GREBE

CR-18

SHORT WAVE RECEIVER

Instruction & Operating

MANUAL

A. H. Grebe & Co., Inc.
Richmond Hill, N. Y. U.S.A.

GREBE

CR - 18

SHORT WAVE RECEIVER

Instruction & Operating

MANUAL

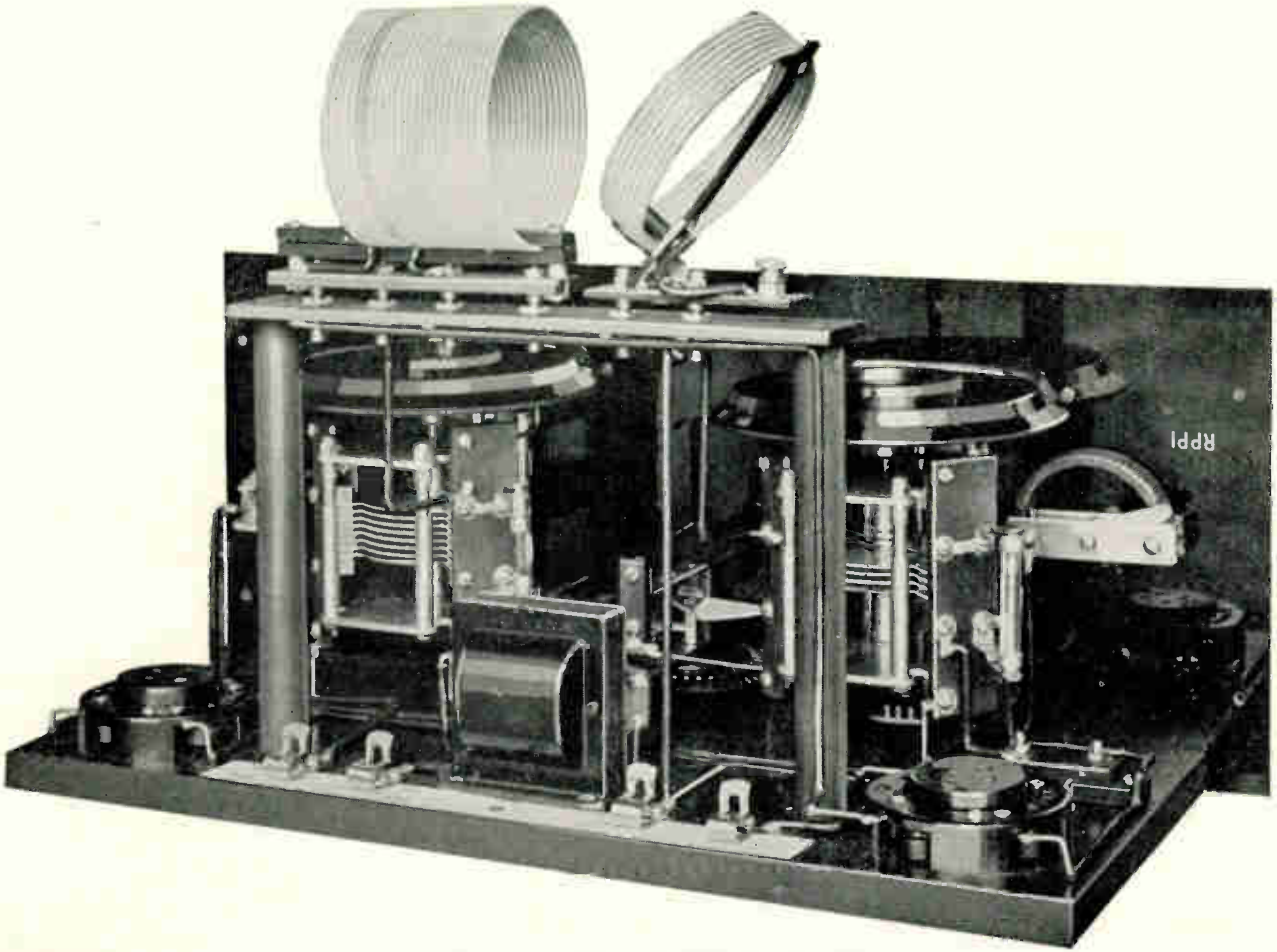
GREBE RADIO

TRADE MARK

Trade Mark Reg. U. S. Pat. Office

A. H. GREBE & CO., Inc.
109 West 57th Street
New York, N. Y.

Factory: RICHMOND HILL, N. Y., U.S.A.



Manufactured under
Grebe Patents
Granted and Pending

GENERAL VIEW OF INTERIOR CR-18

Showing Secondary Coil at Left and Antenna at Right

Licensed under Armstrong
Patent No. 1,113,149
Oct. 6, 1914

INTRODUCTION

IN order to appreciate the work that is being done today with low power, it is necessary to briefly review the history of short wave communication —pioneered by the American Amateur.

In 1912 the Department of Commerce classified and licensed all radio stations, assigning certain wavelengths to each class of station. In order to prevent amateur interference with Naval and commercial traffic, the wavelength of 200 meters (then considered useless) was assigned them, with provision for a few special stations on 275 and 375 meters.

Although limited to low power on 200 meters, it took but a few years for the amateur to perfect apparatus which enabled him to communicate up to two thousand miles. While not consistent these results were encouraging and the amateur saw possibilities not then realized by commercial companies.

Except for the period during the World War, when amateur activities were suspended, continuous progress was made. With the development of tube transmitters for continuous waves (C. W.) and telephone transmission, new interest was aroused, the number of amateurs increased and practical broadcasting was accomplished.

Following these developments commercial companies became interested in broadcasting and it was not long before the number of broadcasting stations became so numerous that new wave bands were necessary. To make room for additional broadcasting stations and to remove the possibility of interference from amateur transmitters a radio conference was called by Secretary Hoover in Washington, D. C. As a result of this conference, the amateurs were assigned a wave band extending from 150 to 200 meters.

After operating on the lower portion of this band for a short period, it was found that greater distances could be covered than was heretofore possible. This lead many to believe that the wavelengths below 150 meters held further possibilities.

A few amateurs therefore obtained a special license which permitted them to operate on wavelengths as low as 100 meters and for the first time they succeeded in carrying on communication with France and many other foreign countries. This remarkable work encouraged many exeprimenters to drop to still lower wavelengths. Tests and experiments on wavelengths as low as 10 meters indicated that extremely short waves offered a fertile field for research and was useful for long distance communication with low power.

For the first time, the United States Army and Navy and commercial companies began to realize the importance of the low wavelengths and erected many stations in order to further study the characteristics of these high frequencies. Many foreign countries also began to utilize the shorter wavelengths and the number of these short wave stations increased rapidly.

At the present time the Department of Commerce has allocated wave-lengths down to .74 meters, as shown on page 14 and commercial companies are effecting trans-continental, trans-oceanic and relay broadcasting on their respective assignments. Using the present assignments, world-wide communication by amateurs, both day and night, is a common occurrence. Not only has such communication been established using C. W. but amateurs have also succeeded in transmitting the human voice a distance of twelve thousand miles.

The greatest of amateur achievements took place on April 17, 1925, when delegates of twenty three nations assembled in conference in Paris and formed the International Amateur Radio Union, I.A.R.U., electing H. P. Maxim, U. S. A., president and K. B. Warner, U. S. A., Secretary and Treasurer. The purpose of this union is to encourage international two-way communication on amateur wavelengths.

You have read what the amateurs have already accomplished—what they will do in the future we dare not predict.

Theory of Short Waves

It would be beyond the scope of this booklet to discuss in detail the various theories of short wave propogation, however, we believe it is important to mention the fact that the very short waves do not follow the curvature of the earth as do the longer waves but are reflected by some medium in the upper atmosphere. This reflection results in what is now termed a "skipped distance effect;" in other words, a signal which is very strong a thousand miles away might be inaudible a few hundred miles from the transmitter. The "skipped distance effect" is determined by the season of the year, the time of day, wavelength used, and the power and location of the transmitter.

