRA.

Traffic: W6CTP 57, W6BGL 29, W6AXN 23, W6BKX 11, W6BAM 11, W6EOP 8, W6AKY 3.

PHILIPPINES — Acting SCM, I. S. Liner, KA1SL — This report received by radio at W6AMM and mailed to HQS. KA1HR handled the bulk of states traffic and was plenty busy, as his total will show. KA1CO, KA1SP and KA1JR handled the overflow. KA1SL was total loss due to poor receiving conditions at newspaper office. KA1AC is with us again. Letter from Japanese Minister of Communications indicates further cooperation. Already many Jap commercials have been taken from the bands. KA1CE has been abolished due to lack of operators.

Traffic: KA1HR 2559, KA1JR 167, KA1SL 166, KA1SP 42.

ROANOKE DIVISION

WEST VIRGINIA — SCM, C. S. Hoffmann, Jr., W8HD — Army- and Navy-Amateur nets on Monday nights seem the only important activity for this month, the control stations being W8OK and W8CAY respectively; W8AHF being the A-A Net Station for the 'phones. W8EGA, W8OK and W8BDD are crystal, and W8CRP building crystal set. W8DNN received commercial license. W8BWK was assigned portable call, W8FJS. W8AZD was heard in U.S.S.R. on 7 mc. Following stations reported having schedules, and QSP: W8ELO: W8AMF, W8FIB; W8HD: W8DNX, W8VEV and A-A Net; W8OK: A-A Net; W8CAY and W8ADI: Navy Net; W8TI: W8AKZ, W8BQT. W8DSJ and W8CXR, both formerly loosely coupled to their YLs, are now directly coupled! The Ohio Valley

Here's Power for Two 210-Type Tubes

ASSEMBLE your own source of filtered power for filaments and plates of your 210-type tubes from standard General Radio parts. Everything is listed below (except the two 281-type rectifier tubes). Order from this advertisement, or write for Bulletin 933 containing complete specifications. Also see the October issue of the General Radio "Experimenter" for a description of a 5-meter transmitter using this power supply.

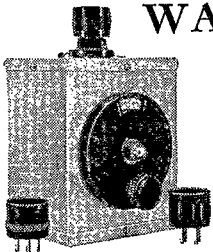
PART LIST

One TYPE 565-B Full-Wave Transformer	\$13.50
One TYPE 527-A Rectifier Filter	17.50
One TYPE 439 Center-Tap Resistor .....	.35
Two TYPE 349 Sockets (for Rectifiers) .....	.70
One TYPE 214-B 2-Ohm Rheostat	1.50
One TYPE 127-C 2.5 amp. Filament Ammeter	6.50
PRICE COMPLETE.....	<u>\$40.05</u>

GENERAL RADIO COMPANY CAMBRIDGE A, MASSACHUSETTS

Pacific Coast Warehouse: 274 Brannan Street, San Francisco

WAVEMETERS CHEAP!!



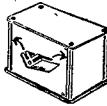
Type AM — Accurate Amateur-Band Wavemeter (Calibration within 1/4 of 1%). Like photo. With Calibrated Coil and Chart for *any one Ham Band*, \$6.95 net. Calibrate Other Bands Yourself; or, add \$2 for each extra Band Desired.
Type AB Wavemeter** Continuous Range (with overlaps), 14 to 250 Meters. Like Photo. Complete with Coils, Chart, Full Instructions; Ham Price, \$8.95. You need both

meters — one for filling in between Bands. Both for \$15. . . If C.O.D., Send \$1 Bill or Stamps, Pay rest to Postman when delivered. Include Postage. Foreign Orders Cash.

DELFT RADIO

524Q Fairbanks Ave. Oakland, California

ALUMINUM BOX SHIELDS



Genuine "ALCOA" stock, silverdip finish. 5 x 9 x 6 \$1.89 — 9 x 14 x 7 \$4.65. 10 x 6 x 7 Monitor size \$3.25. 5 x 5 x 5 Shield (like picture on the left) \$1.00.

ANY SIZE TO ORDER

Coil Shields, Coil Hole Covers, Shielded Wire. Resistance wire for shunts and ovens.

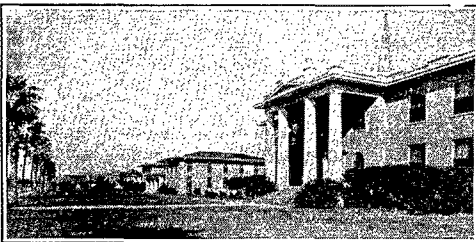
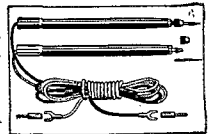
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Hedgehog Transformers
BURGESS VACUUM CONTACT
WESTON and JEWELL
METERS

C.R.L. IMPEDANCE COUPLED
1 STAGE AUDIO AMPLIFIER for
Short Wave and Television . . . \$2.95

**LARGEST VARIETY OF
RADIO PARTS IN THE WORLD**

BLAN, The Radio Man, Inc.
89 Cortlandt St. New York City Box Q11

"BUDDY" Test Prods
Always sharp pointed, using phonograph needles, 4-ft. wires, spade or phone tips. Colored nipples identify each lead. \$1.50 pair.



.. Includes Radio-phone, Television and
Wireless Telegraphy

PORT ARTHUR COLLEGE

PORT ARTHUR (world-known port) TEXAS

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



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ACCREDITED
TRAINING
SCHOOL**

In three to seven months, we train you to pass government examination and secure your license. Examinations are held in our school about every 90 days. Our graduates are operating broadcasting stations in all parts of America, and many are travelling the seven seas as ship operators. If further details desired, mail coupon.

Port Arthur College, Port Arthur, Texas
Please send details concerning Radio Course to

Name.....
Street or Box.....
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Make a **FUTURE** of your **Hobby!**

...complete your knowledge by study at RCA Institutes... the only schools associated with largest, most complete research laboratory in radio industry.



YOU'VE probably often thought you'd like to increase your knowledge of radio... in a way that may bring you worthwhile returns. RCA Institutes suggests that opportunity... for with study here you may make a future of your hobby!

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4 Complete Resident Schools

Resident schools at New York, Chicago, Boston and Philadelphia offer thorough elementary and advanced courses in practical radio. Courses based on 22 years' experience... added to and revised as new developments are perfected. Advanced methods of instruction by outstanding teachers.

Win Radio Scholarship

RCA Institutes Extension Courses enable you to study at home. Capitalize your spare time. Special laboratory equipment furnished. Also extension graduates receive two weeks' instruction at resident schools. Outstanding graduates of extension courses are eligible for free scholarship in advanced courses at nearest resident school. Tuition costs for all courses moderate. Tear out and mail the coupon today for free general catalog, full details.

RCA INSTITUTES, Inc.

RCA Institutes, Inc., Dept. TS-12, 75 Varick Street, New York, N. Y.

Gentlemen: Please send me your General Catalog. I am checking below the phase of radio in which I am particularly interested.

- | | |
|--|---|
| <input type="checkbox"/> Aircraft Radio | <input type="checkbox"/> Disc and Film Recording |
| <input type="checkbox"/> Broadcast Station or Studio | <input type="checkbox"/> Talking Pictures |
| <input type="checkbox"/> Television | <input type="checkbox"/> Servicing Home Entertainment Equipment |

Name _____

Address _____

Occupation _____ Age _____

Amateur Radio Club has changed meetings to every Friday night. Hams visiting Wheeling are welcomed. W8BWK is President and W8DPO Secretary-Treasurer. Ex-PAØID is locating in Wheeling. ORS cancelled; W8DNN. W8ENY and W8DDH have organized a Radio Club in Martinsburg.
Traffic: W8HD 37, W8OK 34, W8TI 21, W8DPO 16, W8AZD 10, W8CSF 4, W8BOW 3, W8ELO 3.

