A GUIDE TO RECEPTION

OF

SHORT-WAVE BROADCASTING STATIONS

MARCH, 1937

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ISSUED BY PHILCO RADIO & TELEVISION CORPORATION OF GREAT BRITAIN LTD.

FOREWORD

WHILE it has been necessary in this booklet to give information in great detail and to emphasise the limitations and difficulties of short-wave reception, this has been done in the interest of those readers who have no knowledge of the subject, and should not be taken to indicate that the happy and intensely interesting use of a short-wave receiver is either complicated or unusual, or requires either a high degree of skill or professional knowledge.

With a little practice and patience, the user of a properly installed and properly operated all-wave receiver, equipped with an adequate aerial system, will soon learn how great is his reward and how unusually interesting, instructive and entertaining is the vista of the world's speech and music disclosed to him through his Philco all-wave receiver.

Your Philco can mean all the world to you.

Yours for good reception,

PHILCO RADIO & TELEVISION CORPORATION
OF GREAT BRITAIN, LIMITED.

Short-Wave Radio :: Empire's Strongest Link

Issued by Philco Radio & Television Corporation of Great Britain Ltd.

THIS booklet contains information which will enable you to obtain more interest and pleasure from your short-wave receiver.

We have tried to explain, in non-technical language, the importance of an adequate aerial system, how the latest types of aerial work, why short-wave reception appears erratic, and how to choose stations most suitable for the time of year and day.

We have included data supplied by:

THE UNITED STATES DEPARTMENT OF COMMERCE,

THE PHILCO RESEARCH LABORATORIES,

MR. R. W. HALLOWS, A.M.I.E.E., etc.

to whom we acknowledge our gratitude.

CONTENTS

Installation of the Radio Set

WHILE, for the most part, the modern radio receiver will be installed by a skilled radio man, for the benefit of those who will wish to make their own installation it is to be noted that the choice of the aerial size and location, and the connection of the radio receiver to the earth is of major importance. Thus, the efficiency of any aerial varies greatly with the frequency of incoming radio waves, a given length being excellent at certain frequencies and comparatively poor at certain others. Thus, for best possible results throughout a wide tuning range such as found in the modern short wave receiver an aerial of adjustable length would be necessary.

The best performance of radio receivers on the shorter wavelengths can be ensured by installation of the noise suppression type of specially constructed receiving aerials. For densely populated districts, this type of aerial system is virtually a necessity.

Years ago, in the very early days of broadcasting, stations were few and far between and their power was very small. So feeble were the impulses received from them that owners of wireless sets had to put up aerials of the most efficient kind known, and keep them in good order if they wanted any results. As time went on broadcasting stations increased in number at an amazingly rapid rate, and what had previously been looked upon as big transmitters were soon regarded as midgets, dwarfed as they were by the huge plants which sprang up in this country, all over the continent of Europe and in almost every part of the civilised world.

Progress was made in transmitting gear, and Philco receiving sets did not lag behind. Their sensitivity was increased almost beyond belief, and sensitivity means their ability to range further afield and to receive more stations. Selectivity (the power of separating one station from another) went up by leaps and bounds. Automatic volume control, which reduces the effects of fading, was improved year by year, and in Philco sets *full* automatic volume control that really does the work has always been an important feature.

Sets, in fact, became so good that they were far better than their aerial systems. The highly sensitive Philco receiver would bring in station after station with nothing more elaborate than a piece of wire slung round a room. This being so, countless listeners put up aerials of the most inefficient kind when they bought their first Philco receivers, whilst others who were not newcomers to the most fascinating of all hobbies allowed their aerials to go year in year out without any attention whatever.

It is no exaggeration to say that over 80 per cent. of the receiving aerials in use to-day are hopelessly inefficient.

The idea that a good set will work well from any old aerial is absolutely wrong. It will work, but it won't work half so well as it could and should.

The better the set the better the aerial should be. Conversely, the better the aerial the better are the results that you will have from your set, no matter what the type, cost or make.

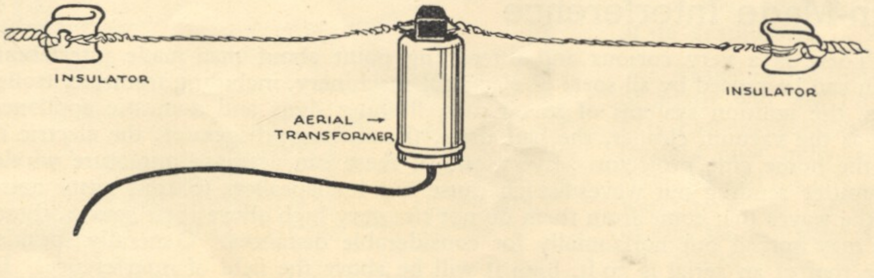
"Roof" and Down-Lead

An ordinary aerial can be regarded as consisting of two parts. There is, first of all, the horizontal portion, which is usually called the roof. Then there is the vertical, or semi-vertical, wire which connects the roof to the wireless set. This is known as the lead-in or down-lead. No matter how much trouble is taken in making it as good as it can be, this kind of aerial has two big drawbacks. Philco engineers realised these to the full and set themselves the task of discovering the perfect aerial system. It was a long and difficult business, but all their painstaking work has been amply repaid by the amazing Philco All-Wave All-Purpose Aerial.

Misfit Aerials

Now let us see what are the drawbacks of the ordinary aerial system. First of all, one and the same aerial of the ordinary kind cannot match each of the wavelength ranges of your set. If you make its roof long enough for the best results on the medium and long waves it will be too long for the short waves. Supposing that you cut the aerial down to the best dimensions for short-wave reception, it would work excellently on the short-wave range, but your results on the medium and long waves would be poor. What is generally done is to compromise by making the aerial of medium length, which means that it is a misfit all round, and that reception on any wave-band is not so good as it should be. To get the best out of a set, four or five separate aerials would be needed—and nobody wants anything of that kind.

The Philco All-Wave All-Purpose aerial is really a whole family of aerials in one.



The Philco All-Wave All-Purpose Aerial

The roof of the Philco All-Wave All-Purpose Aerial consists of two pieces of stranded wire. Between them is a small hermetically sealed metal box containing a transformer, which is an arrangement of coils specially designed for the purpose by Philco engineers. The connection between the roof of the aerial and the set is very different from the down-lead of the ordinary aerial. It looks much the same, except that it is thicker and that it consists of two cabled wires twisted together in a special way ; but it is not in reality a down-lead at all, it is a transmission line. By using a transmission line instead of a down-lead, Philco engineers have got rid of the second great drawback of the ordinary aerial system.