Further knowledge of short wave characteristics can be obtained only by careful and diligent experimentation. A great deal of this experimental work can be accomplished by any one who will listen in on the short wave lengths and keep an accurate record of the results obtained. Such records maintained over a period of several months would prove invaluable to the advancement of this science. For convenience in making such records we have furnished the following data:

Wavelength Assignments (Page 14)

A list of short wave stations of the world (Pages 12-13)

A time chart indicating time in all parts of the world (Pages 10-11)

A list of International Intermediates, authorized by I. A. R. U. (Page 7)

A list of signals which indicate relative audibility (Page 7)

A cross section sheet for plotting additional curves (Page 20)

Short Wave Receiver Design

In designing a receiver for short wave reception many problems are encountered which are not met with when dealing with the higher wavelengths. Radio Frequency Amplification does not seem to offer any particular advantages and more complex circuits using multi-stage amplifiers are either unstable or have too many operating controls to be of any practical use.

The adjustable tickler coil circuit, for example, is inferior at very short wavelengths because a change in regeneration produce so great a change in wavelength that the transmitting station cannot be received with any degree of certainty. On the other hand, the capacity feed-back coupling method generally used is such that the stray capacity effect is so great that tuning is destroyed and the receiver becomes difficult to operate. While a few receivers have been designed, using the above mentioned circuits, generally the wavelength range of such sets is small and they can only be used to cover a limited band.

In order to receive continuous wave stations to the best advantage the circuit should be such that the point of oscillation is practically constant over the entire tuning range. For reception of broadcasting on the high frequencies however, the regeneration control should operate in such a manner that the change from oscillating to non-oscillating condition is gradual rather than sudden.

The CR-18 receiver has been designed with all these points in mind, and a study of the circuit on page 9 will reveal the following features:—variable electro-magnetic coupling between the antenna and secondary circuit is employed contrary to the usual practice of using a small coupling condenser. This coupling coil permits a greater transfer of energy without affecting the wavelength calibration, and affords greater selectivity, reduces interference and induction noise and makes possible the use of harmonic tuning* when using a large antenna.

In order that tuning will not be too critical the receiver is provided with five different coils which cover wavelength ranges, as shown on the chart page 8 and the various calibration curves pages 15 to 19. These coils are fitted with plugs and are mounted outside of the cabinet, in order to reduce all losses and permit the coils to be interchanged without delay or difficulty.

Although each coil covers only a small wavelength range the frequency range is very large and for this reason the beat frequency control, consisting of a small variable air condenser, is incorporated in the receiver. This condenser permits one to discriminate between stations separated by only a fraction of a kilocycle and makes it possible to hold a station which is swinging or changing its frequency.

* (See page five).

In place of a choke-coil in the plate circuit, the CR-18 employs a resistance. This resistance eliminates non-oscillating points in the tuning range which frequently occur when a choke-coil is used.

Cushion sockets are used to eliminate all vibration and microphonic disturbances, which seriously affect the operation of a short wave receiver.

Operating Instructions

The CR-18 was designed to operate with 201-A, 5 volt, .25 ampere, X type base vacuum tubes. It is some times advisable to reverse the tubes in order to obtain the most desirable results. A storage battery should be used for filament supply.

At least 90 volts of B battery is necessary. A clip should be provided on the detector lead so that variation of detector plate voltage may be easily secured, as certain coils require more voltage than others, as shown on the calibration curves.

A grid leak of proper value is furnished with the receiver. If there is an occasion to replace this, a leak of at least 7 megohms resistance should be used. A lower value than this will cause unstable operation and generally produces howling or squealing.

Mounted on the side of the regeneration condenser are two clips which hold the regeneration stabilizer unit. This is a 25,000 ohm grid leak type resistance.

The antenna should consist of a single wire approximately 75 or 100 feet in length including the lead-in and should be well insulated. Good results may be obtained with an antenna as short as 25 feet, or even an indoor antenna may be resorted to. Connection to the ground should be made securely by means of a ground clamp fastened to a water pipe or radiator system. Care should be exercised in making all connections, as loose connections are more detrimental on short waves than on the higher wavelengths.

After connections have been properly made, as shown on page 9, insert coil No. 3 (the 40 meter coil) in the jack mounting. Do not insert the antenna coil or connect the antenna, but turn the rheostat to 2 and plug the telephone receivers in the jack provided for this purpose.

Set the wavelength dial on '0' and starting at '0' on the regeneration dial slowly increase the reading to 35 or as far as necessary to cause indications of oscillation to be heard in the telephones. This point, as noted from the calibration curves, is usually 40 but will be subject to slight variations. When the point on the regeneration dial at which oscillations occur has been determined, move the dial 5 points higher. The receiver should now be in an oscillating condition over the entire wavelength range covered by the wavelength dial. A simple test to determine whether the receiver is oscillating or not is to touch the left hand screw on the secondary coil and if a click is heard in the telephones the receiver is oscillating.

Insert the antenna coupling coil and connect the antenna to the binding post provided. Adjust the antenna coil so that there is a separation of 2 inches between the top of this coil and the top of the secondary. Note again whether oscillations take place; if they have stopped, increase the regeneration dial 10 degrees and if this is not sufficient to cause oscillations, further separate the antenna coil from the secondary coil. Starting at 'O' move the wavelength dial to 100 and if points are found where the receiver stops oscillating it indicates that the antenna circuit or a harmonic of it is in tune with the secondary circuit. If in later experience it is found that these non-oscillating points fall directly in the most generally used wavelength ranges, the points may be shifted by either lengthening or shortening the aerial. It will be impossible under certain conditions to eliminate all these points, regardless of the treatment of the antenna, but when these points occur moving the antenna coil further away from the secondary coil will again permit oscillation to be maintained. Moving the regeneration dial to a higher point will also accomplish this, but it is preferable to utilize the antenna coupling coil for this purpose.

With further reference to the occurrence of non-oscillating points on the wavelength dial, some may prefer to use a third method of shifting or eliminating such points. It may be accomplished by connecting a small variable condenser with a capacity of .0003 or .0005 between the aerial and the antenna binding post on the receiver. By tuning this external condenser a point will be found where the receiver stops oscillating and by adjusting the condenser, above or below this point, stable operation will again be restored.

* It is important for the operator to fully appreciate the advantages that may be gained by harmonic tuning. This can be accomplished by using a small variable condenser connected in series with the antenna and the coupling coil. The effects are most noted on wavelengths in which the fundamental period of the antenna is some multiple of the received wavelength.

For example, if the length of the antenna is such that when it is connected to the antenna coupling coil it has a natural period of 300 meters the following harmonics would occur; second harmonic at 150 meters; third at 100 meters; fourth at 75 meters; fifth at 60 meters, etc. If the antenna coil is close to the secondary coil the receiver will stop oscillating at these wavelengths, however, if oscillations are again restored by any of the previously mentioned methods, stronger signals will be obtained at these points than on other wavelengths in the tuning range. It is therefore possible to adjust any antenna so that some harmonic falls on approximately the wavelengths one desires to receive. The advantage of this method is that a long antenna may be used, which naturally will have better pick-up qualities.

It is important for the operator to realize at the outset that the frequency bands included in a single wavelength dial division is sufficient to accommodate as many as 15 stations and while very fine tuning can be secured with the tangent wheel, many of the stations will be passed over unless use is made of the beat frequency control. The tuning values of the main wavelength condenser and the beat frequency control are so proportioned that whereas approximately 15 stations will be found in one degree of the wavelength dial (one notch of the tangent wheel) each station may be separated by approximately one notch on the beat frequency control wheel. With this in mind the operator will soon become familiar with the tuning capabilities of this receiver.

While the foregoing instructions are satisfactory for preliminary operaticn the following should help one to obtain still more satifactory results.