NORTH CAROLINA — SCM, H. L. Caveness, W4DW — The season of increased activity is here, and there are plenty of messages on the air to be relayed and delivered. We need more ORS in this state, especially on 3.5 mc. We will be pleased to send ORS blanks to all stations interested. Make schedules with stations you can hear consistently. Southern schedules are especially valuable, as it is usually difficult to move traffic South. Send the SCM a report each month whether you are an ORS or not, and even if you have only a message or two to your credit. Let's put N.C. higher up in the scale of traffic handling states. Those hams listed below are doing their bit, and in addition W4JR, W4AGO, W4ABT, and W4DQ reported. W4IF and W4AIS have been appointed OBS. W4TU and W4AKC got their commercial tickets at the Winston-Salem Convention, one of the best conventions ever held anywhere. W4ABT is building for 3.5 mc. to push traffic. We congratulate W4AOE and W4AIS on their traffic totals, and welcome W4WE back on the air. W4ATC has opened up with a fine bunch of operators from among the student body of State College.

Traffic: W4AIS 292, W4AOE 102, W4DW 66, W4WE 42, W4TR 22, W4ABW 20, W4IF 6, W4TU 5, W4RX 4, W4ATC 1.

VIRGINIA — SCM, J. F. Wohlford, W3CA — With this report W3CA, who has been SCM for a number of years, ends his activities as SCM. It has been a pleasure to have had the cooperation of the hams in this Division in this work, which before changes made several years ago comprised West Virginia, North Carolina and Virginia. I wish to thank each and every ham within this Division for the help given and, although I have done what I could to make the reports agreeable to all, I feel with the lack of time that another can do the work and give a much better showing. This, however, does not affect my interest as a ham, and the entire fraternity will always find the latchstring hanging on the outside at W3CA. Welcome, always. W3YD is anxious to have your traffic for Guantanamo Bay, Cuba, Nicaragua, Haiti, Cuba, Porto Rico, Virgin Islands, and Canal Zone for his schedule with CMSYB. W3AVU with Fred Gwynn and Thomas Pollack did some excellent work at Yorktown at Sesqui-centennial, with W3ZU, W3FJ, W3CFL, W3AAJ and others helping out at the Richmond end. W3FJ loaned his equipment to the local Scouts during their encampment during sesqui celebration. W3IB has finished a new receiver, and was at convention. W3ADJ is a new station in Richmond. W3AGH reported by radio. W3CFL gathered a lot of traffic from W3AVU at Yorktown. W3ZU attended convention also. W3AEW is building a 500-watt job. W3ARU is still messing around with the higher frequencies. W3AUG has crystal-control job on 3.5 mc. W3HL is due an apology. His reports have been mailed this office, but for some unseen causes they were not included in the report for several months. Sorry, OM. W3TN seems most active. W3BRA helped W3NT rebuild shack. W3FE is using TNT PF circuit built by W3ZU. W3APT has gone on 3500 kc. W3BRY is building new AC receiver. W3BJX, a new station, shows signs of being a good one. W3BGS had to return the MG and is waiting for tubes for rectifier. W3WO has been working so hard he has had very little time on the air. W3ZA attended convention, went to Richmond and told gang there all about antennae, came to Roanoke, chewed the rag for several hours with the gang, and threatens to return to tell us more. W3BUR reports too much YLitis right now. W3BDZ says the junior operator keeps him very busy, especially around 3 a.m. W3BZA seems to be lost. 'Smatter, OM? W3BZ had great time at Winston-Salem. W3AAJ also had a big time at convention, and put that Virginia net stuff over in great shape. In the future please send reports to W3AAJ until an election has been held.

Traffic: W3YD 506, W3AEW 487, W3AAJ 213, W3CFL 23, W3ZU 71, W3AUG 50, W3HL 21, W3BRA 4, W3BGS 10, W3WO 14, W3APT 67, W3BJX 26, W3AGH 291, W3FJ 93.

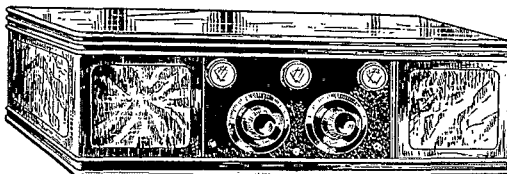
ROCKY MOUNTAIN DIVISION

COLORADO — SCM, E. C. Stockman, W9ESA — The following appointments were made this month: W9FXP, ORS; W9JB, OBS and OO; W9AUJ, ORS;

AERO TRANSMITTER

Phone and C. W.
In beautiful walnut
cabinet 15 to 30 watt.

\$39.50



Complete Phone and C.W. Transmitter 15 to 30 Watts, \$39.50. Including tuned plate, tuned grid oscillator with provision for crystal control. Wired for one or two UX 210 tubes. One or two UX 250's as modulators, two stages of speech amplification. Mounted in beautiful two toned walnut cabinet. Has ample space for AC power supply. Price includes one Stromberg-Carlson microphone.

Power Supply Unit for 15 to 30 Watt Transmitter \$19.75. Will deliver 600 volts 150 milliamperes for plate current. Has filament for 281, 210, 250, 277 and 226 tubes.

ATTENTION HAMS: Why waste a lot of money on paper condensers when electrolytics are better, cheaper and self healing? Mershon 8 Mfd. Electrolytic Condensers, 500 volts \$.85. A series of four of these condensers will give 2 Mfd. at 2000 volts.

Aero Hi Peak Audio Chokes for your shortwave receiver gives the peak amplification which is many times greater than you get with just ordinary transformer amplification. . . \$3.00

One Mfd. 600 volt Replacement Type Condenser. . \$3.50

10 Mfd. 800 volts Automatic Electric Condenser Block, values 4 Mfd., 2 Mfd., 2 Mfd., 1 Mfd., 1 Mfd. . . \$1.65

13 Mfd. 800 volt Condenser Blocks, values 4 Mfd., 2 Mfd., 2 Mfd., 2 Mfd., 1 Mfd., 1 Mfd. and 1 Mfd. . . \$2.35

Midget Power Transformer, 3-227 or 224 tubes, 1-247 or 245 and 1-280 tube, 700 volts C.T. Ideal for low-powered transmitters. . . \$1.95

Imperial Concert Grande Midget Dynamic Speaker Chassis, any field resistance, or for any type tube. . . \$4.25

Smallest Completely Shielded Screen Grid Coil available — \$.55 each — matched set of 3 — \$1.65.

R.C.A. Raditron 210 Tubes \$2.75

Aero Pentode Auto Radio \$20.00

Uses 4-236 auto screen grid tubes and 2-238 auto pentode tubes. We guarantee a thousand-mile radius. Price complete with tubes, dynamic speaker, batteries and suppressors. \$39.50

World Wide 2-Tube Short Wave Receiver, \$11.75. A two-tube receiver in a beautiful shielded metal cabinet. An ideal all around set which will give loud speaker reception on many stations. Very flexible in tuning. Complete with set of 6 clip-in coils. Covers 14 to 550 meters. Can be used with any standard base tubes.

Low Power Transmitter, adaptable for phone or code. With plug-in coils. \$14.75

Short Wave Sets, one tube complete with 5 coils, 14 to 550 meters. \$6.45

Stromberg-Carlson telephone transmitter on desk stand. \$2.75

B Eliminator, Dry, 180 Volts, will operate up to 10 tube set, with 280 tube, fully guaranteed. \$6.75

Aero Pentode Power Amplifier. Input for low impedance pick-up microphone or radio. Employs 1-227, 2-247 Pentodes and 1-280 rectifier. Supplies its own field power. Undistorted power output 5 watts. \$11.50

Aero ABC Power Supply. A complete filament and B power supply for 6-224, 6-227 tubes. Also 6-235 tubes and 2-247 Pentodes or 2-245 tubes. \$9.75

Aero Short Wave Converter Superheterodyne. Converts your AC or DC radio set into a short wave superheterodyne 15 to 200 meters. \$12.50

International Microphone — Two button for public address, systems and transmitters, speech or music. \$9.75

Catalog on Request

CHAS. HOODWIN CO. 4240 N. LINCOLN AVE. CHICAGO, ILL.
Dept. M-8

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You Hams who want snappy mail order service — a real stock to pick from and real prices — use our new catalog and get your orders in. The rush is starting.