Where the Down-Lead Fails

Ideally, the down-lead should be nothing more and nothing less than an easy path for wireless waves from the roof of the aerial to the receiving set. In other words, the roof should *collect* impulses and the down-lead should *conduct* them to the set without doing anything else. Unfortunately it does do other undesirable things. First of all, it may be responsible for very serious losses, if its insulation is not too good ; or if it contains poorly-made joints ; or if it passes close to walls, and so on ; or if it is of considerable length. Very few of the down-leads of receiving aerials of the ordinary type in use nowadays are without one or more of those " ifs," and the result is that though the roof may play its part well as a collector of wireless waves, the down-lead fails to deliver to the wireless set all that the roof has collected. The Philco transmission line, with its transformers at either end, knows nothing of " ifs " and " buts." Its joints are factory soldered and permanently good. This transmission line is not prone to leakages and losses as the down-lead is. A length is supplied with the aerial, but you can make it 400ft. in length if you like without impairing the performance of the set, and you can staple it to the skirting board if you wish to do so.

No Crackles Here

Another weak point about the ordinary down lead is that it will not stick to its job of *conducting*. It insists upon acting as a collector of wireless impulses, and it is the down-lead which is mainly responsible for picking up interference from electrical machinery which causes those crackles, those noises like frying sausages and those unpleasant sounds like the tearing of a strip of American cloth with which most listeners are all too familiar. That is where the Philco transmission line scores. It does one job and one job only. It conducts but does not collect. It does *not* pick up man-made interference.

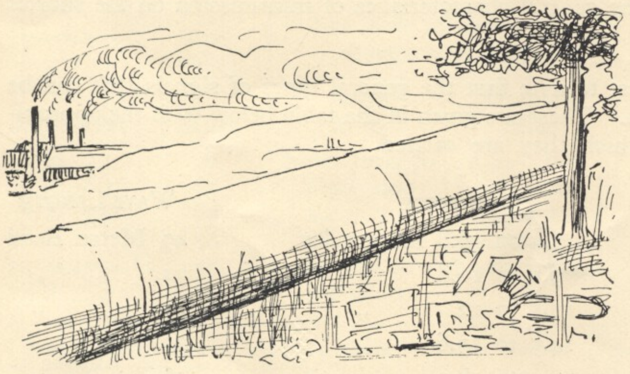
Man-Made Interference

There is a very curious and interesting point about man-made interference, which can be caused by all sorts of electrical machinery, including tramcars, trolley-buses, the ignition systems of motor-cars, flashing signs and domestic appliances, such as the vacuum cleaner, the hair drier, the electric refrigerator, the electric fan and the home cine projector. Every one of these can act as a miniature wireless transmitter sending out waves which cause our loudspeakers to emit nasty noises. But the waves that come from them do not rise very high above their source, though they may spread out horizontally for considerable distances. Generally speaking, if the roof of an aerial is 30 ft. high it will be above the field of interference. But it is no use having a high roof if your down-lead in passing through the " danger zone " picks up all the interference that is going. You see now one of the great virtues of the Philco All-Wave All-Purpose Aerial. Erect it so that its roof is reasonably high and its transmission line, which is a *conductor* and not a *collector*, will bring wireless waves from the station that you want safely through the danger zone without their being contaminated by interference.

How the Philco Aerial System Works

Perhaps we can best understand the working of the Philco All-Wave All-Purpose Aerial by thinking for a moment of the water supply of a busy industrial town which is covered by a pall of smoke from factory and household chimneys. Our imaginary town lies in a valley, and on the hill-top far above the smoke region is a reservoir. Into this falls pure clean rain, and the water of the reservoir itself is crystal clear. The City Fathers connect the reservoir with the town by means of a wide, shallow ditch, which meanders down the porous soil of the hillside with many a bend and turn. Much of the water passing from reservoir to town seeps into the soil and is lost. The banks of the ditch are not too good, and at some of the bends the stream overflows and spreads itself over the surrounding fields. Vegetation along the banks of the ditch sucks up a good deal of the water. Only a fraction of the available water arrives at its destination.

On leaving the reservoir the stream of water flowing through the shallow ditch is perfectly clear; but it ceases to be so soon after it enters the pall of smoke, where it becomes contaminated not only by drops of dirty rain, but also by the dead cats, old bicycle tyres and other little offerings that those living near its banks fling into it, as dwellers by the side of any stream invariably do. And what of the water which eventually reaches the city in this way? To begin with only a portion of what the reservoir puts into the ditch ever reaches the city, since so much is lost on the way. Next, the water leaves the reservoir pure, clean and clear, but is far from being any of these when it arrives at its destination.



Realising that this state of affairs will not do, the City Fathers install a large straight pipe between the reservoir and the city. The water now has the easiest of easy paths; none is lost by evaporation, by the transpiration of trees and plants, by leakages or by seeping into the ground. There is no contamination by smoke-dirtied rain or from the various discards of mankind. The city receives the whole of the water that its reservoir collects, and it receives it free from any sort of contamination.

A Comparison

The wide shallow ditch corresponds to the ordinary down-lead, and the pall of smoke through which it passes is the invisible pall of man-made interference—the danger zone—which covers every town and every village where electrical machinery is in use or where there is much motor traffic. The reservoir is, of course, the roof of the aerial. Being above the interference pall, it collects wireless waves free from disturbances; but on their way through the down-lead the waves become contaminated by interference and serious losses take place.

The large straight pipe is the Philco transmission line. Here there is no contamination, no picking up of interference, and all that the roof of the aerial collects is passed into the set without loss.

Where Philco Scores

You see now why it is that the Philco All-Wave All-Purpose Aerial with its transmission line is so far ahead of the ordinary aerial, and, indeed, of any other receiving system.

Good reception in many installations will be obtained without connecting the instrument to an external earth, since the power lines to which the receiver is connected often serve to supply this earth connection. Best results, however, can be insured only by earthing the radio set in the conventional manner to a water-pipe or radiator, or to a metallic pipe or stake driven from 5 ft. to 8 ft. into the soil. The earth lead when used should be short, preferably not more than 15 ft. in length, and metallically connected to the pipe or stake surface by means of a suitable earth clamp.

