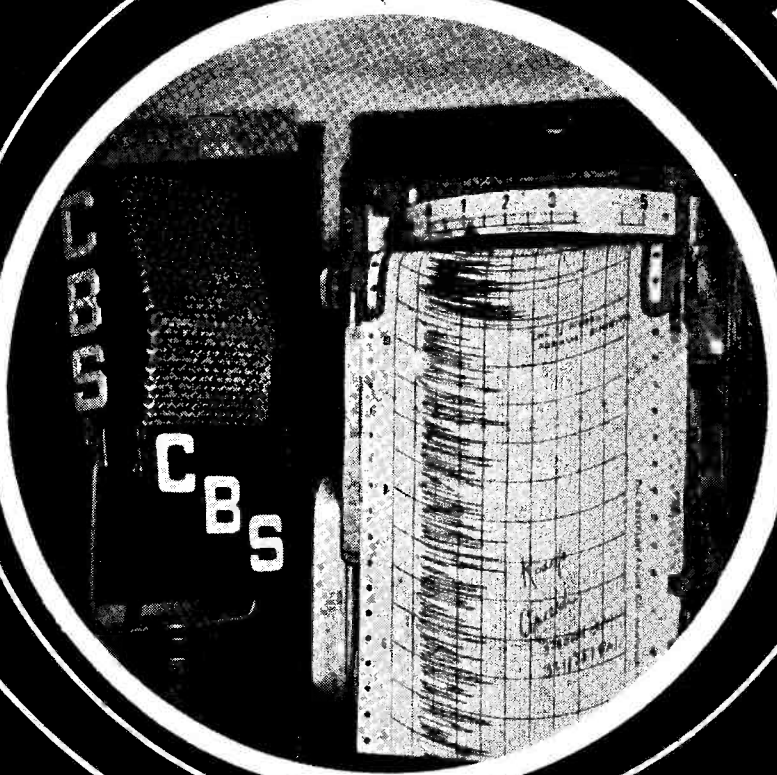
The SHORT-WAVE MAGAZINE

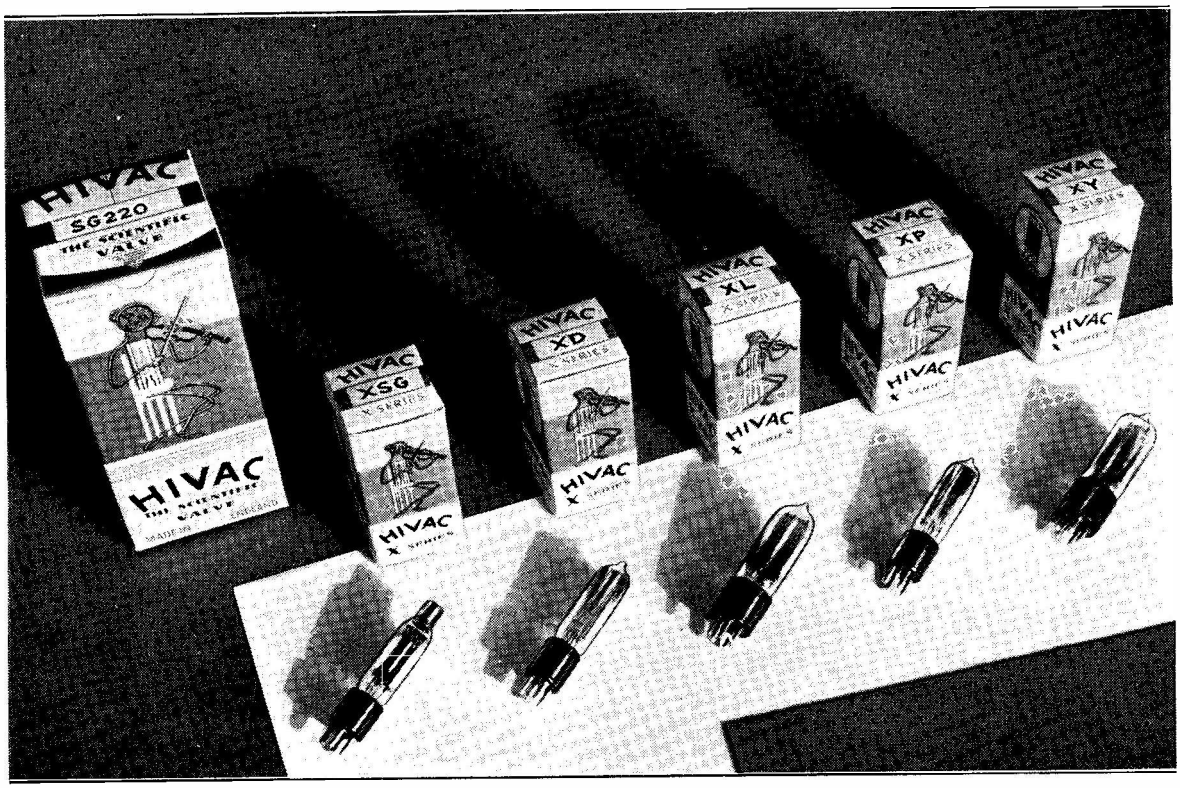
6D



No. 5

JULY, 1937

Cover photo shows a recording of H.M. King George VI's voice (see page 5).



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to any problem relating to short-wave radio is offered free to our readers. All enquiries must be sent with the coupon cut from page 40 and addressed to "The Editor, The Short-Wave Magazine, 84-86 Tabernacle Street, London, E.C.2." Problems considered of sufficient general interest will be published. A stamped addressed envelope must accompany all correspondence.

THE SHORT-WAVE MAGAZINE

Vol. 1 JULY 1937 No. 5

Editor . BASIL WARDMAN (G5GQ) Editorial Asst.: S. W. CLARK
Advertisement Manager : C. T. MILDENHALL

MAINLY APPRECIATION

Custom dictates that the editorial page should be dignified, but after attempting this for the past four months we are going to descend to lower levels and become human instead of pedantic.

This short-wave hobby of ours is such a friendly one. Correspondents write to us beginning with "Dear Sir" and ending up with "Old man," treating us more as friends and fellow enthusiasts rather than as an impersonal magazine.

Frankly, we like this spirit, because we are enthusiasts. After a day at the office, doing radio work for the magazine, I turn on the radio for relaxation, perhaps listening, or turning on the transmitter to have a talk with other enthusiasts. As often as not my telephone rings and there will be our assistant editor, also in search of relaxation, commenting favourably or otherwise on the transmission. Many a time I have known him to stay with me till the early hours of the morning trying out some new receiver or transmitter, purely for the love of the hobby.

Maybe we are wrong, but we value this personal feeling that exists between our readers and ourselves above everything. When we are treated as friends we feel that mutual understanding and co-operation exists, and that our editorial policy does meet with approval.

To us radio is more of a hobby than a business. We visit radio societies and other enthusiasts, trying to understand what is required of us. We want to give our readers the features they desire, not those we think they should.

Of course it is difficult to satisfy all tastes, but we do try. Examine any number and count up the articles. It's pretty high, but it does ensure that there are some features to appeal to all. To turn out this number every month means that space is valuable, superfluous words must be avoided. The large number of articles means far higher expense to us than if we increased the size of the paper and published fewer, but wordier material, as is more usually done. Each one of these articles has to be prepared, selected and edited, entailing an immense amount of work.

We seem to have wandered somewhat, but the point is we really do appreciate the friendly letters and suggestions we receive.

And so, whether you write us as "Dear Sir," or "Dear O.M.," we thank you, and hope that you will continue to regard us as friends and fellow enthusiasts.

CONTENTS

Contributions for publication in our editorial pages will be given consideration and payment will be made for matter used. Only manuscript accompanied by a stamped, addressed envelope will be returned. Whilst we are willing to advise on suggested articles no guarantee of acceptance can be given.

The publisher does not necessarily agree with the views expressed by all correspondents and contributors, the aim being to open the columns to every phase of opinion.

Annual subscription—Inland, 8s.; Abroad, 10s. Post paid. Published on the first of each month at 84/86 Tabernacle Street, London, E.C.2. 'Phone : Clerkenwell 6230.