When receiving C. W. or I. C. W. code signals the regeneration dial should be reduced to the lowest reading possible where oscillations are just maintained. This will result in weak signals being received with greater intensity. In other words, the weaker the signal the weaker the oscillations in the receiver should be for maximum intensity in the telephones. However, where signals are easily readable stronger oscillations may be used and are helpful in reducing noises and low frequency interference.

In order to receive broadcasting or speech it is necessary to keep the receiver in a non-oscillating condition. Maximum strength of reception will be obtained when the regeneration dial is set just below the oscillating point. A final critical adjustment can be made by using the filament rheostat.

A. H. Grebe & Company, Inc., maintains and operates at Richmond Hill, New York, U. S. A., both amateur and experimental transmitters with call letters 2ZV and 2XE. The operation of these transmitters for the past fifteen years has made it possible for this organization to keep in constant touch with amateur activities and short wave progress. We are therefore in a position to help the amateur in the many problems which confront him from time to time. Station 2ZV is equipped with a precision wavemeter calibrated and frequently checked against a quartz crystal oscillator and we will be glad to furnish correct wavelengths to amateurs when in communication with our station.

LIST OF INTERNATIONAL INTERMEDIATES
(Standardized by I.A.R.U.)

The letters listed below precede the regular call signals and are used to designate the country where the transmitting station is located.

Example:—4AA-4AA-4AA-ZU-2ZV-2ZV-2ZV. The intermediates ZU mean that a station with the call signals 4AA located in New Zealand is being called by a station with call signals 2ZV located in the United States.

A—Australia
AU—Alaska
B—Belgium
BE—Bermuda
BZ—Brazil
C—Canada and New Foundland
CH—Chile
CR—Costa Rica
D—Denmark
E—Spain
F—France
FI—Indo-China (unauthorized)
G—Great Britain
H—Switzerland (Helvetia)
HU—Hawaii
I—Italy
J—Japan (provisional)
K—Germany (unauthorized)
L—Luxembourg
M—Mexico
N—Netherlands
O—South Africa
P—Portugal
PI—Philippine Islands
PR—Porto Rico
Q—Cuba
R—Argentine
S—Scandinavia (Denmark, Finland, Iceland, Norway, Sweden)
U—United States
Y—Uruguay
Z—New Zealand

SIGNALS DESIGNATING RELATIVE AUDIBILITY

R-1 Faint signals, just audible.
R-2 Weak signals, barely readable.
R-3 Weak signals, but readable.
R-4 Fair signals, easily readable.
R-5 Moderately strong signals.
R-6 Strong signals.
R-7 Good strong signals, readable through heavy QRN and QRM.
R-8 Very strong signals, several feet from the phones.
R-9 Extremely strong signals.

WINDING DATA FOR INDUCTANCE COILS
USED WITH
GREBE SHORT WAVE RECEIVER TYPE CR-18
A. H. GREBE & CO., INC.   RICHMOND HILL, N.Y.

COIL No.	WAVELENGTH RANGE METERS	L_1	SPACE	L_2	FREQUENCY RANGE MEGA-CYCLES
1	8.5-18	1	1	2	16.6-35
2	15.8-31	3	1	2	9.7-19
3	29-62	8	1	4	4.85-10.3
4	56-112	18	2	6	2.68-5.35
5	107-216	49	1	18	1.38-2.8