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1715 to 4000 Kc. \$7.50

7000 to 7300 Kc. \$12.00

Blanks (1 face and edges finished) . . . \$2.50

WRITE FOR BULLETIN

Mountings — Calibrations — Re-Grinding

Orders Filled by Return Mail

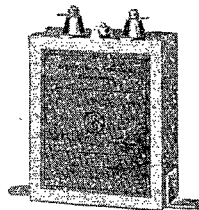
Herbert Hollister & Merriam, Kansas

Merriam, Kansas is a suburb of Kansas City, Mo.

For REAL SATISFACTION use the best

It's cheapest in the long run

Siemens & Halske Condensers are the world's standard for quality



YOUR NET PRICE IN U. S. A.

Working voltage Test voltage DC	1000 3000	1500 4000	2000 6000	3000 10000
1 MFD	\$2.25	\$2.70	\$5.25	\$12.00
2 MFD	3.90	5.10	8.10	19.50
4 MFD	6.60	8.70	15.60	36.00

Send for circular Q1

MORRILL AND MORRILL

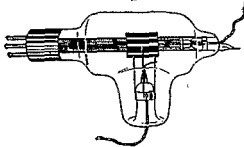
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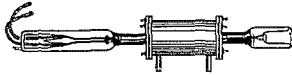
SPECIALS

TRANSMITTING TUBES

250 watt, Screen-grid, Fil.
7 1/2-10 volts, 10 amps.
Plate—2000-3000 volts.
Screen-grid, 500-750
volts. Grid—45 volts.
Brand New, guaranteed,
\$32.50



WATER-COOLED



Half-Wave Rectifiers. Fil. 15-22 volts. Plate—5000-35,000 volts at 3000 Mills.

A Real Buy at \$115.00

A few used at \$65.00

RCA Licensed TUBES

Real good tubes, made to stand the gaff. Unconditionally Guaranteed for 90 days!

UX112A.....	55c	UX226.....	45c	238.....	90c
UX120.....	70c	UY227.....	45c	240.....	90c
UX171A.....	55c	230.....	70c	245.....	50c
UV199.....	65c	231.....	70c	247.....	85c
UX199.....	65c	232.....	85c	250.....	1.45
UX201A.....	45c	233.....	90c	251.....	85c
UX210.....	1.35	235.....	85c	252.....	50c
UX222.....	1.10	236.....	90c	281.....	1.25
UY224.....	60c	237.....	75c		

ELKON bone-dry Electrolytic Condensers—500
Volt peak, working voltage—450. 8 mfd—75c,
4 mfd—60c.

COLUMBIA POWER TRANSFORMERS

A quality line of transformers. All mounted, with leads brought out to lugs on terminal boards. Guaranteed for One Year!

Type	Wattage	Volts	Price
A	200	600-0-600, 7 1/2 ct, & 7 1/2	\$3.75
B	250	750-0-750	4.95
C	350	1000-0-1000	6.25
D	500	1500, 1000-0-1000, 1500	9.35
E	800	2000, 1500-0-1500, 2000	12.85
F	250	750-0-750, 7 1/2 ct, & 7 1/2	5.75
G	400	750-0-750, 7 1/2 ct, & 7 1/2 ct	7.45
H	150	350-0-350, 5, 2 1/2 ct, 2 1/2 ct	3.75
K	100	285-0-285, 5, 5 ct, 2 1/2 ct	3.45
M	150	400-0-400, 5, 2 1/2 ct, 2 1/2 ct	3.95
N	150	300-0-300, 5, 1 1/2, 5 ct, 2 1/2 ct	3.75

STAND-OFF INSULATORS, similar to General Radio. Each—10c, Dozen—85c.

COLUMBIA FILAMENT TRANSFORMERS; An efficient, sturdily constructed job. All secondaries center-tapped. Deduct 10% from these prices if no center tap is desired.

Volts	12 watts	25 watts	50 watts	100 watts
2 1/2	\$1.25	\$1.95	\$2.50	.....
2 1/2 & 2 1/2	1.50	2.25	2.75	\$3.75
7 1/2	1.25	1.95	3.25	4.45
7 1/2 & 7 1/2	.....	2.25	3.95	4.95
10	.....	.....	3.40	4.50

BRISTOL double button microphone transformers. May also be used for single button. Special—\$1.40.

RCA-VICTOR power transformer, 150 watts. Just the job for that 245 push-pull transmitter. Supplies 750 volts center tapped, 2 1/2 center tapped, 5 ct and 2 1/2, 1 1/2, and 1 1/2—\$2.25

DOUBLE, 30 henry, 125 mill chokes, \$1.95.

COLUMBIA 30 henry chokes. Very efficient, ruggedly built. Mounted. Special, 200 mills, \$2.40; 120 mills, \$1.30.

Send for our new Fall catalogue. It's free!

TERMS: Cash or C.O.D. No deposit required

COLUMBIA SPECIALTY CO.

925 Westchester Avenue

New York, N. Y.

J. T. Rooney, B.Sc.

Pioneer Piezoelectric Crystal Maker

Crystals finished to any practicable specifications

4 Calumet Building

Buffalo, N. Y.

W9CND, ORS. W9CDE says QRM too much for his low power. W9EAM has been heard in Russia. W9CJJ is doing nice work on 20-meter 'phone. W9GBQ has the dance business craze, but showed some activity, nevertheless. W9BJN is rebuilding his receiver. W9DQD is back on the air after a short absence. W9DNP — Where's that thousand a month total? W9FPZ is a radio school instructor. W9EFP's shack was raided by five YLs. Watch your step, OM. W9APZ has been off for a while account moving. W9GNK reports U.S.N.R. going strong at Durango, and W9CWA is new station at Mancos. W9EII is newcomer at Gunnison. W9CSR and W9FYY QRL school work.

Traffic: W9DNP 126, W9CND 62, W9EAM 53, W9GBQ 44, W9CJJ 23, W9GNK 17, W9FCX 16, W9BJN 10, W9FXP 7, W9FYY 5, W9FPZ 2, W9CDE 1, W9EFP 1.

UTAH-WYOMING—SCM, C. R. Miller, W6DPJ— According to W7AWZ, DX has been very good lately. W6DPO has joined the A.A.R.S. W1ZZA came down to Utah again before settling in Wyoming for the winter. W6BTX finds it hard to QSP east. W6APM had trouble with his schedules. W7AAH reported late last month. W6BSE still can't find traffic. W6DPJ is rebuilding.

Traffic: W7AWZ 72, W6DPJ 28, W6DPO 26, W1ZZA 22, W6BTX 21, W6APM 9, W7AAH 8, W6BSE 5. (August) W7AAH 42.

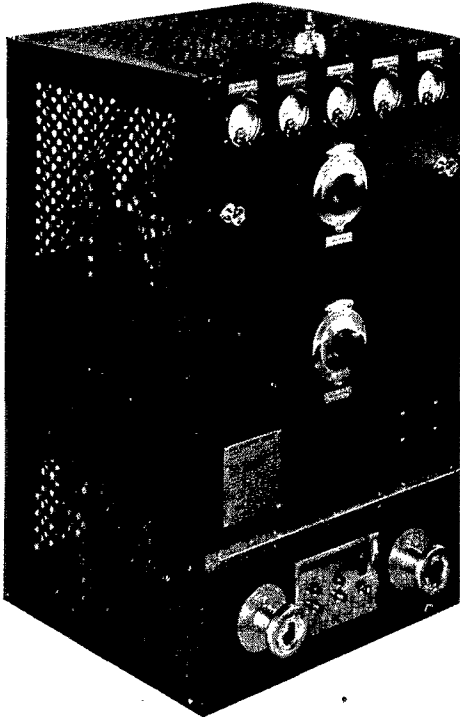
SOUTHEASTERN DIVISION

EASTERN FLORIDA— Acting SCM, Ray Atkinson, W4NN — HI, HO, everybody. Here's another month and lots of news for all. Old Florida begins to hum with activity. And here we find our old friend and SCM, Ned Winter (W4HY), opening a peachy radio store in Jax. Ned says he hates like heck to resign as SCM after you fellows elected him, but handling G. E. Radio and getting started will keep him hopping. Well, Ned, we hate to lose you, and here's to your success. W4AGR has the best traffic total, and is followed closely by W4ABL. W4ALL has a new P.P. outfit and a monitor. W4ADP reports with traffic. W4AII has daily schedule with EH7C. W4AHZ is active, as is W4KW, who reports the 50-watter he won at the convention (Darn him) is about to perk. W4AKV keeps schedules with W4WT, W4FZ, and W4FP. U.S.N.R. Station, W4BG, took 19 messages and got them off same day. W4WS, M.O. of the Knights of KC, comes through with a snappy traffic total. The 'phones are sure piling up scores lately. FB. Hey, W4QF, glad you have a nice total and a schedule with W4AGR. W4AXY, Haines City, is on 'phone. W4AFV rebuilt his transmitters. W4AQ and W4SG are new 'phones in Tampa. And here's W4FZ with a FB total and nice report.