"The Glamour of the East"

Japanese Broadcasting is Reviewed in this Article

JAPANESE CUSTOMS, music, language, all so different to those of the West—almost another world—but now brought to our homes through the medium of the Japanese short-wave stations, JVM and JZJ.

Here in Europe we are used to Government control of broadcasting, and are apt to think that only in our continent is broadcasting really done well. Most of us look down on America because of their sponsored broadcast system, and as for Asia, well, we think that there are just a few small stations serving a few meagre thousands of listeners.

But such is not the truth. In Japan there are nearly 3,000,000 licences issued, served by no fewer than 41 medium-wave broadcast stations, while four high-power short-wavers carry the programmes to all parts of the world.

Four separate corporations control broadcasting in the Japanese Empire, these being: the Nippon Hoso Kyokai, in Japan proper (The Broadcasting Corporation of Japan); the Chosen Hoso Kyokai (The Broadcasting Corporation of Chosen) in Chosen; The Taiwan Hoso Kyotai (Taiwan Broadcasting Corporation) in Taiwan, and The Manchurian Telegraph and Telephone Company in Manchuokuo; and between all these companies working agreements are in existence.

Broadcasting in Japan commenced in 1925. On March 22nd of that year the experimental station JOAK at Tokyo was opened, this station being followed within a few months by JOBK at Osaka and JOCK at Nagoya. In August 1926, the Broadcasting Corporation of Japan was formed under government supervision, acquiring the three stations JOAK, JOBK, and JOCK.

Others were opened by different companies until, in 1934, the government passed an act by which all were taken over by The Broadcasting Corporation of Japan.

● Licence Fees

Listeners in Japan obtain licences by signing an agreement with the Broadcasting Corporation. The charge for this is an initial fee of 1 yen (approximately 1s. 2d.) followed by a subscription of 50 sen per month (approximately 7d.).

The application forms for licences are rather more involved than those here, as the applicant must specify the type of receiver he intends to use, and also his profession or occupation. By this means the Corporation is able to estimate the power required by each station and also the type of programme most suitable for each locality.

An interesting feature of Japanese licensing is that every listener is issued with a metal plate which he is required to place in a prominent position in front of his house to indicate that he has paid his fee!

Licences are not only obtainable from the Corporation and from post offices but also from dealers and electricity supply companies, who actually handle the bulk of the licences.

Manufacturers of receivers or parts may submit them to the Corporation for approval, and this has been taken advantage of by many.

Mains receivers are in almost general use, the percentage being 96% compared with 3% for battery and 1% for crystal sets.

● Relay Systems

As is to be expected most of the listeners are in thickly-populated areas, and so in the poorer country districts a relay service operates. In this system a special receiver is installed in the house of a listener in a village, and from this receiver extension lines are run to the houses of other subscribers, the cost of the service thus being reduced considerably.

● Short-Wave Stations

Last year experimental transmissions were started from certain Japanese short-wave stations, and so successful were these tests that a regular service was begun on January 1st of this year. Four transmitters, each of 20 kw. output are now in regular use, the schedules being:—

TRANSMISSION 1.

Directed to Europe, British Isles, and N.W. Africa. Daily, 19.30—20.30 G.M.T.

JVM 10,740 kc., 27.93 metres.
JZJ 11,800 kc., 25.42 metres.

TRANSMISSION 2.

Directed to the East Coast of North America and South America. Daily, 21.00—22.00 G.M.T.

JVN 10,660 kc., 28.14 metres.
JZJ 11,800 kc., 25.42 metres.

TRANSMISSION 3.

Directed to the West Coast of North America and Hawaii. Daily, 05.00—06.00 G.M.T.

JZJ 11,800 kc., 25.42 metres.

TRANSMISSION 4.

Directed to the South Seas, Straits Settlements, Dutch East Indies, South China, Siam, Philippine Islands, and Australia. Daily, 14.00—15.00 G.M.T.

JZI 9,535 kc., 31.46 metres.
JZJ 11,800 kc., 25.42 metres.

Announcements are always made in English in all transmissions.

Greatly improved reception is anticipated when new transmitters with a power of 50 kw. are put into service. These are at present under construction and it is hoped will be in use during this year.

● Medium Wave Stations

DX listeners who would like to try their luck on the medium waves will no doubt be interested in the latest list of Japanese medium-wave stations.

Kilocycles.	Kilowatts.	Stations.	
590	10.0	JOAK	Tokyo, No. 1.
610	3.0	JOJK	Kanazawa
630	0.5	JOKK	Okayama
640	0.5	JODG	Hamamatsu
650	0.3	JOUK	Akita
670	0.5	JOTK	Matsuye
680	0.5	JOVK	Hakodate
690	10.0	JOBK	Osaka, No. 1.
700	0.3	JOCG	Asahikawa
720	0.5	JORK	Kochi
730	10.0	JOCK	Nagoya, No. 1.
740	1.0	JOSK	Kokura
770	10.0	JOHK	Sendai
780	0.5	JOPK	Shizuoka
790	10.0	JOGK	Kumamoto
810	10.0	JOIK	Sapporo
830	10.0	JOFK	Hiroshima
870	10.0	JOAK	Tokyo, No. 2.
890	0.5	JOLG	Tottori
910	0.5	JOLK	Fukuoka
920	0.5	JOQK	Niigata
930	0.5	JOAG	Nagasaki
940	10.0	JOBK	Osaka, No. 2.
950	0.5	JOOG	Obihiro
980	0.5	JOXK	Tokushima
990	10.0	JOCK	Nagoya, No. 2.
1000	0.5	JOBG	Mayebashi
1020	0.3	JOFG	Fukui
1040	0.5	JONK	Nagano
1050	0.5	JOHG	Kagoshima
1060	0.5	JOIG	Toyama
1070	0.3	JOOK	Kyoto
1080	0.5	JOJG	Yamagata
710	10.0	JODK	Keijo, No. 1 (Chosen)
820	0.5	JBBK	Heijo, No. 1 (Chosen)
970	50.0	JODK	Keijo, No. 2 (Chosen)
1030	0.25	JBAK	Fusan (Chosen)
1090	0.5	JBBK	Heijo., No. 2 (Chosen)
580	1.0	JFCK	Taichu (Taiwan)
720	1.0	JFBK	Tainan (Taiwan)
750	10.0	JFAK	Taihoku (Taiwan)

● Japanese Music

Short-wave enthusiasts who have listened to JVJ or JVM will have noticed that both Oriental and European music is included in the programmes, and will no doubt be interested in some details of the native music which they hear. The oldest traditional music of Japan is called the "Gagaku," which means "graceful music," played by an orchestra consisting of wood wind, string, and percussion instruments. This type originated in China, becoming popular in Japan about 450 A.D. Although it has long died out in China, in Japan it became the royal music, until recently played only in the Imperial palaces.

Another type is the "Yokyoku," a branch of the Gagaku. The yokyoku is the music of the Noh play, and consists of recitation to music. This is also of ancient origin, dating from the end of the fourteenth century, and was mainly played in the homes of the samurai, or knightly families.

Koto music is the music of the fair sex. The koto is a string instrument about six feet long and a foot wide, having thirteen strings tuned by movable bridges, and is played by three fingers of the right hand, on which are ivory plectra. In tone the koto is not unlike a harp.

The "Samisen" is the most generally used musical instrument, somewhat like a banjo in appearance, but the soundbox is square and is covered with cat skin. Three strings are used and are played with a plectrum.

The extraordinary wailing music so often heard is made by what is called a "Shakuhachi," which is a form of flute, eighteen inches long, and is played not only by means of stopping up the holes but also by the player altering the angle of his lips to the mouthpiece.

H.M. KING GEORGE'S VOICE

The voice of the newly-crowned King, speaking from Buckingham Palace to the peoples of the Empire, is graphically recorded on our cover. Beginning at 8.03 p.m. with his opening words, "It is with a full heart that I speak to you to-night," and continuing to 8.11 p.m. when he concluded, "I thank you from the bottom of my heart. May God bless you all!"

The King's voice was transmitted by short wave across the Atlantic to millions of American listeners by the Columbia Broadcasting System in co-operation with the B.B.C.