Characteristics of Short-Wave Radio Transmission

While the design of the modern radio receiver is such that no previous experience or special skill is required for its proper operation, its full possibilities can be realised only by those familiar with the general characteristics of transmission on the shorter wavelengths.

It is, therefore, of interest to note first the general types of signals that can be heard on short-wave receivers. These are given in the table below with the approximate frequency bands on which they are carried.

SIGNALS	FREQUENCY	WAVE LENGTH
Foreign Programmes ..	5.5 to 6.8 megacycles	49 Metre Band
	9.3 to 10.8 ,,	31 ,, ,,
	11.5 to 12 ,,	25 ,, ,,
	14.5 to 15.6 ,,	19 ,, ,,
	17.5 to 18.1 ,,	16 ,, ,,
	21 to 22 ,,	14 ,, ,,
Trawlers	1.6 to 2.2 ,,	181 to 134 ,, ,,
Aircraft Calls	2.7 to 3.5 ,,	100 ,, ,,
	5.4 to 5.9 ,,	50 ,, ,,
Amateur	1.7 ,,	175 ,, ,,
	3.5 ,,	85 ,, ,,
	7.0 ,,	43 ,, ,,
	14.0 ,,	21 ,, ,,
	28.0 ,,	10 ,, ,,
Television	40.0 to 50.0 ,,	7 ,, ,,

While the short wave channels listed above are much used in all parts of the world, the programmes which are carried on them are available to the short-wave listener for only a portion of the day, and that depending on the distance from the transmitting station, and many other factors including the time of the year. A brief discussion of the characteristics of the short-wave will, it is believed, therefore be of marked assistance in the operation of short-wave receivers.

Transmitted signals of any wavelength are known to divide into two components—the " Ground " wave and the " Sky " wave. The former remains close to the earth's surface, providing reliable service only over short distances from the broadcasting station.

The sky wave, however, travels into the higher layers of the atmosphere and is reflected back to the earth's surface only at a considerable distance from the station. With short-wave signals, the sky wave usually does not return within the radius covered by the ground wave, resulting in a so-called deadspot region within which reception is impossible or extremely unsatisfactory. The radial length of the region wherein such conditions are effective is known as the skip distance, varying greatly from day to night and from summer to winter approximately as shown in the table below.

TABLE I

EFFECT OF TIME OF DAY AND SEASON OF YEAR ON SHORT-WAVE TRANSMISSION *

Frequency	Ground Wave Range	Sky Wave (Mid-Summer) Approximate Range		Sky Wave (Mid-Winter) Approximate Range	
		Noon	Midnight	Noon	Midnight
Megacycles	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*
2 to 3	90	More than 90	90– 600	90– 100	90–2,500
5 to 6.12	75	100– 200	250–5,000	200– 600	400 or more
7 to 9.67	60	200– 700	1,000 or more	500–2,000	1,500 or more
10 to 12	50	300–1,000	1,500 or more	600–3,000	2,000 or more
13 to 15.82	35	400–2,000	2,500 or more	900–4,000	†
17 to 18.7	25	700–4,000	†	1,500 or more	†

* Time and Season apply to transmitting station. Distances specified are based on relatively high-power transmission and favourable conditions of reception.

† Ordinarily cannot be heard.

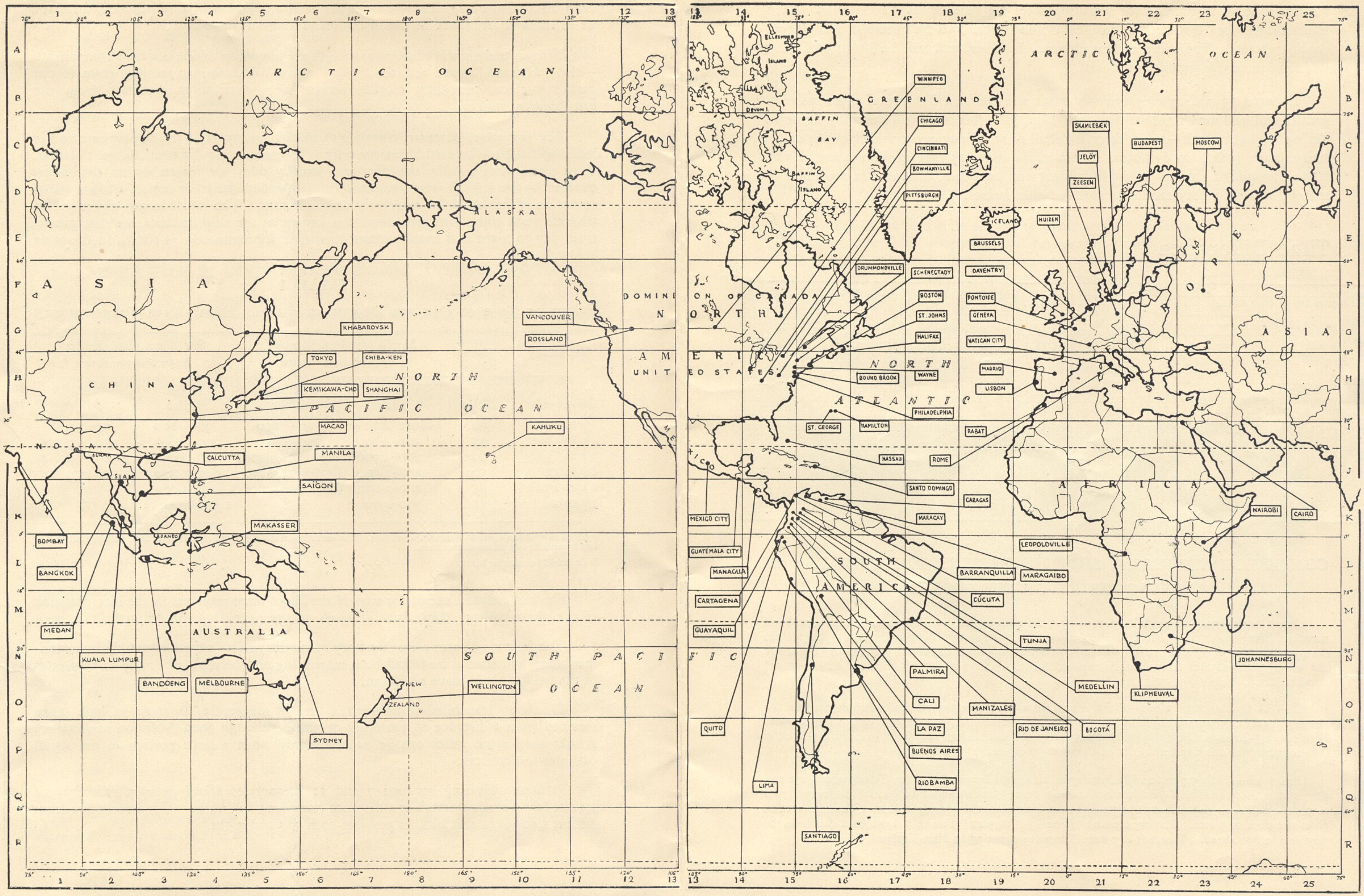
For the convenience of the user of the short-wave receivers in the interpretation of the above mileage data, there is given on the next page the Azimuthal Chart.