NOTE - ALL COILS ARE WOUND (3 INCH DIAMETER) WITH #16 S.C.C. COPPER WIRE SPACED 10 TURNS PER INCH

2-17-26

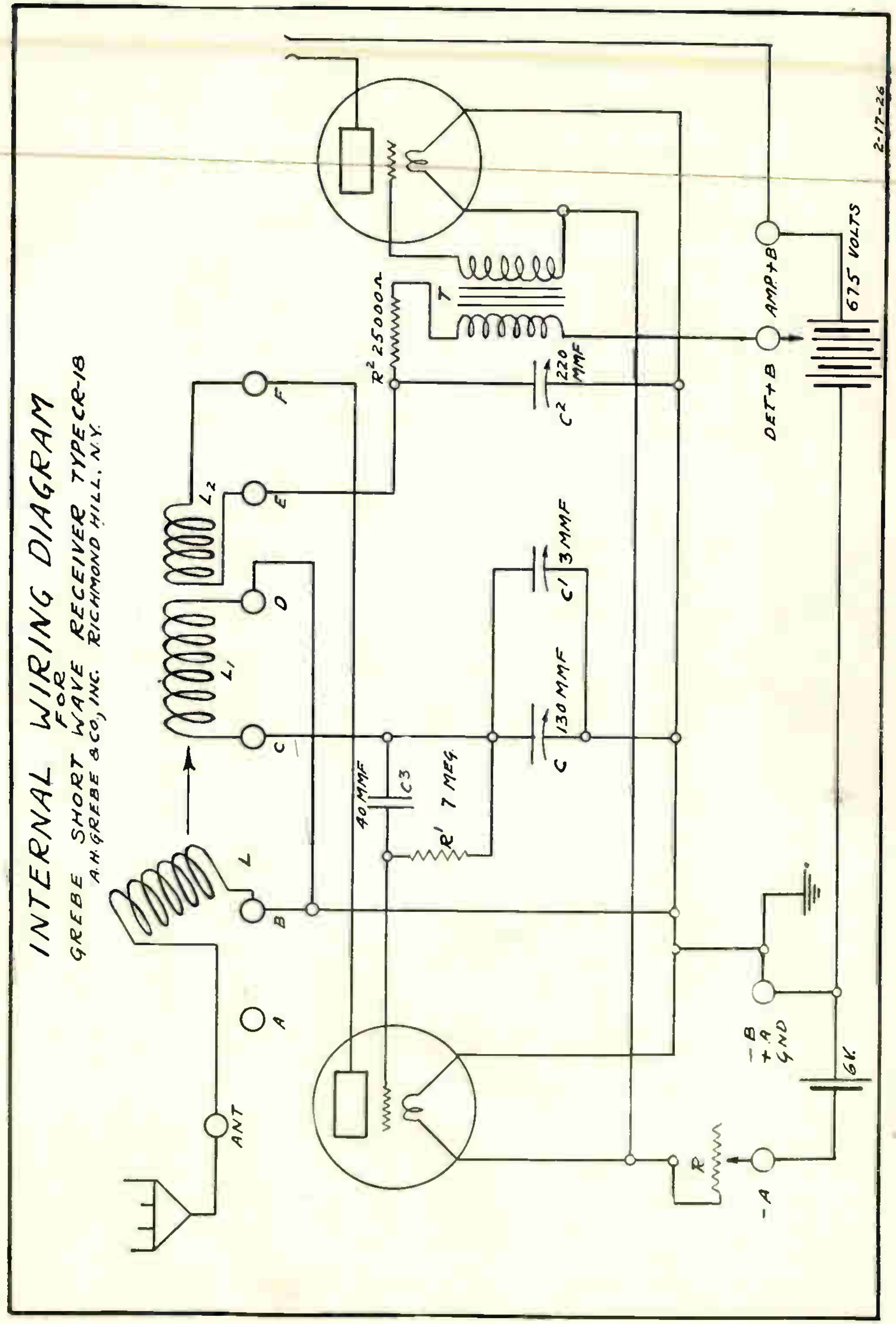
TIME CHART

Hawaii	San Francisco P. C. T.	Denver M. S. T.	Chicago C. S. T.-D	Havana Cuba	New York-Washington E. S. T.	Daylight Saving	Halifax Buenos Aires	Rio de Janeiro Brazil	London Paris Madrid	G. M. T.	Sweden Germany Switzerland Italy	Petrograd Constantinople Capetown Jerusalem	Bagdad Persia	Calcutta Bombay India	Borneo Java Dutch E. I.	Manila P. I. China Western Australia	Tokio Central Australia	Sidney Melbourne Eastern Australia	Auckland New Zealand	Samoa
1.30P.M.	4.00P.M.	5.00P.M.	6.00P.M.	6.30P.M.	7.00P.M.	8.00P.M.	8.00P.M.	9.00P.M.	Midnight	0000	1.00A.M.	2.00A.M.	3.00A.M.	5.00A.M.	6.00A.M.	8.00A.M.	9.00A.M.	10.00A.M.	11.30A.M.	Noon
2.30	5.00	6.00	7.00	7.30	8.00	9.00	9.00	10.00	1.00A.M.	0100	2.00	3.00	4.00	6.00	7.00	9.00	10.00	11.00	12.30P.M.	1.00P.M.
3.30	6.00	7.00	8.00	8.30	9.00	10.00	10.00	11.00	2.00	0200	3.00	4.00	5.00	7.00	8.00	10.00	11.00	Noon	1.30	2.00
4.30	7.00	8.00	9.00	9.30	10.00	11.00	11.00	Midnight	3.00	0300	4.00	5.00	6.00	8.00	9.00	11.00	Noon	1.00P.M.	2.30	3.00
5.30	8.00	9.00	10.00	10.30	11.00	12.00	Midnight	1.00A.M.	4.00	0400	5.00	6.00	7.00	9.00	10.00	Noon	1.00P.M.	2.00	3.30	4.00
6.30	9.00	10.00	11.00	11.30	Midnight	1.00A.M.	1.00A.M.	2.00	5.00	0500	6.00	7.00	8.00	10.00	11.00	1.00P.M.	2.00	3.00	4.30	5.00
7.30	10.00	11.00	Midnight	12.30A.M.	1.00A.M.	2.00	2.00	3.00	6.00	0600	7.00	8.00	9.00	11.00	Noon	2.00	3.00	4.00	5.30	6.00
8.30	11.00	Midnight	1.00A.M.	1.30	2.00	3.00	3.00	4.00	7.00	0700	8.00	9.00	10.00	Noon	1.00P.M.	3.00	4.00	5.00	6.30	7.00
9.30	Midnight	1.00A.M.	2.00	2.30	3.00	4.00	4.00	5.00	8.00	0800	9.00	10.00	11.00	1.00P.M.	2.00	4.00	5.00	6.00	7.30	8.00
10.30	1.00A.M.	2.00	3.00	3.30	4.00	5.00	5.00	6.00	9.00	0900	10.00	11.00	Noon	2.00	3.00	5.00	6.00	7.00	8.30	9.00
11.30	2.00	3.00	4.00	4.30	5.00	6.00	6.00	7.00	10.00	1000	11.00	Noon	1.00P.M.	3.00	4.00	6.00	7.00	8.00	9.30	10.00
12.30A.M.	3.00	4.00	5.00	5.30	6.00	7.00	7.00	8.00	11.00	1100	Noon	1.00P.M.	2.00	4.00	5.00	7.00	8.00	9.00	10.30	11.00
1.30	4.00	5.00	6.00	6.30	7.00	8.00	8.00	9.00	Noon	1200	1.00P.M.	2.00	3.00	5.00	6.00	8.00	9.00	10.00	11.30	Midnight
2.30	5.00	6.00	7.00	7.30	8.00	9.00	9.00	10.00	1.00P.M.	1300	2.00	3.00	4.00	6.00	7.00	9.00	10.00	11.00	12.30A.M.	1.00A.M.
3.30	6.00	7.00	8.00	8.30	9.00	10.00	10.00	11.00	2.00	1400	3.00	4.00	5.00	7.00	8.00	10.00	11.00	Midnight	1.30	2.00
4.30	7.00	8.00	9.00	9.30	10.00	11.00	11.00	Noon	3.00	1500	4.00	5.00	6.00	8.00	9.00	11.00	Midnight	1.00A.M.	2.30	3.00
5.30	8.00	9.00	10.00	10.30	11.00	12.00	Noon	1.00P.M.	4.00	1600	5.00	6.00	7.00	9.00	10.00	Midnight	1.00A.M.	2.00	3.30	4.00
5.30	9.00	10.00	11.00	11.30	Noon	1.00P.M.	1.00P.M.	2.00	5.00	1700	6.00	7.00	8.00	10.00	11.00	1.00A.M.	2.00	3.00	4.30	5.00
7.30	10.00	11.00	Noon	12.30P.M.	1.00P.M.	2.00	2.00	3.00	6.00	1800	7.00	8.00	9.00	11.00	Midnight	2.00	3.00	4.00	5.30	6.00
8.30	11.00	Noon	1.00P.M.	1.30	2.00	3.00	3.00	4.00	7.00	1900	8.00	9.00	10.00	Midnight	1.00A.M.	3.00	4.00	5.00	6.30	7.00
9.30	Noon	1.00P.M.	2.00	2.30	3.00	4.00	4.00	5.00	8.00	2000	9.00	10.00	11.00	1.00A.M.	2.00	4.00	5.00	6.00	7.30	8.00
10.30	1.00P.M.	2.00	3.00	3.30	4.00	5.00	5.00	6.00	9.00	2100	10.00	11.00	Midnight	2.00	3.00	5.00	6.00	7.00	8.30	9.00
11.30	2.00	3.00	4.00	4.30	5.00	6.00	6.00	7.00	10.00	2200	11.00	Midnight	1.00A.M.	3.00	4.00	6.00	7.00	8.00	9.30	10.00
12.30P.M.	3.00	4.00	5.00	5.30	6.00	7.00	7.00	8.00	11.00	2300	Midnight	1.00A.M.	2.00	4.00	5.00	7.00	8.00	9.00	10.30	11.00

Note—The heavy lines denote a change of date. Passing the heavy line, going to the right, denotes the following day. Passing the heavy line to the left, denotes the previous day. All figures on the same horizontal line indicate standard time in the various Time Zones at the same instance.

SHORT WAVE STATIONS OF THE WORLD*

Call Signal	Location	Frequency in K. C.	Wave Length Meters	CR-18 Coil No.
POF	Nauen, Germany	22209	13.5	#1
2XS	Rocky Point, New York	20082	14.93	#1
2XAW	Schenectady, New York	19988	15	#1
2BR	Chelmsford, England	19988	15	#1
2XE	**A. H. Grebe & Co., Inc., New York**	19988	15	#1
POF	Nauen, Germany	18738	16	#2
NKF	Anacostia, District of Columbia	18738	16	#2
2BR	Chelmsford, England	17636	17	#2
POF	Nauen, Germany	16657	18	#2
2XAD	Schenectady, New York	14991	20	#2
KFVM	S. S. Idalia	14991	20	#2
POF	Nauen, Germany	14991	20	#2
NAL	Washington, District of Columbia	14991	20	#2
NEPQ	U. S. S. Relief	14991	20	#2
2ZV	**A. H. Grebe & Co., Inc., New York**	14991	20	#2
NKF	Anacostia, District of Columbia	14414	20.8	#2
WIK	Rocky Point, New Jersey	13628	22	#2
2YT	Poldhu, England	11993	25	#2
POY	Nauen, Germany	11993	25	#2
FW	Sainte Assise, France	11993	25	#2
NKF	Anacostia, District of Columbia	11758	25.5	#2
AGA	Nauen, Germany	11532	26	#2
PCMM	Kootwijck, Holland	10903	27.5	#2
POW	Nauen, Germany	10708	28	#2
2XI	Schenectady, New York	9994	30	#2
NAL	Washington, District of Columbia	9798	30.6	#3
2YT	Poldhu, England	9369	32	#3
ANE	Malabar, Java	9369	32	#3
2XE	**A. H. Grebe & Co., Inc., New York**	9369	32	#3
NAJ	Great Lakes, Illinois	8630	34	#3
WQO	Rocky Point, New York	8560	35.03	#3
PCMM	Kootwijck, Holland	8328	36	#3
PCUU	Kootwijck, Holland	7890	38	#3
KFVM	S. S. Idalia	7496	40	#3
NAS	Pensacola, Florida	7496	40	#3
NAJ	Great Lakes, Illinois	7496	40	#3
NPG	San Francisco, California	7496	40	#3
NRRL	U. S. S. Seattle	7496	40	#3
NQW	U. S. S. New Mexico	7496	40	#3
2XAC	Schenectady, New York	7406	40	#3
2ZV	**A. H. Grebe & Co., Inc., New York**	7496	40	#3
NKF	Anacostia, District of Columbia	7260	41.3	#3
2XAF	Schenectady, New York	7160	41.88	#3
5XH	New Orleans, Louisiana	7139	42	#3
FW	Sainte Assise, France	7139	42	#3
WIZ	Rocky Point, New Jersey	6970	43.02	#3
WQO	Rocky Point, New York	6814	44	#3
KZA	Los Angeles, California	6814	44	#3
KZB	Los Angeles, California	6814	44	#3
PCLL	Kootwijck, Holland	6518	46	#3
WHD	Sharon, Pennsylvania	6119	49	#3
NPM	Honolulu, Territory of Hawaii	6119	49	#3
2XAD	Schenectady, New York	5996	50	#3
SAJ	Karlsborg, Sweden	5996	50	#3
WQN	Rocky Point, New York	5822	51.5	#3
NPU	Tutuila, Samoa	5657	53	#3
NBA	Balboa, Canal Zone	5552	54	#3
NKF	Anacostia, District of Columbia	5811	54.4	#3