The chart shown moves downwards as the recording stylus moves from left to right during the broadcast. The wavy lines represent the peaks and fluctuations of the King's voice as he expressed his gratitude for the demonstrations of loyalty tendered him and the Queen and pledged unswerving service to his subjects throughout the Empire.

The device, known as a recording volume indicator, is located in the master control room of the C.B.S. and records voice fluctuations in decibels, or sound-volume units.

"H.A.S."

Heard **and verified** all States in the U.S.A. on 'phone

By (BOB) R. D. EVERARD

To ACCOMPLISH the above is no mean feat even in these days of high-powered phones. The State of Nevada is the chief stumbling block. (The writer himself has no Nevada "veries" yet, but has lately logged W6BIC and is also on the trail of another Nevada phone—a portable in South Nevada, call sign at present not identified.)

Now, let us review the "W" Districts Nos. 1-9. W1 DISTRICT takes in the states of Maine, Massachusetts, New Hampshire, Vermont, Rhode Island and Connecticut. By far the most commonly heard are those from Massachusetts. Next comes Connecticut and Rhode Island, but phones from Maine (and New Hampshire and Vermont in particular) are quite decent "catches," owing to the rather more scattered population.

W2 DISTRICT, consisting of various counties in New York and New Jersey are easy to log.

W3 DISTRICT, which includes the States of Pennsylvania (South of Blue Mountains) and Delaware, parts of New Jersey not in W2 District, Maryland, Virginia and part of Columbia. Of these phones those from New Jersey and Pennsylvania are by far the commonest, although a number can also be heard from Maryland and the others, but these are rather better catches, especially those from the smaller towns.

W4 DISTRICT.—The States of North and South Carolina, Georgia, Tennessee, Florida and Alabama (and K4, Porto Rico and Virgin Islands). This district is a little more real DX than Nos. 1-3. Phones from North Carolina are most common, but South Carolina phones are not nearly so often heard. Phones from Florida and Georgia are also quite often heard, but those of Tennessee and Alabama are somewhat scarcer. Phones from the *smaller* towns in above states are worth-while catches, whilst Virgin Isles and Porto Rico are scarce, though 1 to 3 of above have been heard.

W5 DISTRICT comprises the States of Mississippi, Texas, Oklahoma, New Mexico, Louisiana and Arkansas. This really starts the "big three" of W district DX reception. Those phones from Texas being easily heard owing to its size, whilst phones from New Mexico and Arkansas are certainly the scarcest of this district. Although Louisiana phones are distinctly good stuff, those from Mississippi are heard a little oftener.

W6 DISTRICT ("the home of the Californian Kilowatt!"), the second of the big DX three. California phones are quite often logged when conditions are right (the writer has 174 verified) but Utah and Arizona are rarely logged. (I have only two veries from each.) Phones from Hawaii are fairly easily logged but those from Samoa, Guam and Midway Island have yet to be logged, and thus remain an unknown quantity.

W7 DISTRICT, embracing the States of Oregon, Idaho, Washington, Montana and Wyoming (and K7, Alaska). This district without doubt is the hardest of any W district to log (I have only 26 "veries.") Oregon seems to be the commonest, followed by Washington, but Montana, Wyoming and Idaho are rather scarcer, whilst phones from Alaska are distinctly rare. Any W7 phone is worth logging.

W8 DISTRICT, which includes all counties of New York not in No. 2, all Pennsylvania not in W3, lower peninsula of Michigan, Ohio and West Virginia. Phones from Ohio, Michigan, Pennsylvania and New York States are quite easily logged, though many phones from smaller towns in these States are well worth logging. Phones from West Virginia, however, are much less common.

W9 DISTRICT, covering the States of Illinois, Indiana, Iowa, North and South Dakota, Nebraska, Kentucky, Kansas, Colorado, Missouri, Wisconsin, Minnesota and Upper Michigan. Illinois is the most common, but phones from North and South Dakota, Nebraska and Upper Michigan are very good catches indeed. Colorado phones are slightly more common, but any outside of large towns in Kentucky, Iowa, Missouri, and other W9 States are quite decent catches.

In conclusion, to those who have waded thus far, I wish all the best of luck in landing that H.A.S. verification and hope that Nevada "veri" comes along *and soon*.

FOR SCOUT LISTENERS

The American Radio Relay League advise us that amateur radio will be used at the International Scout Jambouree to the held at Washington, D.C., from June 30 till July 9.

W2SN and W2IOP will be handling traffic on 3.5 mc. during this period, and scout listeners will no doubt be interested to look for them on this band.

Ultra Short-Wave News

By LESLIE W. ORTON

TEN METRE American experimental stations may be recognised by their calls. If you pick up a station with a call starting with "W," a figure and "X" followed by other letters, you can know that you are listening to a station that is not an amateur. It may be police, broadcast or what is termed experimental.

A few such experimental stations are W1XK, Boston, on 41 mc.; CRCX, Bowmanville, on 24.3 mc., etc., etc.

Ultra short-wave broadcasters are readily picked up in this country when conditions are favourable and two of the best heard are W6XKG, Los Angeles and W9XAZ, Milwaukee.

The former broadcasts a twenty-four hour programme and is consequently always there to be searched for. He operates on 25.9 mc. and his programmes consist of gramophone records, local advertisements and relays of KGFJ—quite an entertaining selection.

W9XAZ (the Z is pronounced as "Zee") is operated by the *Milwaukee Journal*. The best times to search for this station are around 6 p.m. His actual schedule is from 6 p.m. to 5 a.m. He generally relays WTMJ on 26.4 mc. with a power of 500 watts.

Another popular broadcaster is W3XKA at Philadelphia. Search for him on 31.6 mc. (or 9.494 metres, if you prefer) between 2 and 4 p.m. He relays the National Broadcasting Company programme and may often be heard relaying KYW.

● A Full Band

Other stations operating upon 31.6 mc. (or 9.494 metres) are W1XKA, Springfield, which relays WBZA from 11.30 a.m. to 6 p.m. daily; W2XDV, Wayne, which operates during the afternoons, relaying WABC; W3XEY, Baltimore, etc.

The last mentioned is probably one of the best heard 9.494 metre stations. Search for him around 3 p.m. He relays WFBR.

Many medium-wave broadcasters have ultra- (as well as short-) wave relays and you will find W4XCH relaying WMC during the afternoons.

KDKA is relayed by W8XKA from 8 p.m. to 4 a.m. and WHAM by W8XAI, Rochester, from 12.30 p.m. to 5 a.m.

A more complicated schedule is adhered to by W8XWJ who relays WWJ, Detroit. The schedule of this station is as follows:—Sundays from 7.30 p.m. to 12.30 a.m. and from 11.55 a.m. to 5.30 p.m. Daily from 7 to 10 p.m.

W9XHW, Minneapolis, relays WCCO at the following times:—Mondays to Fridays from 12.15 p.m. to 3 p.m., and Saturdays from 9 to 5 a.m. On Sundays transmissions are made between 2 and 3 p.m.

W9XJL, Wisconsin, relays WEBC during the afternoons and W9XPD broadcasts programmes from KSD, St. Louis, from 2 p.m. to 6 a.m.

BOOK REVIEW

ELECTROLYTIC CONDENSERS, THEIR PROPERTIES, DESIGN, AND PRACTICAL USES

By Philip R. Coursey, B.Sc., M.I.E.E., F.Inst.P., etc. Technical Director, Dubilier Condenser Co., Ltd., London. Publishers: Chapman and Hall, Ltd. 172 pp., price 10s. 6d.

THOSE EXPERIMENTERS who were interested in wireless 14 years ago will recall trying to make their own electrolytic condensers out of jam-jars containing ammonium phosphate with electrodes of aluminium and lead. Mica and paper condensers were then the only types available, the commercial electrolytic condenser for radio having yet to make an appearance.

Since then the electrolytic condenser has come into almost universal use for voltages up to 450, its small size and cost, combined with high capacity giving it an advantage over all others for many purposes.