Geel fellows, it's great to see such fine traffic being handled. Let's put our Section way up in traffic totals this year. Make reliable schedules now and tell everybody to report any traffic handled. W4CI, RM, reports that Army-Amateur season opened September 14th, and the Florida 'phone net scored more points than all the rest of the 4th Corps area combined. Congrats to the Fla. 'Phones. W4MF and W4NN are broadcasting daily on the same program at WJAX. W4AKL, Canepa the "Maestro" and "Hey Snoop" Reid, W4TK, are caught whispering to W4HZ, Grange, about cleaning the M.G.s at WJAX. But don't worry, they're all on the staff. Hi. W4ZZD, Lake Worth Amateur Club, reports good DX with crystal control. W4AJX worked four continents with low power. W4AMQ works 300 mile DX with 2 volt tubes. W4AGB worked another YL at W4KB on 'phone. Here's 4SK saying he is busy at college. W4AHZ reports for the first time. W4ACZ makes application for ORS. W4ATG worked some good 'phone DX.

Traffic: W4AGR 171, W4ABL 50, W4BG 46, W4GS 46, W4FZ 41, W4WS 22, W4AIT 24, W4ATG 20, W4QF 16, W4ALL 10, W4AKV 8, W4SK 8, W4NN 7, W4ADP 6, W4UJ 10, W4AHZ 3, W4KW 3, W4TK 3, W4ZZD 11, W4HZ 1, W4AJX 4, W4AFV 7.

WESTERN FLORIDA— SCM, Edward J. Collins, W4MS — W4KB leads the traffic this month. W4AGS has worked every district. W4AXQ keeps things humming at Laurel Hill. We don't hear much from W4A00. W4AQY is at last on the air. W4AXP has his 'phone going FB. W4AFT has been very quiet of late. W4ASG has some new QRM. Tennis! W4AUW is being troubled with parasites in his PP MOPA. W4AUV has been sick with malaria fever. We don't know where W4RK is at present. Our famous brothers, W4ADV and W4AWJ, have been very busy with Naval Reserve work. W4ART gets on occasionally. W4ARV is still our low power wizard. W4UW-W5N0 has two FB masts with A.R.R.L. emblems on them. W4ATN also has a new lattice mast with his call all over the side. W4AUA is just



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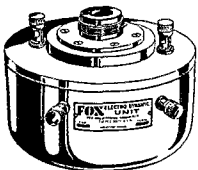


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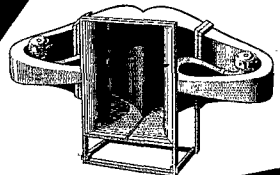
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getting over a very badly infected foot. W4SC keeps the F.N.G. well represented in West Florida. W4QR has a FB 'phone. W4AAX came back from the Jax. Convention with a new blue ticket. W4ACB, our Route Manager, got a blue ticket too. W4FV secured an extra first ticket, West Florida's only one. W4QU now proudly exhibits a new AC receiver. W4MX left the "YL" alone long enough to find out that '10 filaments won't stand 1000 volts. Hi. W4QK has a new QRA. W4HQ is kept very busy with NDD, the U.S.N.R. station. W4SZ has a real 1932 signal. W4ALJ-W4CV has been busy grinding crystals. W4ASV has been getting out better of late. W4AXF has been trying to coax her 'phone to work some DX. W4MS added a blue ticket to the shack wall at the convention. W4ABJ is at the U. of F. We would all like to hear from W4ALEH. We wonder if W4ADC still knows his call. Hi. W4VR is busy with airplanes. W4PN is renewing his licenses. W4AGS has one of those new portable calls, W4POK. Fellows, winter is coming on now, so I am looking for bigger traffic totals from each and everyone. I want more ORS, and who is qualified to be an OO?

Traffic: W4KB 57, W4ACB 43, W4FV 40, W4AGS 22, W4ASG 6, W4AUV 8, W4AUW 8, W4MS 19, W4UW 5, W4HQ 12, W4ASV 3, W4ARV 4, W4ATN 4, W4AAX 10, W4AXF 6.

GEORGIA-SOUTH CAROLINA-CUBA-ISLE OF PINES-PORTO RICO-VIRGIN ISLANDS — SCM, J. C. Hagler, Jr., W4SS — W4IR-W4SM leads the list in traffic this month. W4SS is runner-up and CM8YB third. CM8UF is back from his vacation. W4PM and W4IR-W4SM are doing fine work with the A.A.R.S. W4AAY is building new transmitter. W4JD is pounding brass again. W4AJH is going great at his new QRA. W4CE had a wonderful time at the convention in Winston-Salem. W4IJ is instructor at U. of Va. W4GH is coming on with a couple of '52s in push-pull. W4HN and W4AFQ, the only 'phones in S.C., have cuckoos as mascots. W4AHT worked OA11 on 14 mc. at midnight. W4AJI claims to be the youngest Ham in Georgia. He is 13 years old. W4MO is being exposed to a course in E.E. at Georgia Tech. W4GB is coming back to the 3.5-mc. band for the first time in 1½ years. W4ADA worked ON4AU, G6RB and RX1AA before going to Georgia Tech. W4GT is going to crystal control with a '52 as PA. W4PJ's rectifier does not want to rectify. W4QZ is working with the Georgia A-A Phone Net. W4GY is active once more. W4AZ is putting in a 50-watt CC rig. W4MJ is working again. W4KV is with the Eastern Air Transport Co. and is stationed in Atlanta. After a trip to New York W4WZ is installing some new equipment at WTOC. Regular duties at the U. of S. C. prevent W4MN from doing much ham work. 7 mc. DX comes in on the loud speaker at W4LL since he built a new AC receiver. W4UC is putting out a fine CC sig on 3.5 mc. The Georgia Mike and Key Club had their October convention at Columbus at the invitation of the West Georgia Radio Club. Lt. Raymond, W4PAD, was Chairman of the Entertainment Committee. W4AQN is getting out FB with his new 'phone. Elmer I. Ranson, ex-W4QQ, has a story in the Hearst *Cosmopolitan* of November. Read it and tell the Editor how you like it. W4TE has a new transmitter on 7 mc. W4AMG is still stepping out FB. W4ATZ is rebuilding. W4APM at the Junior College in Augusta is on the air again. W4DV took W4SS, and four non-hams on a two-day trip from Augusta to Savannah in his motor boat. We would like to hear more from the hams in Cuba, P. R. and the V. I. What about it, gang? Let's all pull to make this a big season.

Traffic: W4SM-W4IR 95, W4SS 72, CM8YB 57, W4PM 23, W4AAY 17, W4JD 16, W4AJH 11, W4CE 11, W4MA 8, W4AFQ 7, W4AHT 6, W4AJI 6, W4MO 5, W4GB 5, W4ADA 4, W4GT 3, W4PJ 2, W4QZ 6, W4GY 1, W4DV 26.

ALABAMA — SCM, Robert E. Troy, Jr., W4AHP — W4ASM is getting out nicely with a 'phone outfit. W4ADJ is bothered with school. QRM. W4AP is doing nice work in the Alabama A.A.R.S. 'phone net. W4IA is state N.C.S. in the 'phone net. 'Phone stations wishing to join the A.A.R.S. should write to W4IA at Union Springs. W4KP is holding up his end of the CW A.A. net. Step up and shake the hand of W4AZH, a newcomer. W4AHP is building a monitor that he hopes will get the big set back on. W4RS, with W4OH at the mike and W4TI at the key, are keeping both branches of amateur radio buzzing. A ham from Brooklyn is on the air at the University. W4AAQ went to the convention at Jax. W4AEZ has a MOPA.