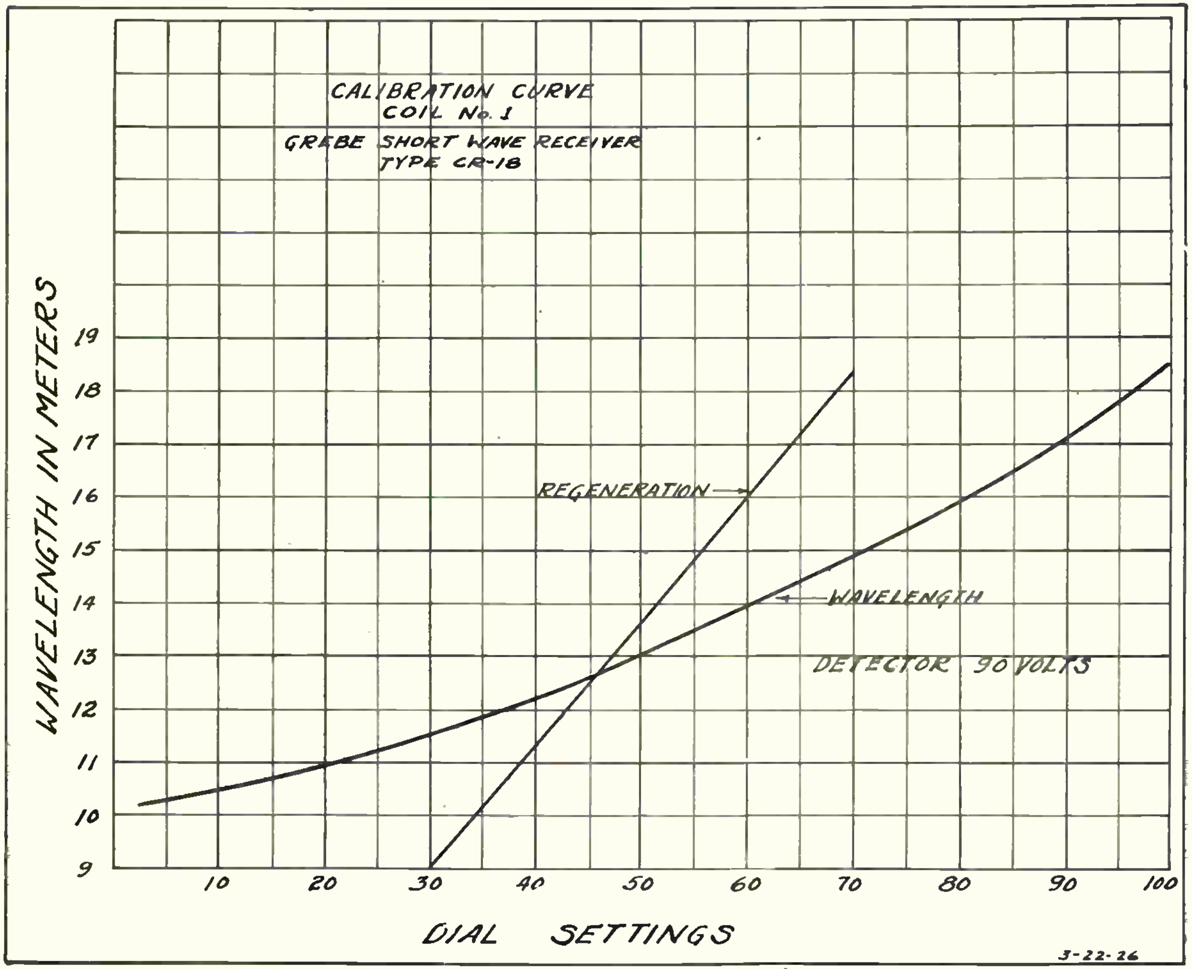
SHORT WAVE STATIONS OF THE WORLD

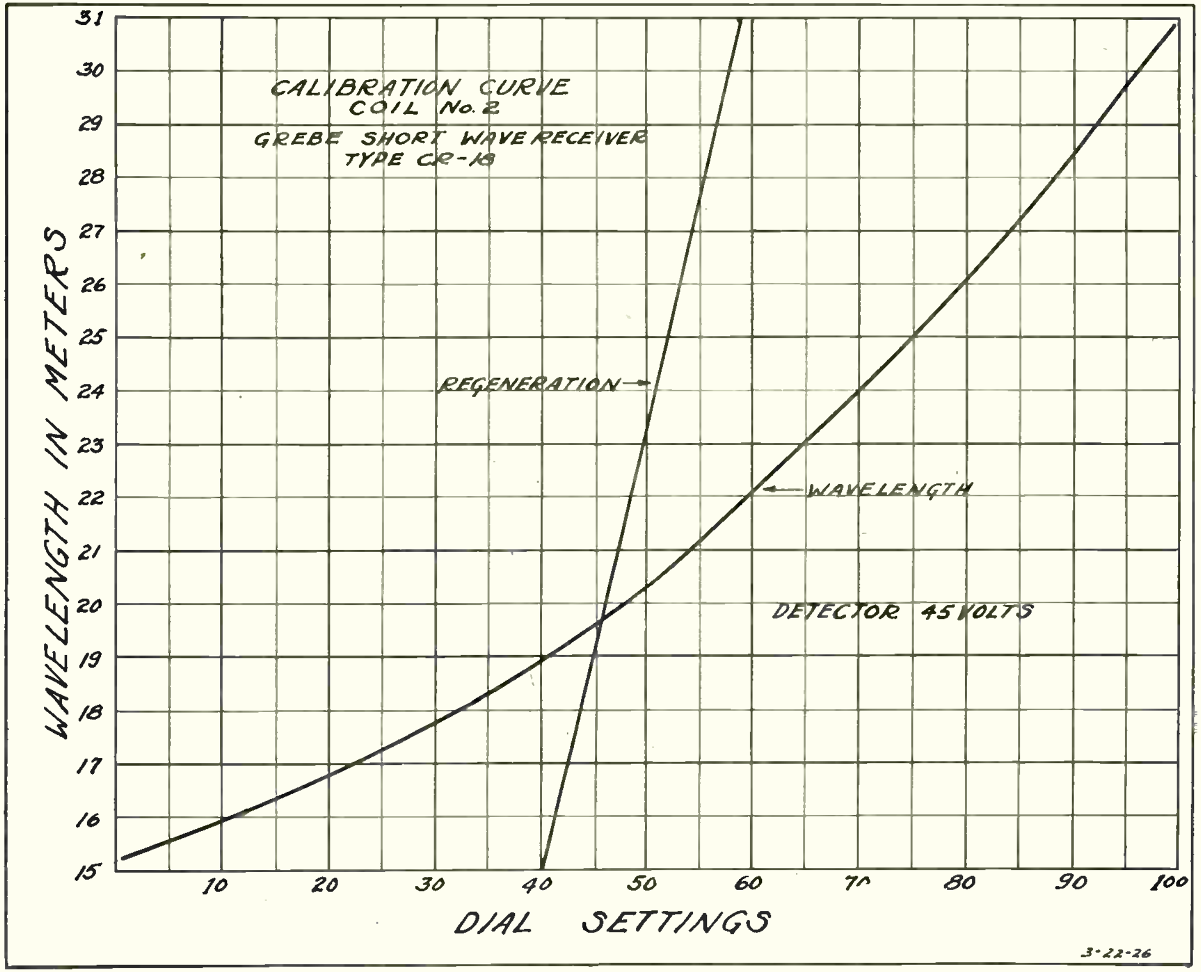
Call Signal	Location	Frequency in K. C.	Wave Length Meters	CR-18 Coil No.
WQN	Rocky Point, New York	5501	54.5	#3
KFKX	Hastings, Nebraska	5354	56	#3
ANF	Malabar, Java	5354	56	#3
IXAO	Belfast, Maine	5354	56	#3
WQN	Rocky Point, New York	5260	57	#3
KDKA	East Pittsburgh, Pennsylvania	5100	58.79	#4
KDC	Casper, Wyoming	5082	59	#4
2YT	Poldhu, England	4997	60	#4
KDKA	East Pittsburgh, Pennsylvania	4759	63	#4
WRMU	**A. H. Grebe & Co., Inc., New York, Marine Broadcast Station**	4759	63	#4
WGMU	**A. H Grebe & Co., Inc., New York, Mobile Broadcast Station**	4759	63	#4
2XE	**A. H. Grebe & Co., Inc., New York**	4759	63	#4
8XS	East Pittsburgh, Pennsylvania	4475	67	#4
NPO	Cavite, Philippine Islands	4409	68	#4
WRB	Miami, Florida	4383	68.4	#4
WRP	Miami, Florida	4383	68.4	#4
2XOA	Belfast, Maine	4283	70	#4
POX	Nauen, Germany	4283	70	#4
NPO	Cavite, Philippine Islands	4283	70	#4
NERM	U. S. S. Los Angeles	4283 4283	70 to 84.5	#4
NQG	San Diego, California	4253	70.5	#4
NKF	Anacostia, District of Columbia	4205	71.3	#4
NPL	San Diego, California	4182	71.7	#4
WIR	Rocky Point. New Jersey	4052	74	#4