Mr. Coursey, in "Electrolytic Condensers," tells us first of all something of the theory of all types of condenser. Turning to the electrolytic he deals first with its history, dating back to the last century, and then to its commercial development and the difficuties involved in manufacture. When one stops to consider these little cans and to realise that there is the negative container, then the anode consisting of metal foil on which a dieletric film is electrolytically formed, and finally a wet or dry electrolyte, some idea of these commercial difficulties may be obtained. This interesting book shows the various methods of obtaining the maximum electrode surface area in a small space, while at the same time maintaining inter-electrode insulation and mechanical rigidity. Innumerable diagrams illustrate the various systems used.

The relative merits of wet and dry electrodes are discussed very fully, and the book concludes with chapters on "Electrical Properties" and "Applications."

Summing up, the work is a very complete handbook on the theory, design, and use of electrolytic condensers, essentially simple yet thorough in treatment, the first to be published on this subject, and should prope of invaluable assistance to all users of these components.

RADIO AMATEUR OPERATORS REVEAL HEROIC WORK

Story behind award of C.B.S. Trophy to Walter Stiles

AMATEUR RADIO enthusiasts, who prefer their self-applied nickname of "hams," have played major parts in alleviating suffering in more than forty disasters in America and Canada since 1919, besides extraordinary contributions to science through improvement of radio and as operators on exploring expeditions.

Probably the brightest chapter in the "history of hams" was supplied when floods ravaged the Alleghany River Valley recently, by young Walter Stiles, of Coudersport, Pa., now 24 years of age. For bravery in this emergency Stiles won the first annual William S. Paley Amateur Radio Award. The presentation ceremonies were broadcast on the WABC—Columbia network on May 24.

● A Call for Help

When the Alleghany River reached the flood stage at Coudersport Stiles, employed as an electrician on the Pennsylvania Railroad, decided that a major flood emergency was in the making and went home to get his portable radio equipment ready for action. In the meantime, he pitched into the work of handling flood calls from various points in the flood area over his permanent station. He continued taking routine flood messages until 9.30 the next morning when a desperate call came from an amateur station near Renova.

Renova was isolated, its 4,000 citizens badly needed food, clothing and medical supplies. Stiles jotted down the message, tried to phone it in to the Governor's office at Harrisburg. The telephone lines were down. So Stiles struck out on his own to rush aid to Renova. The Coudersport Red Cross met hurriedly, started at once collecting necessary supplies. The local camp gave Stiles a truck and a crew to transport supplies and W8DPY's emergency equipment. At six o'clock that evening they started off.

● An Eleven-hour Hazard

The 68 miles of dirt road from Coudersport to Renova skirt the river all the way. Few who watched the rescue crew depart from Coudersport expected them to reach their destination. For miles the road was covered over with flood waters. Bridges were out. Washouts threatened from below; land-slides from overhead. Temporary roads had to be dug out of the mountain sides. Yet by 1.30 the next morning the amateur radio crew had reached a point only five miles from the stricken town.

There a mountain landslide had washed the road ahead into the river. Stiles got out of the truck, removed his clothing, and plunged into the swift, cold current to seek a possible footing for transporting supplies and radio equipment on the backs

The power, speed and grace of radio impulses cast off from the primal force of electricity are symbolized in the William S. Paley Amateur Radio Award trophy, designed by Alexander Calder, internationally known American sculptor. The Award has been bestowed upon Walter Stiles, for heroic flood work.

The base of the trophy is cast in stainless steel to represent elemental electricity in the shape of a lightning bolt. The wire designs stemming out from the base represent radio impulses being hurled out into space. Stiles, recipient of the C.B.S. President's award, is pictured at the left.

of the crew. Finding no bottom, he clambered out and blazed a trail around the landslide over the steep mountain slopes. By 5.00 a.m. they had carried the radio equipment into the town on

stretchers; and by 5.30 Stiles began flashing relief messages over portable amateur station W8PDY. Sleepless for two nights previously, he pounded out messages continuously for more than 24 hours. When two relief operators arrived on Saturday night, Stiles was in a state of nervous collapse bordering on absolute breakdown.

But for 160 hours he had provided Renova with its sole means of communication with the outside world. And the food and first-aid supplies he brought in with his transmitter were all that averted acute suffering until further help could arrive.

● A Busy "Ham"

Stiles is modest about his feat, prefers to speak of it in terms of his transmitter's rather than of his own performance. At the age of 10, he got the money to buy his first radio equipment (a crystal receiver) by selling garden seeds. Four years later he had passed his examination for a licence and set himself up as operator of an amateur transmitter with 4 watts output. When he reached the age of 20 Stiles had worked 72 countries and practically every one of his 40,000 fellows "hams" in the United States.

Stiles' permanent transmitter is located in an extension he built on the rear of his house at Coudersport. There, from early Saturday night to Sunday dawn, the lights are on and Stiles is at his microphone chatting with hams in neighbouring towns or in Australia. All-night sessions on Saturdays have become traditional among amateur enthusiasts, and Stiles hasn't missed one for over 10 years. His wife joins him sometimes at the transmitter.

Besides amateur radio, Stiles' hobbies are a miniature railroad, complete with passenger and freight engines, a stamp collection, and photography. An employee of the Pennsylvania Railroad, Stiles has modelled his own miniature engines after the full-size locomotives on which he works as electrician.

THREE 1938 G.E.C. SETS

Preliminary Announcement

In striking contrast to the general rise in commodity prices, new low price levels are the keynote of the first of the 1938 radio receivers announced by the G.E.C.

The new sets, though built up to high standards and embodying new luxury features, bring the high-grade set within the means of all.

The three new sets are: A.C. All-Wave Five at 9¾ guineas; a de luxe 5-valve 3-band mains superhet with may highly advanced features and designed to give the finest possible performance.

Battery All-Wave Four at 10 guineas: a luxury 4-valve 3-band superhet, complete with all batteries and an array of outstanding features, including the new Chromoscopic dial, touch-lighting and automatic 2-speed tuning.

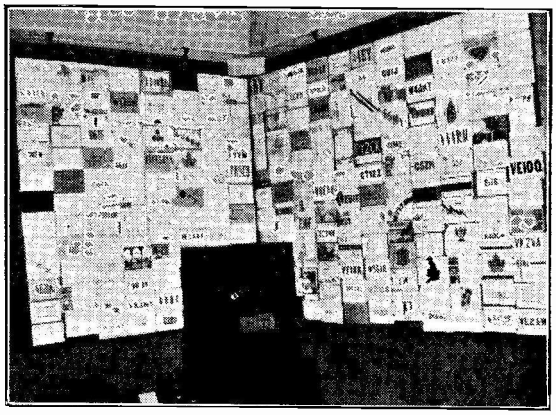
Battery S.P.3 at £6 15s. 0d.: a fully equipped 3-valve T.R.F. receiver of high performance combined with low consumption. All batteries are included.

LISTENERS' DX CORNER

THIS MONTH I am going to begin with a very interesting piece of news from overseas. An amateur in the Dutch East Indies has received television signals on seven metres. He does not know whether they emanated from the Alexandra Palace or from the Phillips station at Eindhoven, but this, I believe, is the best DX recorded so far on this frequency. One or two East coast Americans have been heard in this country on 5 metres, but I have not heard of any W5, W6, or W7 stations being picked up.

Now for the comparatively longer waves between 13 and 50 metres, Bob Everard (Sawbridgeworth) has returned to the fray with a vengeance. Dealing with picking up low-power stations he sent the first European report to VU2BU (10 watts), HI7G (20 watts), W9UEL (40 watts). Receiving W9UEL is exceptional DX because this station is located in Colorado, one of the most difficult parts of the world to hear, and I am sure very few of us have heard this state. I know I havn't, but I should like to hear from others who have.

However, to return to this report. He has also given the first European report to PK1VM (35



W. E. Davey's shack **(see next page).**

watts) and has heard, among other low-power stations (the figures after the call denote power in watts): VS2AK (30), PK4DG (35), ZT2G (35), W8JMM (45), W6XKG (100), VK2UC (24), VK2JA (25), VK2JZ (25), VK2RB (25), VK2QR (21), VP7NA (40), ZS1B (30), W7VS (90)—1st report, W7DAA (60)—1st report, K6CIB—1st report, YV5AM (15), YV4AC (30), K5AF, W5CHC (30), ZS6AJ (48), CO6OM (30), CP7, PK1ZZ (25), XE2N (60), CO2JM (28), CO8VZ (30), VE4BF—1st report, VE4MO (30), VE5JB (30)—1st report, W6GBO (Utah) (60), and recently he has received phone veries from VK2ABG (11) and VK3HF (15).