Traffic: W4KP 23, W4AP 3, W4ASM 29, W4ADJ 1, W4AZH 1.

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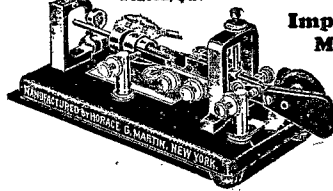
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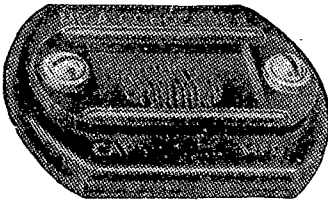
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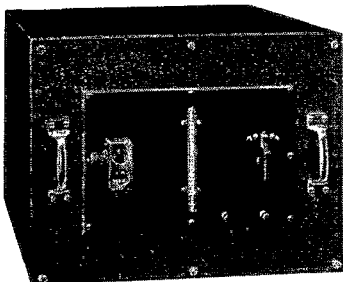
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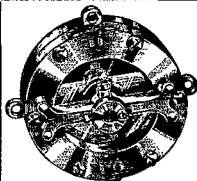
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WEST GULF DIVISION

NEW MEXICO—Acting SCM, Warren M. Andrew, W5AIE—W5AUW handled his share of Pamona's fair traffic. W5AOD reports after six months spent in Chicago. W5BHJ just got home after several months in the hospital. W5AJR can't get the 'phone to perk. W5AOE sports a new AC receiver. W5BQE has too much school and work for radio. W5ND is on occasionally. W5BRV would appreciate a good location. W5AHI left for home in Yuma.

Traffic: W5AUW 760, W5ZZM 31, W5AIE 7.

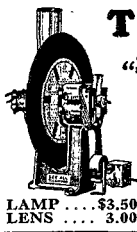
NORTHERN TEXAS—SCM, Roy Lee Taylor, W5RJ—W5BII is now using crystal control on 7166 kc. W5BSY and W5QA come through with their first reports. W5AUL, the RM, is still lining up schedules, and reports the U.S.N.R. at Abilene has been assigned the call W5CCJ. W5RJ has a new 10-pound boy at his house, and he has been heard in the next block already (crying). Hi. W5BTB is back in Texas. W5AVF reports that W5ANU is squirrel hunting instead of DXing. Hi. W5BZT is in school now. How about W5EQ at Jacksonville reporting? W5AUJ at Abilene is rebuilding. W5QU is at A and M College and will op at W5AQY. W5HY is still YLing. W5QY has worked a string of foreigners as long as your arm. W5BTU has been out of town. W5CF still pounds away. W5BKH says business QRM. W5RH was only on three days. W5LY has moved. He reports W5TR and W5AZU, as well as himself, are calibrating Dynatrons. W5AAO wants to become an ORS. W5BJX and W5AYX are still handling traffic for Wichita Falls. The WFARC reports W5OJ paid them a visit on his way to Port Arthur College; also that W5APD is back on with 50 watts. W5AID of Corsiana is reporting for the gang there and says W5AID, W5AMD, and W5BWW are new hams. W5EO is back after operating at W5AQY for four years. W5BUH has worked VK, ZL and K on a type '50 with 500 volts. Don't forget the traffic contest now in progress for Northern Texas hams. Get busy and tell the gang to report.

Traffic: W5BII 90, W5BSY 54, W5AUL 56, W5RJ 32, W5BTB 27, W5AVF 21, W5HY 18, W5BTU 21, W5CF 10, W5BKH 7, W5RH 2, W5LY 2, W5ARV 35, W5AAO 9, W5BJX 17, W5AYX 10, W5BUH 21.

OKLAHOMA—SCM, Wm. J. Gentry, W5GF—W5VQ takes the honors again as high traffic man. FB, OM. W5WR has been ill for some time. W5BEE is a DX holder. W5AYF has his new AC receiver perking. W5GW has MOPA working. W5AEG is busy with Tulsa's new police job. W5BCO is also chief op. at KGPO. W5ATB reports for the first time in five years. W5BOZ is a new reporting station in Sapulpa. W5AVR's two ops make their first report. W5BPM has two '10s on the air. W5KZ should get this ham spirit back and start reporting. W5GA hopes to have his 7-mc. and 14-mc. sets going soon. W5ALD is back on the air with a big wallop. Glad to welcome W5ZZF, our new ex-9 district station, on the air. W5AEJ is using crystal on 14 mc. W5BGX is on 7 mc. with crystal. W5UN is using crystal. W5RU has been building a new receiver. W5BFZ was heard in Russia. W5ALI has got his 3.5-mc. 'phone working. W5BVU is a new ham on 'phone. W5BTZ is on with 'phone in the mornings. W5BJE is a preacher. W5BLF is a 'phone ham. W5PL's antenna blew down. W5OJ has gone to Port Arthur to school. His mother is op. now. W5AYN says it will take 92 bushels of wheat to get his rig perking. Lightning struck it. W5APH hopes to get on soon with 'phone. W5CF is building three transmitters for 14-7-3.5 mc. W5BRD got a new BCL transmitter to play with. Hi. W5APY is about to leave for Oklahoma City to live. Sorry to lose you, OM. W5QL does some nice DX 'phone work. W5ABO is a Leonard service manager. W5MM is in business for himself. W5SW is perking once in awhile. W5BOE is now reporting for the Tulsa gang. W5AAV says his 14-mc. 'phone is good. Well, gang, let's get in there and get some traffic over.

Traffic: W5VQ 1318, W5BMU 60, W5OJ 26, W5EAJ 22, W5BIM 11, W5PL 11, W5AAV 6, W5BFZ 6, W5ATB 15, W5ALD 4, W5BLF 4, W5BPM 2, W5GF 2, W5AVR 7.

SOUTHERN TEXAS—SCM, H. C. Sherrod, Jr., W5ZG—There seems to be considerable negligence on the part of many of the ORS regarding the forwarding of monthly activity reports. These appointments are not for the beautification of the walls of your respective stations. Concisely they mean that you, the holder of the appointment, are the man whom your SCM may depend upon. When you fail your SCM in the matter of reporting, or, for that matter, if you fail to meet all of the requirements of the ORS appointment, you are liable to have your appointment



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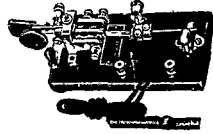
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AEROVOX 7 mfd. Filter Block, 2 mfd. at 1000, 2 at 800 and 3 at 400 volts. Cat. No. 2002. \$ 1.50
WESTINGHOUSE 1 mfd. 2000 volt Filter Condenser (400 volt test). Cat. No. 2061. \$ 2.75
BROWN & CAINE 9 mfd. Filter Condenser Block, 800 volts, tapped at 1, 1, 1 and 5 mfd. Cat. No. 2069. \$ 1.75
BROWN & CAINE 8 mfd. Filter Condenser Block, 1000 volts, tapped at 1, 1, 2 and 2 mfd. Cat. No. 2067. \$ 1.95
VICTOR D.C. Dynamic Speaker Chassis. Used in Victor Sets 32, 45, 52 and 75. 2500 ohm field. Voice coil 15 ohms. \$5.95
STROMBERG-CARLSON 250 Watt Power Transformer, gives 1200 volts c.t., 7.5 for 2-281's, 7.5 for 2-250's, 150 volts c.t. and 4 volts. Cat. No. 1011. \$ 4.75
THORDARSON new T-3202C 250 Watt Power Transformer, gives 1300 volts c.t., 7.5. volts in two c.t. windings, 2.5 volts at 14 amps. Cat. No. 1001. \$ 3.75
 Same transformer as above but delivering 200 mls. in secondary. Type T-3865-T. Cat. No. 1000. \$ 6.95
THORDARSON T-3321 175 Watt Power Transformer, gives 1150 volts c.t., 7.5 volts in two c.t. windings and 3 volts. Cat. No. 1002. \$ 3.25
THORDARSON Double Filter Chokes, two windings, each 18 henrys, 250 mls. Cat. No. 1751. \$ 4.75
THORDARSON Double Filter Chokes, two windings, each 30 henrys, 125 mls. Cat. No. 1768. \$ 1.75
THORDARSON Single Filter Chokes, 30 henrys, 160 mls. Cat. No. 1767. \$ 3.50
R.C.A. Double Filter Chokes, two windings, each 30 henrys, 100 mls. Cat. No. 1760. \$.75

KOLSTER K-5 Dynamic Speaker with 210 power amplifier and "B" supply unit, in console walnut cabinet; uses 2-281's, 1-210. Delivers 500 volts, full wave pure D.C. for 210 transmitter. Less tubes. Cat. No. 7525. \$10.95

R.C.A. UNI-RECTRON Power Supply and 210 Amplifier. Delivers 400 volts of D.C. filtered current. Ideal for low power transmitter. If desired 210 can be used as modulator. Less tubes. Cat. No. 7252. \$7.50

Baird Short Wave Receiver, latest type, completely factory assembled and wired in Cabinet. Excellent for Television. Wave length from 15 to 550 Meters, using three 22's, two 227's, one 245, and one Raytheon BH tube, \$39.50 complete with coils, (less tubes).