The following notes are a summary of extensive data compiled mainly by experimentation and should be found both interesting and helpful, especially to beginners in the field of short-wave reception.

Broadcast transmission between 5 and 7 megacycles is most reliable when received from a distance of 300 miles or more, although good reception at distances greater than 1,500 miles can be expected only when a large portion of the signal path lies in darkness.

Stations operating between 7 and 11 megacycles afford greatest reliability of service to receivers situated at a distance exceeding 800 miles. Good reception from distant stations in this band is possible both day and night.

PRINCIPAL SHORT-WAVE STATIONS



Reception from stations operating on the 12 megacycles band is most common when a span of 1,000 miles or more separates the receiver and transmitter. Such transmission over distances of less than 2,000 miles will be received best during daylight hours. The more distant stations, however, can still be heard well after midnight under favourable conditions.

Between 13 and 15 megacycles stations situated at a distance of 1,500 miles or greater will be found most satisfactory. Signals in this band will generally be heard during daylight hours—rarely after nightfall or when any appreciable portion of the transmission path is in darkness. Frequencies above 15 megacycles are useful only when transmitted entirely through daylight and over long distances (2,000 miles or more) ; ordinarily they cannot be received after sunset.

Time Difference

Aleutian Islands	6p	5p	4p	3p	2p	1p	12n	11a	10a	9a	8a	7a	6a	5a	4a	3a	2a	1a	12m	11p	10p	9p	8p	7p
Alaska. (Hawaiian Islands, less ½ hr.)	7p	6p	5p	4p	3p	2p	1p	12n	11a	10a	9a	8a	7a	6a	5a	4a	3a	2a	1a	12m	11p	10p	9p	8p
Yukon	8p	7p	6p	5p	4p	3p	2p	1p	12n	11a	10a	9a	8a	7a	6a	5a	4a	3a	2a	1a	12m	11p	10p	9p
Pacific Time, Canada and U.S.A.	9p	8p	7p	6p	5p	4p	3p	2p	1p	12n	11a	10a	9a	8a	7a	6a	5a	4a	3a	2a	1a	12m	11p	10p
Mountain Time, Canada and U.S.A.	10p	9p	8p	7p	6p	5p	4p	3p	2p	1p	12n	11a	10a	9a	8a	7a	6a	5a	4a	3a	2a	1a	12m	11p
Central Time, Canada and U.S.A.	11p	10p	9p	8p	7p	6p	5p	4p	3p	2p	1p	12n	11a	10a	9a	8a	7a	6a	5a	4a	3a	2a	1a	12m
Eastern Standard Time, Canada and U.S.A., Cuba	12m	11p	10p	9p	8p	7p	6p	5p	4p	3p	2p	1p	12n	11a	10a	9a	8a	7a	6a	5a	4a	3a	2a	1a
Atlantic Time, Canada, Argentine; (Venez. less ½ hr.)	1a	12m	11p	10p	9p	8p	7p	6p	5p	4p	3p	2p	1p	12n	11a	10a	9a	8a	7a	6a	5a	4a	3a	2a
Brazil	2a	1a	12m	11p	10p	9p	8p	7p	6p	5p	4p	3p	2p	1p	12n	11a	10a	9a	8a	7a	6a	5a	4a	3a
Azores Islands	3a	2a	1a	12m	11p	10p	9p	8p	7p	6p	5p	4p	3p	2p	1p	12n	11a	10a	9a	8a	7a	6a	5a	4a
Iceland, W. Africa, Canary Islands	4a	3a	2a	1a	12m	11p	10p	9p	8p	7p	6p	5p	4p	3p	2p	1p	12n	11a	10a	9a	8a	7a	6a	5a
England, France, Spain: (Holland add 20 min)	5a	4a	3a	2a	1a	12m	11p	10p	9p	8p	7p	6p	5p	4p	3p	2p	1p	12n	11a	10a	9a	8a	7a	6a
Norway, Sweden, Germany, Italy	6a	5a	4a	3a	2a	1a	12m	11p	10p	9p	8p	7p	6p	5p	4p	3p	2p	1p	12n	11a	10a	9a	8a	7a
Russia (Moscow), Egypt, S. Africa	7a	6a	5a	4a	3a	2a	1a	12m	11p	10p	9p	8p	7p	6p	5p	4p	3p	2p	1p	12n	11a	10a	9a	8a
Madagascar, Arabia, Abyssinia, Persia	8a	7a	6a	5a	4a	3a	2a	1a	12m	11p	10p	9p	8p	7p	6p	5p	4p	3p	2p	1p	12n	11a	10a	9a
Central Russia, Turkestan	9a	8a	7a	6a	5a	4a	3a	2a	1a	12m	11p	10p	9p	8p	7p	6p	5p	4p	3p	2p	1p	12n	11a	10a
India (add 30 min.)	10a	9a	8a	7a	6a	5a	4a	3a	2a	1a	12m	11p	10p	9p	8p	7p	6p	5p	4p	3p	2p	1p	12n	11a
Burma, Tibet, E. India (Calcutta)	11a	10a	9a	8a	7a	6a	5a	4a	3a	2a	1a	12m	11p	10p	9p	8p	7p	6p	5p	4p	3p	2p	1p	12n
Sumatra, (Java, add 20 min.)	12n	11a	10a	9a	8a	7a	6a	5a	4a	3a	2a	1a	12m	11p	10p	9p	8p	7p	6p	5p	4p	3p	2p	1p
China, West Australia	1p	12n	11a	10a	9a	8a	7a	6a	5a	4a	3a	2a	1a	12m	11p	10p	9p	8p	7p	6p	5p	4p	3p	2p
Japan, (Central Australia, add 30 min.)	2p	1p	12n	11a	10a	9a	8a	7a	6a	5a	4a	3a	2a	1a	12m	11p	10p	9p	8p	7p	6p	5p	4p	3p
East Australia, New Guinea	3p	2p	1p	12n	11a	10a	9a	8a	7a	6a	5a	4a	3a	2a	1a	12m	11p	10p	9p	8p	7p	6p	5p	4p
Solomon Islands, New Hebrides	4p	3p	2p	1p	12n	11a	10a	9a	8a	7a	6a	5a	4a	3a	2a	1a	12m	11p	10p	9p	8p	7p	6p	5p
New Zealand (less 30 min.)	5p	4p	3p	2p	1p	12n	11a	10a	9a	8a	7a	6a	5a	4a	3a	2a	1a	12m	11p	10p	9p	8p	7p	6p