Well, Bob Everard is certainly upholding the claims of England. He says he has selected these reports at random from the thousands he has got,

and this shows wonderfully consistent DX reception, not occasional fluke pick up.

It seems that many other listeners would like to hear some of these low-power people, so how about letting us have some details of the frequencies and times when these stations can be heard?

One thing I notice is that no one has claimed Reunion Island yet. Here is the card of FR8VX, owned by a real Prince. Has any one else got one of these?


A la Radio Station

VOTRE STATION

Entendu et travaillé avec

A 19.20 GMT. DATE 2/10/36 QRH 14 MEGACYCLES

QSA 4 R 3 T 8 QSS QRN QRM

FR8VX

RÉCEPTEUR Hallicrafters SX9

EMETTEUR Conrad PUISSANCE 30 WATTS

PSE QSLL

PRINCE VINH-SAN, 67, rue Sainte-Anne. Saint-Denis — Ile de la Réunion

Meilleures amitiés et merci

Who has a similar card?

● Conditions in Ireland

Ireland is again in the picture in the form of a letter from W. E. Davey (Belfast), who sent in such a fine report last month. I asked for details of his receiver and in reply he says: "My receiver is an English model (1936 vintage) Phillips 575a, six-valve superhet. It has no band-spreading device and it is impossible to fit one to it. This means that tuning is particularly fine. The antenna in use at the moment is supposed to be an inverted 'L', 50 feet long, 40 feet high, and S-N in direction. A storm, however, brought one end of it partly down so it is somewhat drunken in appearance.

'This queer looking contraption now has the effect of boosting up signals immediately to the south. It is, in effect, a 'V' beam, one arm of the beam reflecting on to the other.

"Since last month I have received two phone reports from J3FJ and J2KJ. These, despite the 400 and 300 watts respectively, I consider to be the best catches since I started DX'ing. I do not remember any reference by any listener in Great Britain of hearing Japanese amateurs on phone. This means that I have now 13 verifications from each continent.

"I have been completely QRT since 23rd April (the morning I heard the two J's) until yesterday. Listening in at 08.00 this morning I heard W6ITH, W8JOE, and VK5AW inside 5 minutes. Last night I was on for about 10 minutes and I heard PY2FF, LU5AN, PY1FR, CX1AA, CX2AK, VS2AK, and YV5ADE, as well as heaps more."

After reading this I feel like going to live in Ireland as it seems so good for DX reception.

He also sent a couple of photos, one of the receiver shack and the other a cartoon of himself, which I have reproduced above. Let's have a few more from other listeners.

● It's Easy !—Wales

From Wales comes a report from Harold Taylor (Bridgend). He says: "I would like to be one of the claimants for H.A.C. on behalf of Wales, and being practically confined to barracks owing to ill-health I manage it almost daily, with VK3LR, JZJ, YDC, VQ7LO, DJB, W2XAD, and VP3MR, which come through with almost perfect regularity. I have never verified a single amateur station as I have received hundreds and hundreds, but I have them all booked down and if challenged could always take the trouble to verify.

"Among stations received are: VK2XU, VK2HU, VK2HF, VK3AL, VK5AW, KA1AK, KA1BH,

BSWL 330, owner of the cards shown on previous page. First pictures for the "Corner."

VS2AK, PK1ZZ, PK1MX, VU2CQ, VU2HQ, OQ5AA, VE5EF, VO6L, W5DQ, W6TT, W7CEO, HI5X, VP6YB, VP9R, XE1AK, TI2KP, YV5ABE, HK3JA, HC1FG, OA4AL, CE3DW, LU6KE, CX2AK, PY2DV, and a station XG3BY whose location was given as off Corsica, and who was talking to GM5NW at 22.45 B.S.T. on June 5th.

"The set used is an all-mains Model 346 Marconi all-wave, with a Marconi all-wave anti-interference aerial running NE-SW from a 34-foot pole to a 45-foot pole."

And so Wales stills upholds the DX brigade with this report. Sorry to hear of Harold Taylor's ill-health, and I hope he soon recovers, but meanwhile he does seem to rake in the DX.

Well, enough for this month and so till next I will say au revoir.

YOUR HEADPHONES

THEIR CHOICE AND OPERATION

LATE NIGHT listening is the cause of a lot of domestic interference to many of us. Conditions are just right, fresh stations to be heard for the listening, when, as we tune one in comes the cry from the rest of the family, "Shut that row off!"

The reply to this form of interference is to use headphones, and the use of these will not only prevent the programme interfering with the rest of the family, but the rest of the family interfering with the programme. With headphones almost any amount of noise can be going on in a room without the wearer hearing it, and that is a very big advantage.

Headphones can be purchased at prices varying from a shilling or two up to fifty, and, like most things, the more paid for them the better the quality and value. The better the instrument the greater the sensitivity, and so it is false economy to use a big receiver to provide sensitivity and then waste the signals it picks up with inferior phones.

● How Headphones Work

The principle of the headphone is that a piece of metal is suspended in front of a permanent magnet. Round this magnet are wound coils of wire through which the current from the output of the receiver flows. This output current is A.C., and varies in sympathy with the signals of the station being received, and as it flows through the windings round the magnet, affects the pulling power of the magnet, and so pulls the metal plate (the diaphragm) to and fro in sympathy with the signals. This diaphragm in turn causes the air to vibrate, and so the A.C. current from the receiver appears as sound.

To manufacture headphones of high sensitivity calls for great skill both in the actual making and in the design. The magnet must be as close as possible to the diaphragm without touching, and the latter must also be thin enough to vibrate freely without being mechanically weak. Resonances must be avoided otherwise every time a certain note is heard, it will be amplified up out of proportion to the rest.

The magnets themselves must be made of special steel, and during recent years much research has been devoted to the development of metals for this purpose, the aim being to obtain as strong a magnetic pull as possible while keeping dimensions to a minimum. Permanent magnets gradually lose their magnetism and so the better the headphone, the longer does it remain sensitive.

Another factor in the design of the magnet is that vibration or blows will cause a magnet to lose magnetism, and so metals which resist this effect are included in headphones of good make.

The "Reed" type headphone is a development of the diaphragm type. As can be seen, the lighter the diaphragm the easier will it vibrate and the lower will be the power required to make it do so.

● Reed Type Headphones

The Brown Reed type, invented in 1908 by S. G. Brown, F.R.S., instead of using a diaphragm of comparatively heavy iron, used one made of the much lighter aluminium. Of course aluminium will not be affected by a magnet so in front of the magnet a small bar, called the reed, made of magnetic metal is placed. This reed will vibrate in the same way as an ordinary iron diaphragm, but is of course much lighter and therefore much more sensitive. The diaphragm proper is a cone of spun aluminum, only .002 in. thick, the centre being bolted to the reed, and firmly suspended at its circumference, resulting in a diaphragm which is free to move, far lighter than the ordinary iron type, yet mechanically strong.

By means of a knurled knob at the side of the earpiece the distance of the reed from the magnet can be varied. The reed has the added advantage that it is possible to tune it to almost any desired frequency and this is very useful when dealing with special work. In the standard instruments, however, the reed is tuned to 900 c.p.s. which has been found to be most satisfactory for reception of broadcast and Morse signals. This enables a weak Morse signal to be peaked and read through bad interference. A special magnet of 35% cobalt steel is used, and so that there should be no join in the windings, the laminated pole pieces are assembled and fitted with bobbins, and the coils then wound with the bobbins in position.

The wire used is enamelled covered for high resistance types, as space is important, and silk covered wire in low resistance types where space is not so vital.

Naturally with this type of construction only hand-made instruments can be produced, mass production being out of the question.

These two types are the main ones at present in general use. Crystal types have been used in America, but have not proved popular in England.

So, in selecting a pair of phones, remember that on them depends the real sensitivity and the results of your receiver.

On page 14 will be found an article on coupling headphones to a receiver.