SFR	Paris, France	3998	75	#4
NUQB	U. S. S. Pope	3998	75	#4
NIRX	U. S. S. Canopus	3998	75	#4
NAJ	Great Lakes, Illinois	3945	76	#4
NFV	Quantico, Virginia	3874	77.4	#4
J1AA	Iwatsuki, Japan	3795	79	#4
KFVM	S. S. Idalia	3748	80	#4
NEL	Lakehurst, New Jersey	3748	80	#4
2XK	Schenectady, New York	3748	80	#4
NPG	San Francisco, California	3701	81	#4
2ZV	**A. H. Grebe & Co., Inc., New York**	3701	81	#4
NKF	Anacostia, District of Columbia	3679	81.5	#4
RDW	Moscow, Russia	3612	83	#4
NKF	Anacostia, District of Columbia	3569	84	#4
SFR	Paris, France	3527	85	#4
NQG	San Diego, California	3486	86	#4
KIO	Kahuku, Territory, Hawaii	3331	90	#4
2YT	Poldhu, England	3190	94	#4
KEL	Bolinas, California	3156	95	#4
8XS	East Pittsburgh, Pennsylvania	3123	96	#4
POX	Nauen, Germany	2998	100	#4
NAM	Norfolk, Virginia	2998	100	#4
WGH	Rocky Point, New Jersey	2911	103	#4
WHU	S. S. Big Bill	2855	105	#5
2XK	Schenectady, New York	2751	109	#5
KFVT	S. S. Eloise	2726	110	#5
KFHV	S. S. Facile	2726	110	#5
KFWJ	S. S. Gallavant	2726	110	#5
1XAO	Belfast, Maine	2677	112	#5
FL	Paris, France	2607	115	#5
KFWK	S. S. Nirvana	2607	115	#5
KFVB	S. S. Bridget	2600	115.3	#5

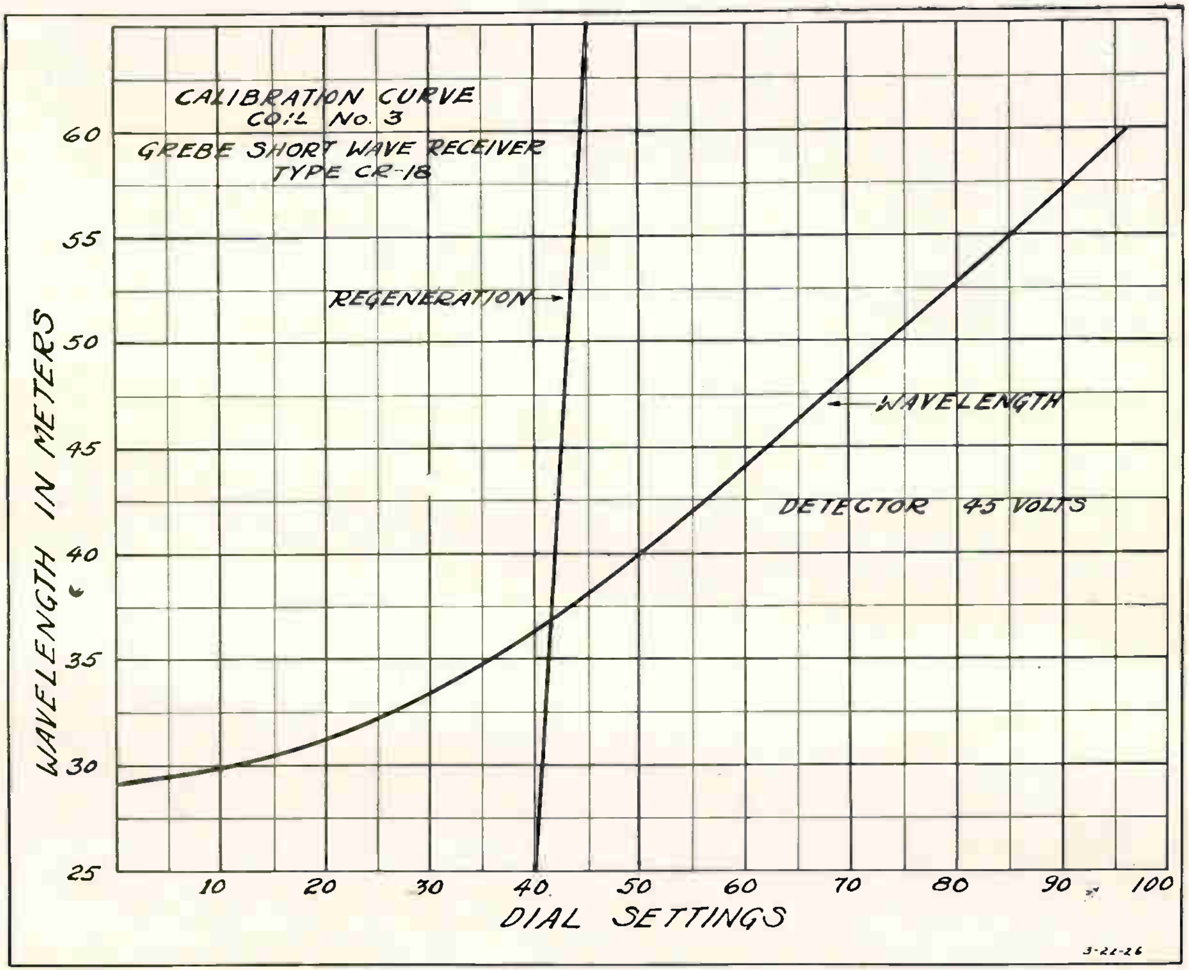
* Courtesy of Radio Broadcast Magazine.