CONVERSION TIME-TABLE SHOWING PRESENT TIME AND DAY IN ANY COUNTRY OF THE WORLD

Select horizontal line opposite the country in which you live (using particular time band mentioned for your locality), and move along this line to the nearest hour as shown by your watch, then move up or down the vertical column to the line opposite the country in which you desire the time. The figure at the intersection is the time required ("a" denotes A.M.; "p" denotes P.M.).

To find the day, the rule is—if when moving up or down the vertical column you pass the zig-zag line in an upward movement, the time indicated will be "yesterday," or one day behind. If in moving downward on the vertical column you cross the zig-zag line, the time indicated is "to-morrow" or one day ahead. If on daylight saving, subtract one hour.

Example.—If it's 5 p.m. on Wednesday in London (Greenwich Mean Time) what time and day is it in New Zealand? Follow horizontally along line marked "England" (in heavy type) to 5 p.m. and drop down from this point to the New Zealand horizontal line. The intersection gives the time as 5 a.m. Having crossed the heavy "zig-zag" line in a downward direction the time is one day ahead. Hence it is 5 a.m. Thursday morning in New Zealand.

Although reception on the short wavelengths is less affected by atmospherics, or static, and good results may be had in midsummer even during a thunderstorm, the reverse is true of man-made interference. Electrical machinery, such as trolleys, dial telephones, motors, electric fans, automobiles, aeroplanes, electrical appliances, flashing signs and oil burners, create far more interference to the shorter waves than to frequencies in the standard broadcast band (550 to 1,500 kc.).

While this brief discussion will be found to be generally applicable, many other factors may so influence the transmission of short waves that exceptions to it may occur in certain locations. Experience in the operation of short-wave receivers in a given location soon reveals what to expect in reception at various times.

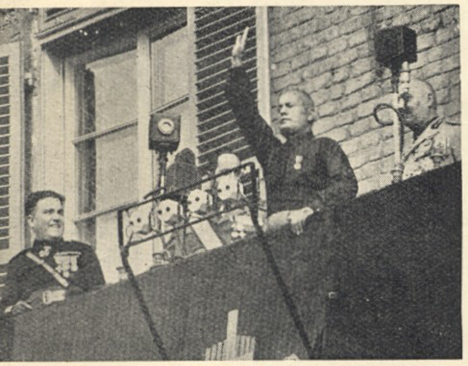
For specific information as to the programme schedules of these and other stations, the short-wave listener should consult those publications which are devoted to this subject. Data on the programme plans and the actual programmes of these stations is gathered by several national and international agencies and is available through a large number of publications.

For convenience in identifying stations, a list of the principal short-wave stations of the world in order of frequency will be found on page 16.

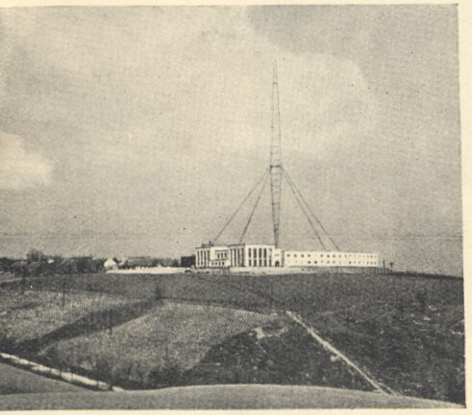
EMPIRE SHORT-WAVE TRANSMITTER AT DAVENTRY

HUNGARY

NORWAY



ITALY



GERMANY

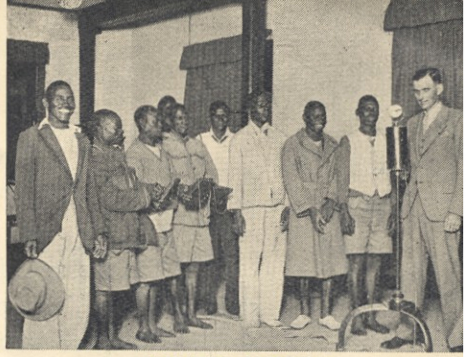
INTERNATIONAL CALL LETTERS

The identification of radio stations by means of a uniform type of signal was first provided for by an international conference in 1912, and though amended from time to time is still in effect fundamentally as originated. The signals adopted consist of from three to six letters, or of one or more letters and one or more numbers, the initial letters of which designate the nationality of the station.

Current assignments are as follows :

CA to CE	Chile
CF to CK	Canada
CL to CM	Cuba
CN	Morocco
CP	Bolivia
CR	Portuguese colonies
CS to CU	Portugal
CV	Rumania
CW to CX	Uruguay
D	Germany
EA to EH	Spain
EI	Irish Free State
EL	Liberia
EP to EQ	Persia
ES	Estonia
ET	Ethiopia
F	France and colonies
G	United Kingdom
HA	Hungary
HB	Switzerland
HC	Ecuador
HH	Haiti
HI	Dominican Republic
HJ to HK	Colombia
HR	Honduras
HS	Siam
HV	Vatican City
HZ	Hedjaz
I	Italy and colonies
J	Japan
K	United States
LA to LN	Norway
LO to LW	Argentina
LX	Luxembourg
LY	Lithuania
LZ	Bulgaria
OA to OC	Peru
OE	Austria

OF to OH	Finland
OK	Czechoslovakia
ON to OT	Belgium and colonies
OU to OZ	Denmark
PA to PI	Netherlands
PJ	Curacao
PK to PO	Netherland India
PP to PY	Brazil
PZ	Surinam
RA to RQ	Russia
SA to SM	Sweden
SP to SR	Poland
ST to SU	Egypt
SV to SZ	Greece
TA to TC	Turkey
TF	Iceland
TG	Guatemala
TI	Costa Rica
VA to VG	Canada
VH to VM	Australia
VO	Newfoundland
VP to VS	British colonies
VT to VW	British India
W	United States
XA to XF	Mexico
XG to XU	China
YA	Afghanistan
YI	Iraq
YJ	New Hebrides
YL	Latvia
YM	Danzig
YN	Nicaragua
YS	Salvador
YT to YU	Yugoslavia
YV to YW	Venezuela
ZA	Albania
ZK to ZM	New Zealand
ZP	Paraguay
ZS to ZU	Union of South Africa



SOUTH AFRICA

AUSTRALIA

JAPAN

U.S.A.