Reflected Waves and Side-splash

in other words—All Sorts of Things

I DON'T propose to add further to the exhausting discussion regarding the possibilities of a really great revival in home construction with the approaching bigger demand for television receivers. Those who think, and argue, that before television can reach a stage when it can rightly be described as popular it will have to be preceded by an era of home construction similar to that which attended the full growth of broadcast radio, may be right. Their opinion will probably be justified if a really satisfactory means of mechanical scanning were devised, but at the moment it seems more likely that the complication and expensive testing instruments needed will prove too great an obstacle.

● Why Twenty Valves ?

True, the latter objection may be overcome by radio club members who have access to apparatus already owned or which can be acquired collectively. At present there is but a mere handful of receivers in the television service area, due, no doubt, not so much to the high original cost but to the fear of a rapid depreciation. Everyone who bought a factory-made broadcast receiver knows only too well that in even less than twelve months he can expect to get only a comparatively small allowance for it when part-exchanging. I can think of no other article which depreciates so heavily, and yet, that twelve-months-old radio has still a lot of use and may differ only in minor points from the latest model.

After such alarming depreciation one might well be excused for giving prolonged consideration before parting with a big outlay for something which might be suspected of becoming obsolete in a short time. The home constructor would admittedly still hold his ace card: the advantage of having a big percentage of components still of use to him. If the present scanning system is to be the ultimate, all that remains is for the stages to be "hotted-up." It seems incongruous to me as a short-wave fan that twenty-odd valves are to be needed for a local signal!

● Adaptors

Among we short-wavers there is still a very high proportion of home-constructed receivers and, valve for valve, they must admittedly be generally more efficient. I have heard some startling results on small sets, and it is refreshing to find, after reviewing the uniformity of modern broadcast sets, that there is still a healthy variety. Many commercial all-wavers, with intelligent use, put up a very high performance especially on the broadcast short-waves and in view of such competition the short-wave adaptor seems doomed. Remember too, the demand for all-wavers is increasing daily and you can confidently expect at next Radiolympia to see them in an overwhelming majority.

● H.A.C. is easier Nowadays

With the great improvement of factory-made short-wave sets many keen listeners feel they are being robbed of a hard won distinction now that the honour to be an H.A.C. (heard all continents) is becoming comparatively commonplace. It has, unfortunately, held a rather vague meaning as the man who did it with a Comet Super Pro is hardly comparable with the keen experimenter who earned the honour previously attached thereto with a hook-up nearly all from the scrap-box or the junk-stall. I have seen some splendid efforts of the latter class, especially by older schoolboys and youngsters with but little money to spare.

● Junk Shops

Nowadays, it seems impossible that radio apparatus could have been so dear as it was when my interest awakened shortly after the War, but I can well recall the thrill on the final acquisition of some precious piece after weeks of hard saving. To-day the beginner can get a much greater thrill by obtaining big results from simple apparatus, added to which there are glorious opportunities for bargain hunting in the surplus and older type component shops (known in the vernacular as junk-shops) apart from the several large firms who run special lines in manufacturers' type surplus components, etc. The knowledgeable constructor can build a creditable imitation of almost any set at a ridiculous price. Please particularly note, I said knowledgeable constructor; others often find they do not get such a bargain as they first think.

Junk-shops seem ubiquitous in populous areas and there is a certain fascination about them—I, for one, find it impossible to walk by without a thorough inspection of the stock even when I know full well that there is nothing I possibly want, and then I have to remind myself that I already own boxes full of bits and pieces similarly bought, which might have been useful but have never had occasion to use.

The junk-shops must have harmed the component manufacturing industry and certainly make it

difficult to gauge the true extent of present-day home construction. The ever-growing complication of modern receivers combined with the cheapness and efficiency of commercial sets has almost made the handyman type of constructor (with no technical leaning) a thing of the past.

In spite of these difficulties the component industry has made progress and a greater range than ever will be available next winter. Notwithstanding the more limited market, improved manufacturing methods have made the maintenance of the already low prices possible, although the rising prices of raw material caused by the armaments programme has meant an increase in the prices of certain components and there are possibilities of still another small increase.

May I again urge on you the wisdom of buying quality components. They can be used in many subsequent reconstructions and you never have doubts about them "pulling their weight." Again, and this is very important, you can feel assured that they do conform with the stated characteristics. It is a good plan to have a section in your scrap-book (I presume that you do keep a scrap-book, they prove themselves worth the trouble many times over) to keep the literature supplied with each component you buy. You never know when re-designing a set just when that information will be useful.

● Holiday Listening

In the very early days of broadcasting I invariably took a set away with me when going on holiday. At that time sets were cumbersome and so inefficient that a high and lengthy aerial was a positive necessity, and stations were low-powered and few and far between. Add to that the fact that bright emitter valves were rated at 1 amp. each, and garages (much scarcer in those days) where they were able to re-charge the accumulator needed finding, and you will see that I was something of an enthusiast. I remember convincing myself that I was seeking first-hand knowledge of local listening conditions, heights, distances and the effects of being screened by the Cotswold or whatever range of hills happened to be handy. Looking back I have a shrewd suspicion that it was more than partly because of a conviction that the place where I then lived was something of a "black spot" for radio reception and that I was very anxious to prove it.

With the lack of exact knowledge or its availability at that time, it certainly seemed to me to be the only explanation why a receiver on which I spent so much time and trouble should eventually have quite an ordinary performance. Whatever the real reason, the habit remained and for many years since I have taken some sort of set away with me, in more recent years of course it has been a small short-wave —simply for listening. The days when one carried a soldering iron and an assortment of grid-leaks, etc., are long dead.

Centre Tap.

RADIO FOR WORLD'S LONELIEST ISLE

POWER FROM THE WIND

TRISTAN DA CUNHA, "loneliest island in the world," is at last to enjoy proper radio equipment. This tiny island, in the centre of the South Atlantic, has no electric mains, no facilities for accumulator charging, and can obtain batteries only once a year when the annual mailboat calls.

For these reasons all previous attempts of the inhabitants to keep a radio set in operation have failed. Last week their problem was completely solved by a presentation made at the Southend-on-Sea Rotary Club luncheon. The Rev. H. Wilde, on furlough from the island, was handed a specially devised set of equipment for the islanders as a gift from E. K. Cole, Ltd., manufacturers of "Ekco" radio sets, whose factory is at Southend.

● Novel Power Supply

The set, an all-wave model, is of the "No H.T." type introduced at the last Radio Exhibition by E. K. Cole, Ltd. It entirely obviates the difficulty of power supplies as it requires no high tension batteries and is operated entirely by small accumulators. These will be kept fully charged on the island by means of a small generator operated by a wind-driven propeller mounted above the building in which the set will work.

No reception difficulties are anticipated, as Tristan da Cunha, with thousands of miles of open ocean in every direction, will be free from freak conditions caused by intervening land, and the set is powerful enough to receive signals from almost any distance.

A CORRECTION

NEW TIMES SALES 3-in-1 Kit.

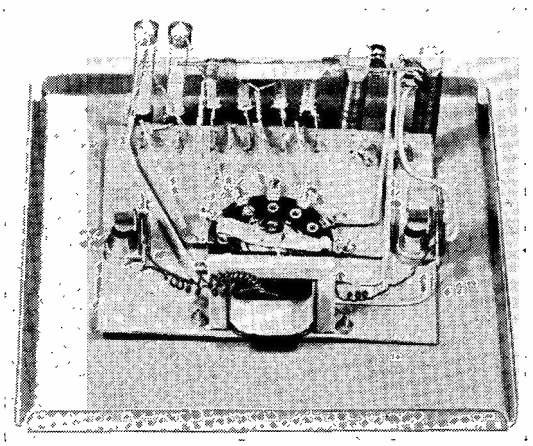
Owing to an error in the June issue we showed the price of this kit to be 12s. 6d., the price should have read "£1 5s. 0d."

CONSTRUCTING AN "R" INDICATOR

This measuring instrument will find useful application in the listeners' gear

THE LITTLE piece of apparatus described here will be found of interest to both listener and experimenter. To the listener, not interested in signal strength reporting it provides a ready means of using headphones with a broadcast receiver, while to the experimenter it also provides a means of ascertaining "R" strength.