SPECIAL PRICES on Weston and Jewell Meters, Pyrex Insulators, Sangamo Condensers and any kind of Amateur material desired.

AMERICAN SALES COMPANY
 Q-44 W. 18th St. New York City

revoked. This is the last warning. Corpus Christi: W5AOI reports for Corpus. W5MS has moved to Woodsboro. W5AQK and W5BKG attended the convention. W5ALV has a new Super heli converter. W5MX is using a 75-watt crystal job. W5AB is still at sea. W5JJ burned out a plate transformer. W5TO has a 100-watt MOPA rig. W5BOC is having "Termite" trouble. No, it's not an insect, it's a new motor boat. W5BY is contemplating a move. W5BRY has left for Georgetown to attend school. The Corpus Christi Radio Club now has the call W5BXX. Bryan: W5AQY, the A & M College of Texas is back on the air and going strong. For the 1931-32 season of the A & M College Radio Club the officers are as follows: President, W. H. Parker; Vice-President, B. D. Lee, W5AYU; Secretary-Treasurer, G. C. Hutcheson, W5ATZ. W5AEB, a new ORS, is working on 7275 kilocycles. Houston: W5AFV is using a PP MOPA on 14 mc. W5AHW and W5AMJ are heard consistently. Galveston: The Galveston Amateur Radio Club now has the call W5ADY. W5AUX is on with a crystal-controlled '52. W5CDH will be on shortly. W5BTK is on. Newton: W5ACR will be an ORS by the time this is in print, and is anxiously seeking a reliable schedule with Houston. Noxville: W5HX, on 14 mc., has been QSO all districts, Canada and Mexico. Austin: W5CT is keeping schedules with W5WW at 11 a.m. on Sundays. Baytown: W5DS is the new Route Manager, succeeding W5EI, due to the latter's inability to be on the air just now. W5DS is keeping schedules with W5BSY-W5NW and W8BOT. Incidentally, it is with pleasure that we welcome Groves, W5NW, back to the States. San Antonio: The San Antonio gang take the credit for the largest report in the columns this month from our Section. W5CS is doing much of the reporting for the S.A. gang. W5ABQ is busy at KMAC. W5AX is also at KMAC. W5JC is grinding a new crystal. W5MN is on more regularly now. W5RV has an MOPA and some new QSL cards. W5BUIV is busy with the S.A.R.C. W5BWM now has a portable, W5CCF, at the Junior College. W5AUC has moved. W5VL is doing some good work. W5PC is putting up a new antenna. W5BQH has rebuilt. W5CBW is having a little trouble with her TNT. W5BSH at Converse visits the gang now and then. W5OW is going strong with Sgt. Van Pelt at the key. W5CS is planning a 150-watter. W5BBC is on intermittently. W5EU requested that he be omitted from the reports. 'Smarter, OM, hiding something? W5UX, Senior and Junior, are both members of the Santone gang. W5BVG works K6 with his '45 rig. W5BKI is studying for a commercial ticket. Ex-W9DJJS is living at the Y. M. C. A. The officers of the S.A.R.C. are as follows: J. V. Fitzhugh, W5VL, President; Mr. J. B. Yantis, W5RV, Vice-President; and Mr. C. A. Murgatroyd, W5BUIV, Secretary-Treasurer. W5ABQ, an old-timer, is back again. It is with gratitude that the SCM acknowledges the generous response of the members of the S.A.R.C. with much interesting information.

W5BKE 199, W5BWM 7, W5DS 48, W5CT 36, W5HX 2, W5ACR 43, W5AEB 10, W5AQY 79, W5AOI 1, W5AQK 6.

CANADA

MARITIME DIVISION

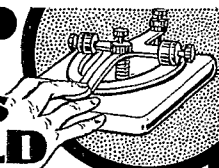
NOVA SCOTIA — SCM, A. M. Crowell, VE1DQ — VE1AX is now adding crystal to his 3.5-mc. 'phone. VE1BC is changing QRA to Halifax. VE1BW is on 7 mc. VE1BV at Stewiacke is working all comers. VE1BL works his 250-watter on 7 mc. exclusively. VE1CC is using a '10 for 3.5-mc. 'phone. VE1DQ "doubled" to 14 mc. again. A few more ORS and OBS are needed in the eastern end of the province.

Traffic: VE1BV 14, VE1BW 11, VE1DQ 8.

ONTARIO DIVISION

ONTARIO — SCM, H. W. Bishop, VE3HB — VE3GT, our Route Manager, is back from the Forestry Branch and has launched upon an Ontario network. He has hopes of a Canadian coast to coast network. Everybody get behind him and push. VE3HL has moved to Ottawa and will operate under VE3JJ. VE3CE will soon be on the air. VE3HE is getting set for 14-mc. 'phone. VE3HN is attending fights. VE3GB is also in Toronto. VE3ZQ, VE3VM and VE3TT are new hams in Toronto. VE3LQ will soon be with us. VE3BV reports. VE3II blew his 50-watter. VE3HB is on approx. 3960 kc. with 60 watts. VE3ZZ is a new ORS. VE3AU is experimenting with 3.5-mc. portable 'phone. This month we have news from the North: VE3DP South Porcupine reports. VE3CI, VE3EN, VE3HY, VE3ID, VE3BD, VE3BN, VE3NY, VE3AA and VE3DP are all pounding away on 3.5 mcg., and VE3GG and VE3HM on 14 mcg. Mr.

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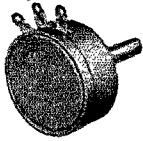
Write for folder Q-12

TELEPLEX CO.
 76 Cortlandt St. New York

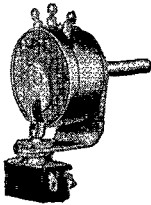
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Why is this new unit completely noiseless?

First, because of the design of the variable contactor used in the new FROST-RADIO No. 20 Series Volume Controls, which makes two separate and distinct *line* contacts, totaling $\frac{3}{16}$ " with the resistance element. Second, because space between turns has been successfully reduced to one ten-thousandth of an inch, permitting the use of *more* turns and *larger* wire. And third, because contact pressure has been greatly reduced, eliminating cutting and scoring. . . The No. 20 Series possesses many other advantages. Write us for further details NOW.

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Sales Division
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Xtalpak Your Transmitter

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SPECIAL PRICES ON QUANTITY LOTS
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CECO UX866 TUBES \$4.50
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For 281 or 866 Tubes—High Quality

1/4-INCH COPPER TUBING 6¢
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 Send for Circular and Discounts

Be sure to send in for New 1932 Catalog

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PACIFIC COAST AMATEURS

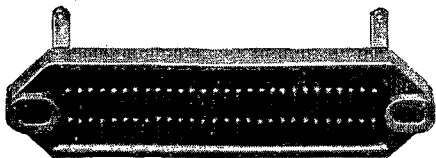
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ASSURE YOURSELF OF PROMPT AND EFFICIENT MAIL ORDER SERVICE ON ALL LEADING MAKES OF SHORT WAVE TRANSMITTING AND RECEIVING APPARATUS. . .

RADIO MANUFACTURERS SUPPLY CO.