Short-Wave Broadcasting Stations

As for the specific radio stations which operate on the short-wave bands and which are, therefore, potentially available to the short-wave listener, the number of these stations and the additions and changes which are constantly being made to and in them are far too great to justify any attempt here of providing a complete listing of them. Such lists are, however, made available by a considerable number of publications and magazines which provide this as well as other information of interest to the short-wave listener. It will, however, be found of some value to list a few of the more commonly heard short-wave broadcasting stations, as below:

Partial List of Short-Wave Broadcasting Stations

Consult Newspapers and Radio Magazines for the latest Time Schedules of these Stations

EUROPE

	Location of Station	*Call Letters*	*Metres*	*(Philco Dial) Mega-cycles*
Belgium ..	.. Brussels	ORK	29.04	10.33
Denmark ..	.. Skamlebaek	OXY	49.50	6.06
France ..	.. Pontoise	TPA4	25.63	11.71
	,, ...	TPA3	25.27	11.88
	,, ...	TPA2	19.68	15.24
Germany ..	.. Zeesen	DJA	31.38	9.56
	,, ...	DJB	19.74	15.20
	,, ...	DJC	49.83	6.02
	,, ...	DJD	25.49	11.77
Great Britain	.. Daventry	GSA	49.59	6.05
	,, ...	GSB	31.55	9.51
	,, ...	GSC	31.32	9.58
	,, ...	GSD	25.53	11.75
	,, ...	GSE	25.29	11.86

EUROPE—*continued.*

	Location of Station	Call Letters	Metres	(Philco Dial) Mega-cycles
Great Britain ..	Daventry	GSF	19.82	15.14
	,, ...	GSG	16.86	17.79
	, ...	GSH	13.97	21.47
	,, ...	GSI	19.66	15.26
	,, ...	GSJ	13.93	21.53
	,, ...	GSL	49.15	6.10
Holland	Huizen	PHI	16.88	17.77
Hungary	Budapest	HAS3	19.52	15.37
Italy	Rome	2RO	31.13	9.64
	,, ...	2RO4	25.40	11.81
	Vatican City	HVJ	19.84	15.11
	,, ,, ...	HVJ	50.26	5.97
Norway	Jeloy	LKJI	31.48	9.53
Portugal	Lisbon	CT1AA	31.09	9.65
	,, ...	CT1CT	24.83	12.08
Soviet Union	Moscow	RAN	31.28	9.59
(Russia)	,, ...	RNE	25.00	12.00
	,, ...	RW59	50.00	6.00
	Khabarovsk	RV15	70.65	4.25
Spain	Madrid	EAQ	30.43	9.86
Switzerland ..	Geneva	HBJ	20.64	14.54
	,, ...	HBL	31.27	9.59
	,, ...	HBP	38.47	7.80

AFRICA

	Location of Station	Call Letters	Metres	(Philco Dial) Mega-cycles
Belgium Congo ..	Leopoldville	OPL	14.97	20.04
	,, ...	OPM	29.58	10.14
Egypt	Cairo	SUV	29.83	10.05
	,, ...	SUZ	21.70	13.83
Kenya Colony ..	Nairobi	VQ7LO	49.31	6.08
Morocco	Rabat	CNR	23.38	12.83
South Africa ..	Klipheuval	ZSS	15.88	18.89
Union of South Africa	Johannesburg	ZTJ	49.20	6.09

ASIA, AUSTRALIA AND SOUTH PACIFIC

China	Shanghai	XGW	28.79	10.42
	Macao	CQN	31.35	9.57
Dutch East Indies	Makasser	PNI	34.19	8.77
India	Bombay..	VUB	31.36	9.57
	Calcutta	VUC	49.10	6.11
Indo-China ..	Saigon	FZS	25.02	11.99
Japan	Kemikawa-Cho ..	JYS	30.40	9.87
	,, ..	JYK	22.06	13.60
	Nazaki	JVM	27.93	10.74
	,, ...	JVN	28.14	10.66
	Chiba-Ken	JYS	30.51	9.84
	,, ...	JYR	38.05	7.88
Java	Bandoeng	PMA	15.50	19.35
	,, ...	PLE	15.93	18.83
	,, ...	PMC	16.50	18.18
	,, ...	PLM	24.40	12.30

ASIA, AUSTRALIA AND SOUTH PACIFIC—*continued*

	Location of Station	Call Letters	Metres	(Philco Dial) Mega-cycles
Java	Bandoeng	PLP	27.25	11.00
	,,	PMN	29.25	10.26
	,,	PLV	31.86	9.42
	,,	PMY	58.30	5.15
Malay States	Kuala-Lumpur	ZGE	48.92	6.13
Philippine Islands	Manila	KAY	20.03	14.98
Siam	Bangkok	HS8PJ	15.79	19.00
Sumatra	Medan	YBG	28.80	10.40
Australia	Sydney	VK2ME-VLK	28.51	10.52
	,,	VK2ME-VLK	30.75	9.76
	,,	VK2ME	31.28	9.59
	Melbourne	VK3LR	31.31	9.58
	,,	VK3ME	31.55	9.51
New Zealand	Wellington	ZLT	27.15	11.05
Hawaii	Kahuku	KKP	18.71	16.04
	,,	KIO	25.63	11.71
	,,	KKH	39.89	7.52
	,,	KEQ	40.71	7.37

NORTH AMERICA

Bahamas	Nassau	ZFS	66.50	4.51
Bermuda	St. George	ZFD	29.04	10.33
	Hamilton	ZFB	29.83	10.05
	,,	ZFA	59.76	5.02