First of all for the benefit of those who are unaware of how headphones can be used in conjunction with a broadcast receiver, this instrument consists of a transformer the secondary of which is plugged into the external speaker sockets of the receiver, while the primary is joined to the phones, thus obviating risk of contact with the high voltages in the receiver. Across the phones is placed a number of resistances of different values, which can be selected by the switch, and allows the volume to be adjusted.



Now for the experimenter this unit is a simple attenuation circuit, the input being a transformer coupled to the set, the phones being placed across the secondary.

The attenuation circuit consists of a bank of reistances which can be placed across the phones, and these resistances are in 10 db. steps, thus varying volume 10 db. per division, i.e., approximately one "R" point.

The construction is so simple that it can all be seen from the photos and diagram. The box is a standard "Burne-Jones," the interior view showing the input jack on the left, the resistance switch in the centre, and the output phone jack on the right.

● Construction

No particular precautions need be taken in the layout: the individual constructor may have other ideas to suit the materials on hand, also it may be more convenient to place the meter inside the set, thus no jacks would be necessary.

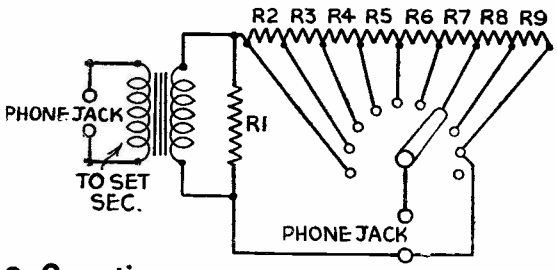
If, however, the design shown is followed one or two points may be worthy of record. It will be seen that one side of the output jack and the contact arm of the ten-way switch are joined together, therefore these two components may be mounted without the use of insulating washers provided the switch moving contact is connected to the jack soldering tag which is nearest the panel. The transformer is used as a step-up instead of a step-down, and accordingly the primary is joined to the other jack, this being insulated from the panel.

Some form of anchoring the resistances had to be found and in the original a 4½-in. square of paxolin was used. About one inch of one side was turned up and pierced so that the wire ends of the resistances could be threaded before soldering together. Everything was mounted on this square before placing in the box, this also providing insulation necessary at the back of the input jack.

Looking at the back of the unit the resistances are placed with that of 30,000 ohms at the right. Reversing this order will make the pointer on the front co-incide with the numbers 1-10, making for easier reading of "R" indication, but if used as a volume control the pointer would come against 10 at lowest strength. Therefore for recording "R" strength instead of using the dial, numbers should be marked on the panel reading anti-clockwise.

Only eight tappings of the switch are used, corresponding to R2-R9, R2 being obtained when there is no resistance across the phones.

An additional resistance, R9, is placed across the secondary of the transformer to reduce maximum volume to reasonable limits. In this case a value of 5,000 ohms was required, but it will depend on the power of the receiver used, in the case of a single valve no extra resistance being needed.



Operation

To use the unit the external speaker sockets of the set are plugged into the left-hand socket, and the phones into the right. Volume will increase as the switch is turned clockwise.

Recording of "R" strength may then be accomplished by tuning in a signal, and turning the switch anti-clockwise until the signal is audible but not readable. The setting of the switch will then indicate the "R" strength.

It should be remembered that the transformer has a ratio of 20/1, suitable for most mains sets, but for those with high impedance, such as one and two valve battery receivers, a 1/1 transformer will be necessary instead.

In cases of doubt of the correct ratio when a commercial receiver is used, the makers will usually furnish the output impedance on request.

Finally, whether the unit is used as an "R" meter or as a volume control, it serves a useful purpose in keeping the D.C. component of the receiver from the phones, adding life to them. For this purpose alone it is well worthy of construction, while for the experimenter it affords a direct reading of "R" strength instead of the usual guesswork indulged in.

Readers may choose to wind their own transformers, therefore the box chosen will easily accommodate a larger model. A system of tone control could also be included and here again space will permit inclusion of components other than those shown.

YOU WILL NEED

Two Bulgin Single Circuit Jacks (J2).

One Burne-Jones Standard 6½-inch box.

One Bulgin 20/1 Midget output transformer (L.F.46).

10 resistances: R1 5,000, ½-w.; R2 10 ohms and R3 30 ohms, 10 w.; R4 to 9, ½-w., 100 ohms, 250, 1,000, 3,000, 10,000, 30,000 (Bulgin).

One Bulgin 10-way switch and dial (if desired). S160 and I.P.7.

A QUICK WAY OF LEARNING MORSE

By C. A. Rigby

THE FIRST essential when learning Morse is to memorise the code letters. There are several easy methods of doing this and the one shown below may be recommended.

It will be noted that the letters are grouped as: "Reverses" or "Opposites," Dots, Dashes and Letters following no rule.

(A)

A .—	G ——.	P .——.
N —.	W .——	X —..—
D —..	R .—.	Q ——.—
U ..—	K —.—	Y —.——
B —...	F ..—.	
V ...—	L .—..	

(B)	(C)	(D) No Rule
E .	T —	C —.—.
I ..	M ——	J .———
S ...	O ———	Z ——..
H		

Figures	Punctuation, etc.
1 .————	Full Stop .. .. ..
2 ..———	Comma .—.—.—
3 ...——	Colon ———...
4 ....—	Question ..——..
5	Commencing Sign —.—.—
6 —....	Break Sign —...—
7 ——...	Finishing Sign .—.—.
8 ———..	
9 ————.	
0 —————	

After memirising the code letters, the problem of learning to recognise them by ear confronts the beginner.

For ordinary practice with Morse a buzzer, 4½-volt cell and transmitting key are needed. (See circuit diagram, *Fig.* 1). These may be obtained for a few shillings.

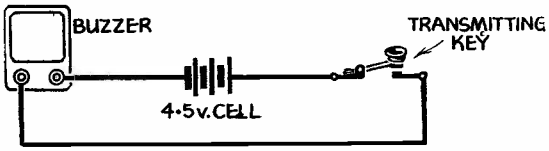


FIG. 1.

Simple Morse Unit

● Copying

Provided the services of a friend are available, one can transmit whilst the other writes down the message. When copying down messages it should be remembered that all letters are written as in ordinary writing—not block capitals—and all letters and words are joined.

Instructions for the spacing and length of signals are given below:

1.—A dash is equal to 3 dots.
2.—The space between the signals which form the same letter is equal to one dot.
3.—The space between two letters is equal to three dots.
4.—The space between two words is equal to five dots.

Since the noise of a buzzer and transmitting key may cause annoyance to others, it may be wise to set up the silent code unit as shown in *Fig.* 2.

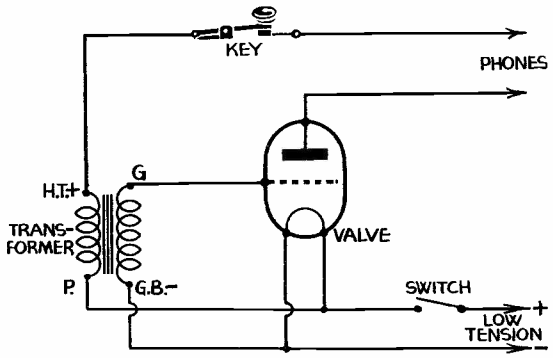


FIG. 2.

Silent Morse Code Unit (Buzzer Omitted)

Excellent Morse practice may be obtained with the aid of a friend, but this is not absolutely essential when transmitting only.

With this unit it is a good plan to practice the sending and receiving of call letters likely to be heard on the short waves. In this way, the particular "tune" of each call is familiarised, and for this a list of short-wave stations showing wavelengths, is given.

● Get the Rhythm

When these different Morse "tunes" have been learned, an effort at listening on the short waves should be made. Possibly the beginner may hear an opening call, i.e., the signal which precedes every transmission (— . — . —). It is given out once, followed by the call letters of the station called—if it is a ship there are four—repeated three times; then come the word "de" meaning "from," and the call-sign of the transmitting station repeated three times.