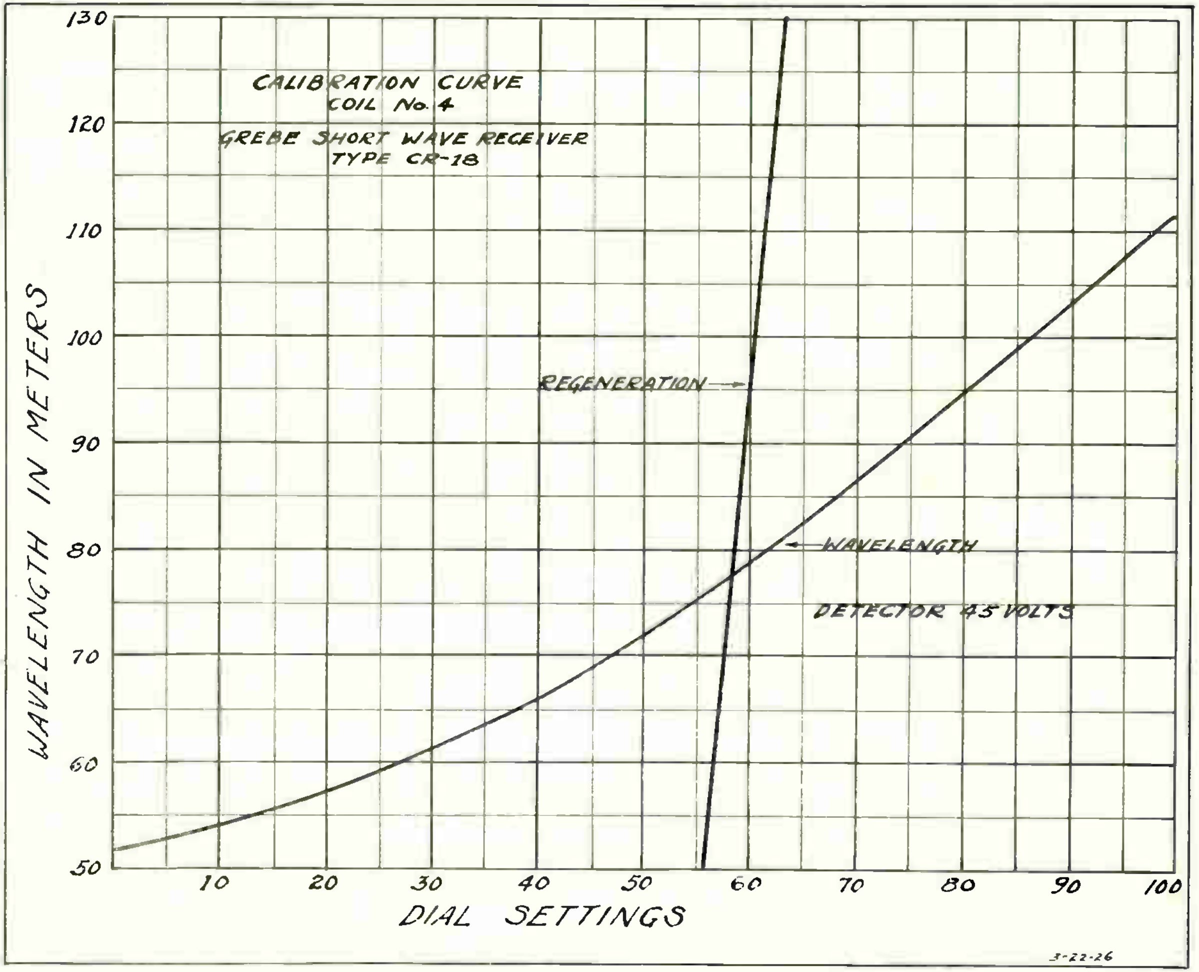
WAVE LENGTH ASSIGNMENTS

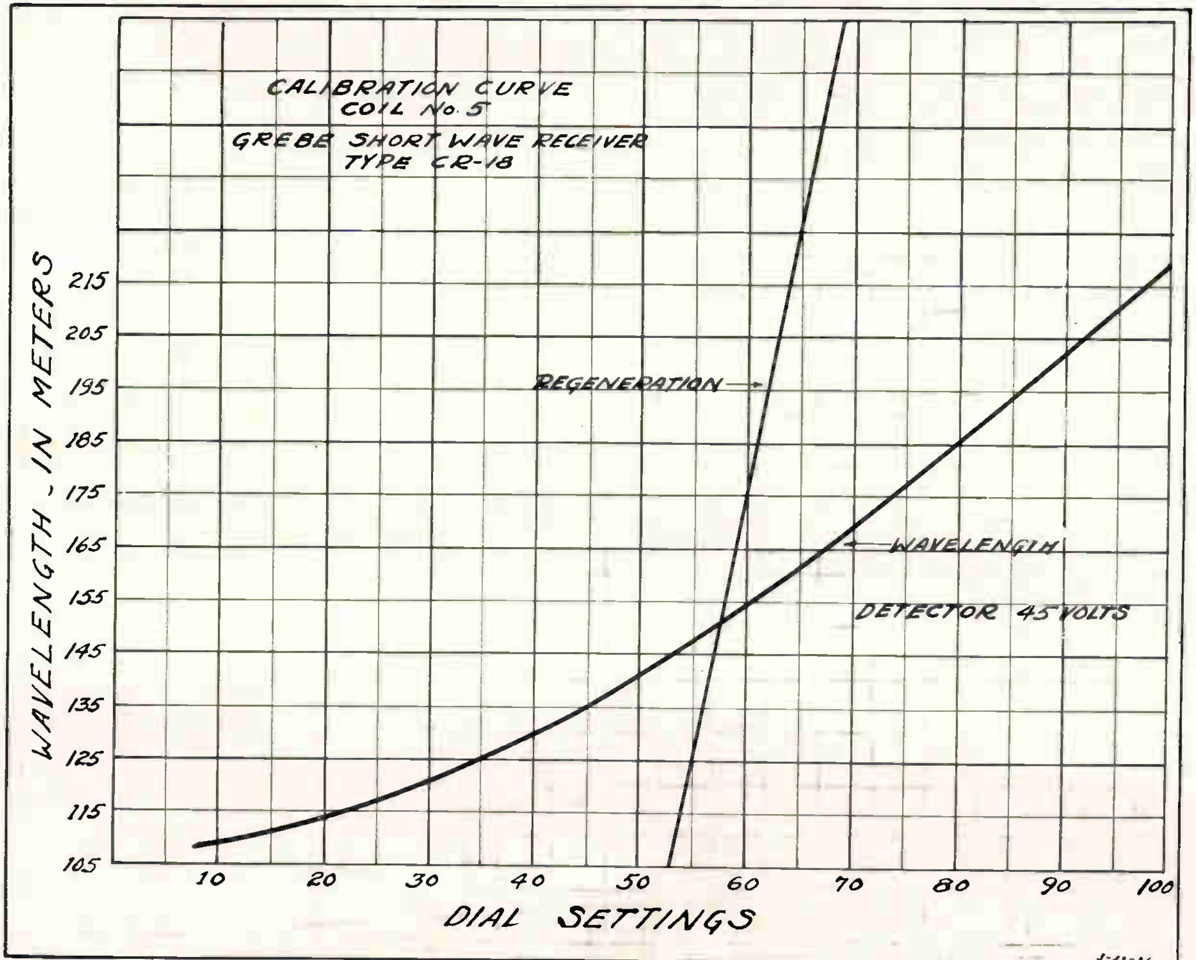
Wave Length (Meters)	Frequency (Kilocycles)	CR-18 Coil No.	Type of Transmission	Service
200—150	1500—2000	#5	CW, ICW, Phone	**Amateur**
150—133	2000—2250	#5		Point to point
133—130	2260—2300	#5		Aircraft only
130—109	2300—2750	#5		Mobile and Gov. Mob.
109—105	2750—2850	#4		**Relay Broadcasting**
105—85.7	2850—3500	#4		Public toll service, Government mobile and point to point communication by electric power supply utilities, and point-to-point and multiple address message service by press organizations only.
85.7—75.0	3500—4000	#4		**Amateur**
85.66—83.28	3500—3600	#4	Phone	**Amateur**
75.0--66.3	4000—4520	#4		Public toll service
66.3—60	4520—5000	#4		**Relay Broadcasting**
60—54.5	5000—5500	#4		Public toll service
54.5—52.6	5500—5700	#3		**Relay Broadcasting**
52.6—42.8	5700—7000	#3		Point to point
42.8—37.5	7000—8000	#3		**Amateur**
37.5—33.1	8000—9050	#3		Public toll service
33.1-30	9050—10000	#3		**Relay broadcasting**
30—27.3	10000—11000	#2		Public toll service
27.3—26.3	11000—11400	#2		**Relay broadcasting**
26.3—21.4	11400—14000	#2		Public service
21.4—18.7	14000—16000	#2		**Amateur**
18.7—16.6	16000—18100	#2		Public toll service
16.6—5.35	18100—56000	#1		Experimental
5.35—4.69	56000—64000			**Amateur**
4.69—.7496	64000—400000			Experimental
.7596—.7477	400000—401000			**Amateur**