NORTH AMERICA—*continued.*

	Location of Station	Call Letters	Metres	(Philco Dial) Mega-cycles
Canada	Drummondville, Quebec	CGA4	32.15	9.33
	,, ,,	CGA3	22.58	13.28
	,, ,,	CGA8	61.15	4.90
	Winnipeg, Man. ..	CJRO	48.80	6.15
	,, ,, ..	CJRX	25.60	11.72
	Rossland, B.C. ..	CFU	52.97	5.66
	St. John's, Newfoundland	VE9BJ	49.26	6.09
	Vancouver, B.C. ..	VE9CS	49.40	6.07
	Halifax, Nova Scotia ..	VE9HX	48.92	6.13
	Bowmanville, Ont. ..	CRCX	49.22	6.09
Dominican Republic	Trujillo	HIZ	47.50	6.31
	,, ..	HIN	48.08	6.24
	,, ..	HIX	48.92	6.13
Guatemala.. ..	Guatemala City ..	TGF	20.71	14.48
	,, ,, ..	TGS	52.26	5.74
	,, ,, ..	TG2X	50.51	5.94
Mexico	Mexico City	XEXA	48.55	6.18
	,, ,, ...	XEBT	50.00	6.00
Nicaragua	Managua	YNA	20.71	14.48
United States ..	Boston, Mass.	W1XAL	49.67	6.04
	Millis, Boston, Mass. ..	W1XK	31.36	9.57
	Boston, Mass.	W1XAL	25.42	11.79
	Chicago, Ill.	W9XAA	49.34	6.08
	,, ,, ...	W9XF	49.18	6.10
	Cincinnati, Ohio ..	W8XAL	49.50	6.06

NORTH AMERICA—*continued.*

		Location of Station		Call Letters	Metres	(Philco Dial) Mega-cycles
U. S.	(New York)	Bound Brook, N.J.	..	W3XAL	16.87	17.78
	,,	,, ,, ,,	..	W3XAL	49.18	6.10
	,,	Wayne, N.J. ..	..	W2XE	19.64	15.27
	,,	,, ,, ..	..	W2XE	25.36	11.83
	,,	,, ,, ..	..	W2XE	49.02	6.12
		Philadelphia, Pa.	..	W3XAU	31.28	9.59
		,, ,,	..	W3XAU	49.50	6.06
		Pittsburgh, Pa.	..	W8XK	48.86	6.14
		,, ,,	..	W8XK	25.27	11.87
		,, ,,	..	W8XK	19.71	15.21
		,, ,,	..	W8XK	13.92	21.54
		Schenectady, N.Y.	..	W2XAD	19.56	15.33
		,, ,,	..	W2XAF	31.48	9.53

SOUTH AMERICA

Argentina ..	..	Buenos Aires ..	..	LSL	14.17	21.16
		,, ,, ..	..	LSN	14.27	21.03
		,, ,, ..	..	LSL	19.02	15.81
		,, ,, ..	..	LSN	20.65	14.53
		,, ,, ..	..	LRX	31.06	9.66
		,, ,, ..	..	LSN	30.30	9.90
Bolivia ..	..	La Paz	..	CP7	19.61	15.29
		,, ...	..	CP6	32.88	9.12
		,, ...	..	CP5	4.93	60.8
Brazil ..	..	Rio de Janeiro ..	..	PSA	14.23	21.08

SOUTH AMERICA—*continued.*

	Location of Station	Call Letters	Metres	(Philco Dial) Mega-cycles
Brazil	Rio de Janeiro	PSF	20.42	14.69
	,, ,, ...	PSH	29.45	10.22
	,, ,, ...	PSK	36.65	8.19
Chile	Santiago	CEC	15.24	19.69
	,, ...	CEC	18.91	15.86
	,, ...	CEC	28.12	10.67
Colombia	Palmira..	HJ5ABH	32.02	9.37
	Bogota	HKE	41.55	7.22
	,, ...	HJ3ABF	48.62	6.17
	,, ...	HJ3ABD	49.55	6.05
	Manizales	HJ4ABB	49.15	6.10
	Cartagena	HJ1ABE	31.58	9.50
	Cali	HJ5ABD	49.30	6.08
	Barranquilla	HJ1ABB	46.51	6.45
	Cucuta	HJ2ABC	31.35	9.57
	Medellin	HJ4ABE	49.25	6.09
	Tunja	HJ2ABA	48.60	6.17
Ecuador	Riobamba	PRADO	45.31	6.62
	Quito	HCJB	33.50	8.95
	,, ...	HCJB	50.93	5.89
	Guayaquil	HC2RL	45.00	6.67
Peru	Lima	OCI	16.06	18.68

SOUTH AMERICA—*continued.*

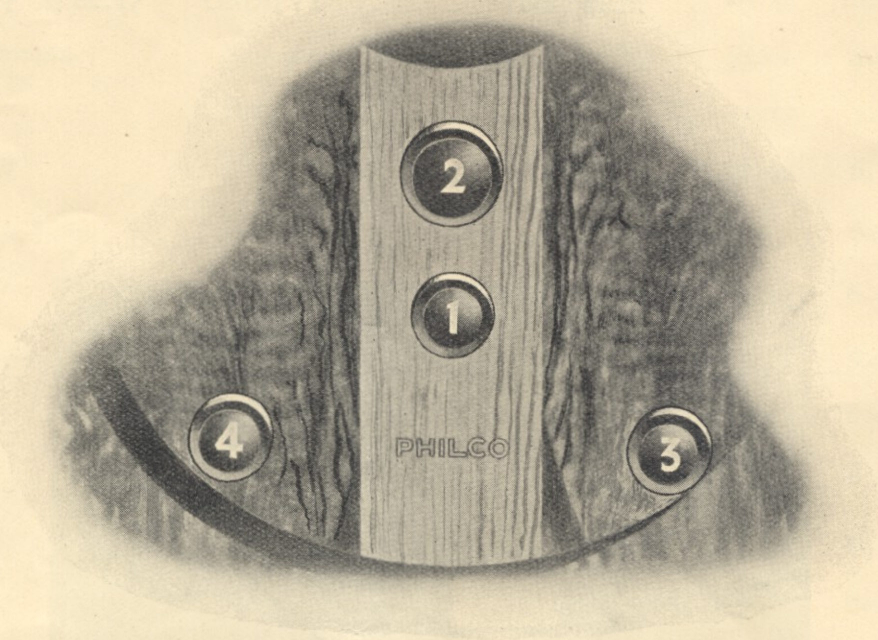
	Location of Station	Call Letters	Metres	(Philco Dial) Mega-cycles
Peru	Lima	OCI	16.06	18.68
	,,	OCI	27.35	10.97
Venezuela	Maracay	YVQ	22.48	13.35
	,,	YVQ	44.96	6.67
	Caracas	YV3RC	48.70	6.16
	,,	YV4RC	47.10	6.37
	Maracaibo	YV5RMO	51.28	5.85

FIJI'S ONLY BROADCAST STATION

Tuning to the Short Waves

The following hints on operating a short-wave receiver will apply to all Philco All-Wave sets and if followed carefully will enable you to obtain the greatest entertainment from your receiver.