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A compact resistor for efficient operation in radio and high frequency circuits.

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What Amateur and Commercial Radio Operators Can Do After Taking the CANDLER System Course

They can make *perfect* copies of WNU press with pencil or "mill"; can cut mimeograph stencils directly from WNU, WHD and KUP press; can copy press 3 to 5 words behind easily without losing out; can count checks automatically and OK copy instantly; can send perfect code groups with key or bug at 30 to 35 wpm and more.

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TELEGRAPH-TOUCH-TYPEWRITING — only method for operators. Shows how to use "mill" in receiving, how to copy several words behind easily at high speed.

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6343 South Kedzie Avenue Chicago, Illinois



WALTER H. CANDLER
World's Only Code Specialist, Instructs You Personally

and Mrs. VE3DW have an increased traffic total. Mrs. VE3DW won a big bottle at the WOARA hamfest. VE3AD has a dynatron ready for calibration. VE9AL has a new power unit on his '61. VE3CP says the '81 he won at the hamfest will sure come in handy. VE3DB reports a static condition at his QRA. VE3IH is moving to new QRA in Quelph. VE3IR has two new ops. coming along. His kid brother, VE3JB, is active at DEORO. VE3HA will be back from the OFB about Nov. 1st.

Traffic: VE3ZZ 211, VE3IR 107, VE3AU 90, VE3DW 31, VE9AL 26, VE3GT 14, VE3HN 14, VE3AD 11, VE3HB 6, VE3BV 2, VE3AU 90.

QUEBEC DIVISION

QUEBEC — SCM, Alphy Blais, VE2AC — The great event of the month: The Montreal Radio Show. Most of the gang was present at the A.R.R.L. booth. Our show was a real success, thanks specially to VE2CA, 2AG, 2CO, 2CX, 2AP, 2BE, Mesher, and our faithful VE2CL, Newman was on the spot. Our C.G.M., Alex Reid, was responsible for our presence at the show. FB, Alex. VE2CX is awake for 28-mc. sigs. VE2BB is at the key as usual. VE2CU increases power. VE2CP comes on soon. VE2CL is high-scorer, his station was on at the show. VE2AG reports for the first time. VE2DJ is a newcomer. Something big is under way at VE2CP. The SCM is expecting monthly reports from all the amateurs he met at the show. It isn't asking too much. Several American, Australian and French amateurs dropped in at the show and were given hearty attention.

Traffic: VE2CL 750, VE2CX 262, VE2BB 46, VE2AP 134, VE2BE 44, VE2AY 22, VE2AG 90, VE2AC 20, VE2CA 11.

VANALTA DIVISION

ALBERTA — SCM, G. F. Barron, VE4EC — Well, gang, here I am back again. VE4HM is pounding out a very FB crystal signal. VE4EA is working hard to get his CC rig going. VE4EI paid a visit to the Edmonton gang. VE4BV is busy with gliding. VE4EC has received a few QSL cards from ZL and VK. There is a new ham at Red Deer, and I would like some dope from him. Come on, Calgary, Hannah, Olds and all the rest of you, send in some dope for next report.

Traffic: VE4EC 3, VE4DT 22.

BRITISH COLUMBIA — SCM, J. K. Cavalsky, VE5AL — The B.C.A.R.A. is staging a "Miles per Watt" contest for all B.C. amateurs. If you haven't heard the good news, be sure to write the Secty at VE9AJ and get your entry forms. Some good prizes are offered. VE5AN has a new location. VE5AG suffers badly from nearby hospitals. VE5CL has left for the East. VE5FF is looking for an ORS. VE5EW had to junk his TNT for a single tube. VE5AL tried 3500 and finds it great. VE5CT is on all bands. VE5GT is on with crystal, and says that Prince Rupert is soon to have a club. VE5FG holds forth with schedules to Vancouver. VE5E1 and VE5GN are getting out nicely on low power. VE5CH is opening up at Horsefly. VE5HF made a nice total before he blew up his receiver. VE5EC got some traffic. VE5DV blew up his transformer. VE5HR reports some DX.

Traffic: VE5AL 20, VE5EC 14, VE5HP 62, VE5GT 21, VE5HR 17, VE5DV 2, VE5FF 9, VE5AM 18.

PRAIRIE DIVISION

MANITOBA — SCM, J. L. Green, VE4BQ — VE4IC and 4FT are back with us. VE4DK has almost completed his new 50-watt MOPA. We are glad to welcome a new amateur, VE4KJ. VE4IS is now at his new QRA. VE4DJ says DX and traffic are feeling the depression Hi. VE4BQ's filter system has blown up. VE4GQ and 4AG are heard on 7 mc. VE4GL is struggling with his new 75-watt outfit. VE4IU is feeling proud lately — a junior "op" arrived. VE4KL has been very active on 7 mc. We are glad to learn that VE4CH is returning to the game. The M.W.E.A. are holding meetings the first and third Thursday of each month in the old CJCG radio studio.

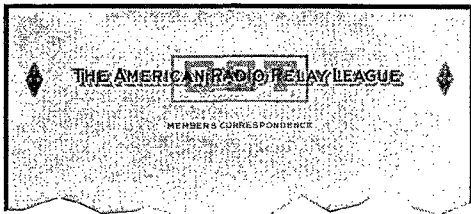
Traffic: VE4KL 2, VE4IU 1.

SASKATCHEWAN — SCM, W. J. Pickering, VE4FC — VE4CV gets through to Winnipeg on 3.5 mcs. Freakish conditions are being noticed at VE4BF. VE4EJ is on 7 mcs. VE4FD has moved. The Saskatoon A.R.A. has moved to new quarters in the Caswell School. VE4GR is sending code practice at 10 a.m., Sundays, on 7 mcs. VE4BB has been visited by VE4HM, HP and CN. VE4AT reports regularly.

Traffic: VE4CV 16, VE5BF 8, VE4BB 6, VE4AT 1.



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Write your radio letters on League stationery — it identifies you.

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

Postage Included

THE AMERICAN RADIO RELAY LEAGUE HEADQUARTERS WEST HARTFORD CONN. U. S. A.					
RADIOGRAM					
CITY OF ORIGIN HARTFORD CONN.	STATION OF ORIGIN W1MK	NUMBER 304	DATE MARCH 26	CHECK 5/	
TO CARL FRANK WOODS 14 HUNTS STREET N W ROCHESTER MINN.		THIS MESSAGE WAS RECEIVED AT AMATEUR RADIO STATION OPERATOR BEST ADDRESS CITY AND STATE			
KINDLY ADVISE PRESENT STATUS OF THE ORIENTAL TRAFFIC ROUTE RUNNING FROM THE EAST COAST TO THE ORIENT STOP IN WOOD. STILL A MEMBER OF THIS CHAIN QUERY LATEST ROUTE MANAGERS BULLETIN MAILED TODAY 23 E. L. BATTERY					
Rec'd	FROM STATION W8CG	LOCATED AT PITTSBURGH, PITTSBURGH, PA.	DATE 3/26/31	TIME 8:54 P.M.	OPERATOR RP

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From:	Date:
Time received: _____ Date: _____ At Radio Station: _____ Address: _____ Phone: _____	
THIS MESSAGE WAS TRANSMITTED FREE OF CHARGE BY AMATEUR RADIO STATIONS OF THE AMERICAN RADIO RELAY LEAGUE ANSWER WILL BE SENT FREE BY FUNG AT THIS STATION.	

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AMATEUR RADIO STATION LOG									
STATE	TIME	FREQ	TYPE	CALLED	CALLED BY	STATION HEARD		MESSAGES, REMARKS, ETC.	
						TYPE	CLASS		

THERE are 39 pages like the one above, 8¼" x 10¾", carefully designed to incorporate space for all the essential information you want and need to record about your station's operation. Thirty-nine blank pages (backs of the log pages) to be used for notes, experiments, changes of equipment, etc. Durable covers of heavy stock with space for your station call and dates over which the log entries extend. On the inside covers and first two pages are complete instructions on maintaining your log, convenient tabulations of the most-used Q signals, miscellaneous abbreviations, operating hints, amateur prefixes and signal-strength scales. The information you want, always at your finger-tips.