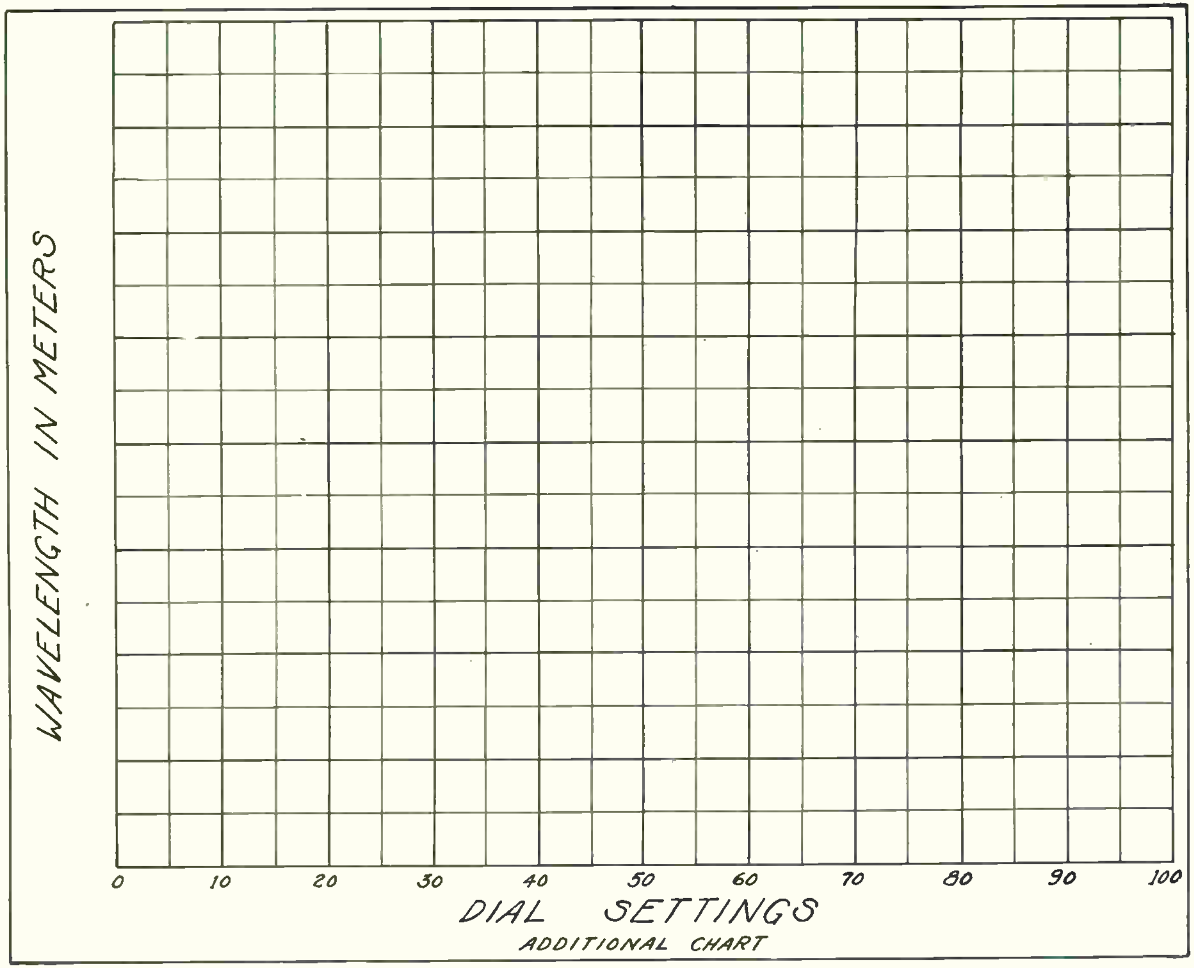

CALIBRATION CURVE
COIL No. 1
GREBE SHORT WAVE RECEIVER
TYPE CR-18
WAVELENGTH IN METERS
9
10
11
12
13
14
15
16
17
18
19
REGENERATION
WAVELENGTH
DETECTOR 90 VOLTS
10
20
30
40
50
60
70
80
90
100
DIAL SETTINGS
3-22-26


CALIBRATION CURVE
COIL No. 2
GREBE SHORT WAVE RECEIVER
TYPE CR-18
REGENERATION
WAVELENGTH
DETECTOR 45 VOLTS
WAVELENGTH IN METERS
DIAL SETTINGS
31
30
29
28
27
26
25
24
23
22
21
20
19
18
17
16
15
10
20
30
40
50
60
70
80
90
100
3-22-26


CALIBRATION CURVE
COIL No. 3
GREBE SHORT WAVE RECEIVER
TYPE CR-18
REGENERATION
WAVELENGTH
DETECTOR 45 VOLTS
WAVELENGTH IN METERS
25
30
35
40
45
50
55
60
10
20
30
40
50
60
70
80
90
100
DIAL SETTINGS
3-22-26


CALIBRATION CURVE
COIL No. 4
GREBE SHORT WAVE RECEIVER
TYPE CR-18
WAVELENGTH IN METERS
130
120
110
100
90
80
70
60
50
REGENERATION
WAVELENGTH
DETECTOR 45 VOLTS
10
20
30
40
50
60
70
80
90
100
DIAL SETTINGS
3-22-26


CALIBRATION CURVE
COIL No. 5
GREBE SHORT WAVE RECEIVER
TYPE CR-18
WAVELENGTH - IN METERS
215
205
195
185
175
165
155
145
135
125
115
105
REGENERATION
WAVELENGTH
DETECTOR 45 VOLTS
10
20
30
40
50
60
70
80
90
100
DIAL SETTINGS


WAVELENGTH IN METERS
0
10
20
30
40
50
60
70
80
90
100
DIAL SETTINGS
ADDITIONAL CHART

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