1. **Band Switch.** This control provides for the choosing of the band of frequencies to which the receiver is sensitive so as to include the frequency at



which the desired programme is being transmitted. Markings will be found on the main indicator scale of the receiver showing what frequency bands are receivable at any setting of the *band switch.*

2. **Station Selector.** This control is that one which causes the main indicator dial to move so as to indicate on the scale of the receiver the specific frequency to which it is tuned. It is provided with the means for moving the dial or pointer quickly or slowly at the operator's will and, in tuning stations, the rapid motion is employed only for arriving at the approximate adjustment

of the indicator, while the slow or vernier motion is employed to provide the precise adjustment absolutely requisite for good programme reception.

3. Volume Control. This control is that one which allows the operator of the receiver to increase or decrease the sound volume with which the programme is being received. It should, however, be noted that *all* Philco All-Wave receivers are equipped with an unseen and automatically operating volume control that tends to bring in all programmes at the same volume and that the manually operated *Volume Control* has for its major function merely the accommodation of the volume of all programmes to the general level at which it is desired to receive them. But, additionally, it provides also for adjustment of the volume of the extraneous sounds which sometimes accompany the operation of the tuning of short wave receivers.

4. Tone Control. This control is that which provides for the control of the general tone colour of the programme being received. It provides either for emphasising the lower tones of the music and speech to give the mellowness which is preferred by many, or for emphasising the high tones and thus give music brilliance, and speech the greater clarity required for most faithful reproduction. It serves, secondarily, for reducing the troublesome effect of extraneous and disturbing signals and noises which may accompany the operation of the short wave radio receiver.

Having identified these several controls and having put the short wave receiver in operation, as is indicated by the illumination of the indicating scale or dial, several operations follow :

First, the *Band Switch* is so set that the frequency range in which the receiver is operating includes the frequency of the desired programme. Then the *Station Selector* is rotated until it is approximately set at the frequency of the desired programme. During this process, it will usually be found desirable to have the *Volume Control* so adjusted that such undesired signals as are heard are not so loud as to annoy the operator or others who may be listening. When the desired programme is heard the *Station Selector* should then be slowly adjusted back and forth through the desired programme, and finally set as precisely as possible at the mid-position. Where a shadow tuning indicator is provided in the receiver, the shadow should be at its narrowest point. After this the *Volume Control* is readjusted to give the desired volume of sound and, if any specific and different tone colour in the programme is desired, the tone control may then be adjusted to suit.

This, in brief, is the process of adjusting the short wave receiver to the desired programme. A few words of caution, however, should be added.

It will be found that every control with which the radio receiver is provided will serve to change the apparent volume of the programme ; that is, not only will the *Volume Control* make the programme louder or weaker, but so will the adjustment of the *Station Selector*, the *Tone Control* and such other controls as may be included in the receiver. Unless, however, only the *Volume Control* is employed for securing the desired volume and the other controls adjusted to perform their own particular functions, the best of programme reception cannot be obtained.

More specifically, on this point it will be found, for instance, that as the *Station Selector* is adjusted, minor departures in either direction from the position in which the signal is loudest will give markedly lower volume and there is thus always a tendency to adjust this control to that volume which is most suitable. Such a procedure, however, does much to make impossible the best programme reception. Not only does the misadjustment of the *Station Selector* result in the possibility of interference from other and undesired signals and stations, but it results in the introduction of extraneous sounds such as rushing noises and the like and, additionally, seriously modifies the tone quality of the station being received. In fact, this tone distortion may be employed as a convenient indicator of the proper setting of the *Station Selector*. Thus, as the *Station Selector* is moved back and forth in the tuning region of the desired programme, it will be noted that at its mid-position and at the position at which it is properly set, the low tones and the general mellowness of the programme is greatest, while at either side-position the high tones are heard to be emphasised along with the introduction of a gentle hiss, and a high pitch character is given to any noises that may be present. And so, to arrive at the proper adjustment of the *Station Selector* it will often be found convenient to rotate it back and forth in the tuning region of the desired programme, noting the two positions for the hiss or noise or high-toned reception and then to set it finally between these two symmetrical positions of mistuning.

Once this position has been arrived at, the adjustment of *Tone Control* and *Volume Control* can then and only then be made if best possible programme reception is to be obtained.

Several of the characteristic phenomena commonly occurring in the reception of short wave signals should be noted. In the first place, all very long-distance signals come to the listener not directly over the surface of the earth but by reflection from the upper atmosphere, as was pointed out previously. The intensity of these signals is, therefore, largely influenced by any changes which may take place in the position and other characteristics of the upper atmosphere. And, indeed, the changes of this medium occur so continuously as to result in continually changing signals. The Philco All-Wave receiver by details of its design and construction provides for correcting this constantly changing condition in a very large degree. However, on occasions, even the wide range of effectiveness of the Philco full automatic volume control is insufficient to accommodate the tremendous change of transmission effectiveness of the medium and the signal slowly "fades" in audibility. There is nothing that the listener can do to minimise this condition that has not already been done in the design of the radio receiver. It is best merely to await the restoration of the signal to its previous level.

It will further be noted that characteristic squeals or humming or singing tones will occasionally be heard to accompany the desired programme. In general, these are the result of the fact that stations all over the world employ the short waves for their long-distance broadcasting and general communications, with the resultant great difficulty in so co-ordinating them as to avoid the interferences which result in the squeals, howls, &c. No preventive for the difficulties of this situation can ever be provided in a radio receiver and the listener can do little other than to reduce the degree of interference by adjustment of the *Tone Control*, if the squeal or howl is of extremely high pitch, or to await the completion of the fading period in which the interference may be making itself heard.

Both of these undesirable phenomena will be found to associate themselves in widely varying degrees with different stations and experience will soon indicate those which are freest from them and indicate those which will thus give the best programme reception.

HUDSON & KEARNS LTD., LONDON, S.E.1.

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