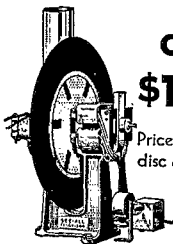
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COMPLETE BOOK OF
INSTRUCTION
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912 Lakeside Place
Chicago, Illinois



Strays

Electrad's latest circular shows some twenty different schemes for controlling volume—information which should be interesting to the receiving experimenter. Simply write Electrad, 175 Varick Street, New York City, and ask for it.

W2BTW takes pen in hand to tell us about an embryo ham who wound his copper tubing coil around the steam pipe in the basement. Upon finishing it he found, much to his consternation, that the pipe was part of the plumbing system and he could not remove the coil.

The funny part of it is that it actually happened!

W2CE wraps his crystals in cellophane—taken from a cigarette package. Makes a good dustproof cover.

Financial Statement

BY order of the Board of Directors the following statement of the income and expenses of the American Radio Relay League, Inc., for the third quarter of 1931 is published for the information of the membership.

K. B. WARNER, *Secretary.*

STATEMENT OF REVENUE AND EXPENSES FOR THE THREE MONTHS ENDED SEPTEMBER 30, 1931

REVENUE	
Advertising sales, <i>QST</i>	\$12,422.97
Newsdealer sales, <i>QST</i>	10,008.00
Handbook sales	5,226.63
Beginners' Booklet sales	187.82
Membership dues	9,906.73
Membership supplies sales	1,864.01
Interest earned	814.07
Cash discounts earned	237.81
Bad debts recovered	41.48
	<hr/>
	\$40,709.52
Deduct:	
Returns and allowances	\$4,217.38
Cash discounts on sales	166.98
Exchange and collection charges	3.51
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	\$4,387.87
Less reduction of provision for newsstand returns	370.61
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	4,017.26
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Net revenue	\$36,692.26
EXPENSES	
Publication expenses, <i>QST</i>	\$11,528.14
Publication expenses, Handbook	2,476.85
Publication expenses, Booklet	114.94
Salaries	19,853.87
Membership supplies expenses	800.42
<i>QST</i> forwarding expenses	659.92
Telephone, telegraph and postage	1,867.98
Office supplies and general expenses	1,863.03
Rent, light and heat	1,166.89
Traveling expenses	2,028.77
Depreciation	353.67
Communications Dept. field expenses	127.89
Headquarters station expenses	112.62
	<hr/>
Total expenses	42,954.99
Net loss from operations	\$6,262.73

HAM-ADS

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

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others.

(3) The Ham-Ad rate is 15c per word, except as noted in paragraph (6) below.

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

(5) Closing date for Ham-Ads is the 25th of the second month preceding publication date.

(6) A special rate of 7c per word will apply to advertising which, in our judgment, is obviously non-commercial in nature and is placed and signed by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, if by a member of the American Radio Relay League takes the 7c rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and takes the 15c rate. Provisions of paragraphs (1), (2), (4) and (5) apply to all advertising in this column regardless of which rate may apply.

PLATE power for your set, the very heart of its performance. For quietness, DX ability, lifelong permanence, absolute dependability, lowest ultimate cost, no other plate source even approaches the achievement of an Edison steel alkaline storage B battery. Built painstakingly; every joint pure nickel, upset electrically welded. Genuine Edison Electrolyte. Our list describes complete batteries, construction parts, enameled aerial wire, silicon steel. Available immediately, filament and plate transformers for the new 872-866 rectifiers, complete plate power units. Rectifier Engineering Service, 4837 Rockwood Road, Cleveland, Ohio.

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CARDWELL, Thordarson, National, Ward Leonard, Electrad, Pyrex, REL, Flechtheim, Jewell, Shalleross, Universal, etc. Wholesale discounts. Tubes, 866, \$4.41, 872, \$13.23, R-3, \$7.35. 20 weeks information service, \$1. Six pounds data, circuits, reports, etc. 50¢ prepaid. Kladrag Radio Labs., Kent, Ohio.

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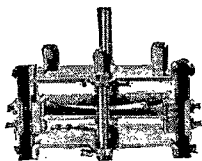
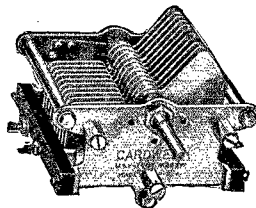
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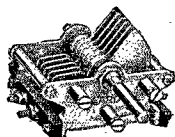
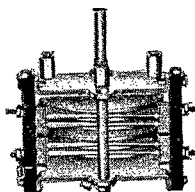
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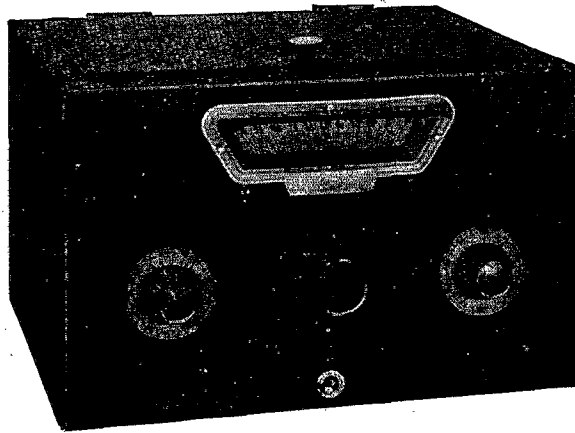
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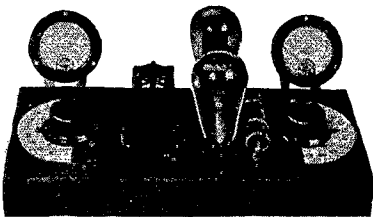
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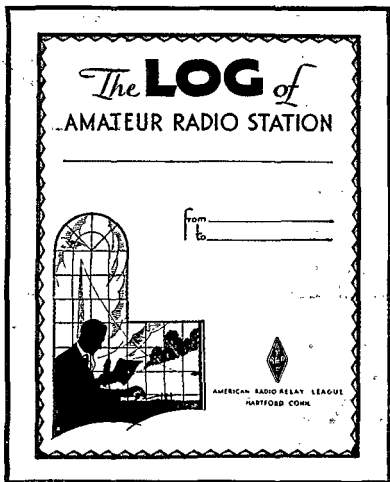
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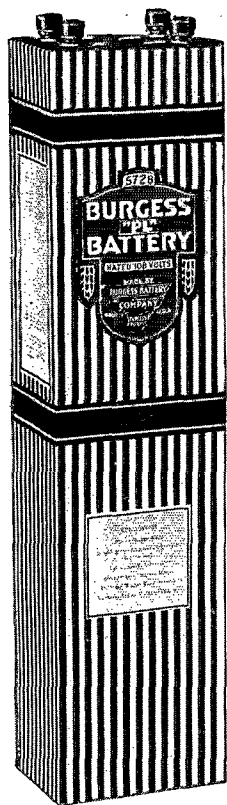
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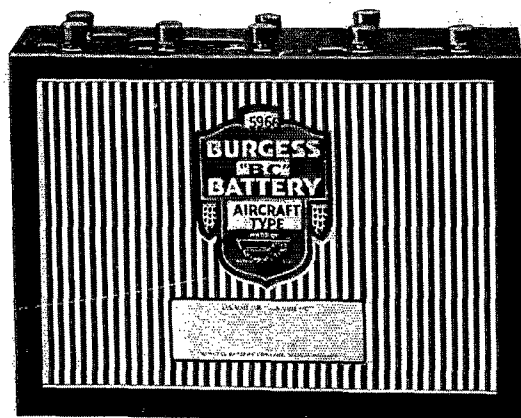
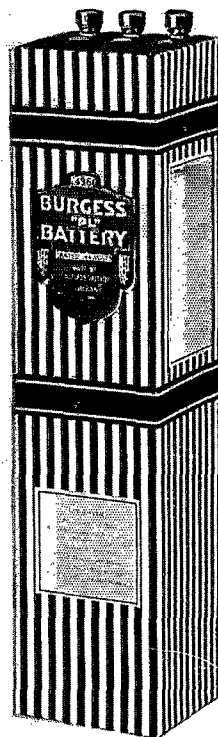
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