As an example, if the ship GLRZ desired to communicate with shore station GES, it would send out

signals in the following sequence: — . — . — (opening call) GES GES GES, — . . . (de) GLRZ GLRZ GLRZ, and would then wait for a reply. This would be sent in very much the same way, i.e., — . — . — GLRuZ GLRZ GLRZ — . . . (de) GES, and the station, if ready to receive the message, would add the letter K, constituting an invitation to transmit. If it were busy with other traffic the last signal (K) would be replaced by "Wait" (. — . . .), followed by a number indicating the probable number of minutes which must elapse before ready to accept the communication.

Where a coast station wishes to send a communication to several ships, it uses the call CQ, or "all stations," but if no reply is required, e.g., if general information such as time signals, weather reports, gale warnings and so on, is being sent out, the K sign is not given.

On the short waves, many of the call letters given in the list should be heard, and often after a series of "V's" or "ABC" repeated thrice.

For further information regarding Morse and code signals the beginner is advised to obtain the "Handbook for Wireless Telegraph Operators," from H.M. Stationery Office, Adastral House, Kingsway, London, W.C.2. Price (including postage) is 11d.

Telegraphy and Telephony Stations

Station	Call	metres
Tuckerton	WSC	13.42
Nauen	DFC	13.5
Sepetiba	PPX	14.48
Bandoeng	PMB	14.5
Nauen	DGB	14.69
Rugby	GAA	14.72
Rocky Point	WQX	14.87
Nauen	DIH	15.04
Monte Grande	LQD	15.46
Sepetiba	PPU	15.58
Lawrenceville	WKF	15.61
Maracay	YVR	16.3
Lawrenceville	WLA	16.36
Rocky Point	WQF	16.74
Nagoya	JNC	16.7
Bandoeng	PLF	16.81
Bangkok	HSP	16.91
Monte Grande	LQC	16.99
Nauen	DFB	17.12
Rocky Point	WKQ	18.75
Nauen	DFR	19.24
Paramaribo	PZC	19.8
Lawrenceville	WMF	20.73
Nagoya	JNI	21.51
Rocky Point	WAJ	22.26
Cairo	SUW	25.19
Sepetiba	PPH	25.15
Monte Grande	LQE	25.59
Nauen	DHA	27.47
Rocky Point	WEF	28.25
Nagoya	JNE	29.53
Madrid	EAQ	30.43
Monte Grande	LQA	30.93
Tokyo	JAO	31.25
Bandoeng	PLV	31.86
Nagoya	JNA	33.41
Cairo	SUV	38.34
Vienna	OEK	40.6
New Brunswick	WEO	43.11
Budapest	HAT2	43.86
Lawrenceville	WOA	44.41
Nagoya	JNL	44.05
Coltano	IAC	45.11
Madrid	EAV	50.47
Nauen	DIZ	51.72
Budapest	HAT	55.56
Nauen	DIC	56.23

QRM

IT HAS BEEN estimated that over a million stations could be accommodated between one and a hundred metres; unfortunately most of them would have to be below ten metres, and so we get QRM.

The enormous number of stations which have to use the very small confines of the amateur bands are probably the worst sufferers, and despite the introduction of crystal filters many a contact is ruined by interference. As if there were not a large enough number of transmitters working on the 14 mc. and 7 mc. bands, several commercial and broadcasting stations have settled there. One hardly dares to imagine what would happen if an amateur wandered from his allotted frequency with the same apparent lack of concern!

Various schemes have been put forward to solve the problem, but so far none have been put into practice. One suggestion, which would be of use in the States is to divide the frequencies into sections for different districts. This plan, originated by W2AOE, divides U.S.A. into three zones—East, Central, and West. The first and third zones should use one part of the band, and the second the other. By this means QRM on local QSO's would be practically eliminated, and on DX ones lessened.

The short-wave broadcast bands are in an even worse state than the amateur frequencies, for, strangely enough, although the "hams" get a little protection from trespassers, broadcasters get none. A more careful distribution of frequencies to stations by their respective authorities would tend to lessen the trouble, but would still leave the commercials, and around 6-6.5 mc. Russian ships. These latter are in some cases equipped with spark which can be heard spreading right into the 49-m. band at times. If broadcasting stations continue to migrate to the higher frequencies their problem seems to stand a chance of being solved. The Americans have done most in this direction, and several of their stations now have relays as low as 8 metres, while one enthusiast in Connecticut transmits a regular programme on 450 mc. QRM certainly won't bother him!

The amateurs, who once held sway over the whole realm of short waves, are realising their situation and looking anxiously forward to the Cairo conference, which may or may not be generous in the matter of extra frequencies. In the meanwhile we all hope the 40-m. band will lose its reputation for over-modulation and every other offence under the sun, and open up a few more kcs. for general use.

Mr. J. O. Heymeson, 221, Welbeck Road, Carshalton, Surrey, is anxious to get in touch with other short wavers in his locality, and would appreciate local readers getting in touch with him.

THE NATIONAL RADIO SOCIETY

By LESLIE W. ORTON, Secretary

SINCE THE announcement of the formation of the National Radio Society last month the organization has grown apace. Representatives have been appointed in many countries and every effort is being made to enable new members to receive benefits from the moment of enrolment.

● Membership Fee

The N.R.S. Committee (Miss Eileen G. Harris, Messrs. Leonard Berry and Charles F. Biggs) have decided that the nominal fee of 1s. per annum be charged for membership and that this will entitle members to a membership card, small quantity of membership paper, and many benefits. When a reply is desired from H.Q. a stamp-addressed envelope should be enclosed.

● Services

The first is an amateur identification bureau. If you pick up an amateur transmitter whose address is unknown you may send the call letters to H.Q. at 11, Hawthorn Drive, Willowbank, Uxbridge, when we will supply the answer if at all possible. This service is free.

And now for our QSL service. As you will realise this entails a considerable amount of work and consequently a charge of 6d. per annum is made to help cover expenses. Members should send this fee along with four big stamp-addressed envelopes to our QSL Bureau at 14, Fairfax Road, Prestwich, Manchester. The organizer of the bueau is Mr. Albert Park, our Lancashire representative.

There are many amateur stations who would appreciate reports of reception of their transmissions. We invite all such enthusiasts to send a stamp-addressed envelope to our QSL Bureau at Manchester. We will then publish the name of the station and any reports that are received will be forwarded to stations via our bureau.

● Membership Paper

We are anxious that our members use the N.R.S. membership paper. Besides being a benefit to your club it will assist in getting replies from stations.

The charge is 2s. 6d. per 100 sheets. We realise that this price is a few pence above that of several other clubs but when you see the paper you will realise that it is worth it. Orders should be sent to 11, Hawthorn Drive, Willowbank, Uxbridge.

● Competitions

And now here is news of particular interest to you all. We are holding a short-wave contest next month (details will appear later) and a County Representative Contest. In this a cup is being presented to the county that leads in membership, services to county members, etc. This cup will be presented to the leading county representative at the end of August. It will be competed for regularly.

Commencing next month we are issuing H.A.C. cards to listeners hearing all continents on given wave-bands. The four groups are: 49 m.; 31 m.; 17, 19 and 25 m.; 13, 10 and 5 m. So get down to pulling in the stations—the cards will be well worth possessing.

● County Representatives

And now may I present our county representatives.

Firstly, we have Mr. Albert Park, LANCASHIRE Representative. His address is 14, Fairfax Road, Prestwich, Manchester.

Mr. Park is a DX enthusiast with an excellent record. His recent catches have included 14 W1's, 14 W2's, 7 W3's, 14 W4's, 4 W5's, 5 W6's, 8 W8's, 11 W9's. Any of you fellows beat this list? Don't forget that Mr. Park was not competing when he compiled his list and if you try to beat him I guess you will find Albert's set will work overtime next month! Among the less regularly heard stations he has logged are PY2BA and PY2EJ, Brazil; VO1I, Newfoundland; I1KN; YI2PA; ST4AG; LA1G; OA4N; OA4C; OA4AL; VE2DC; VE2BG; VE1JA; VE3SM; VE1LR; HA8N; SU1GH; YV5AE; SP1HH; K4UG; K4ENY; CX2AK; TI2RC; VP9R; LU4AW; VK2XU; FT4AR; CT2AB; CE3DW; CO7CX; CO6OM; CO2LK; CO2KC. What a list! Envious? So am I!

Our KENT representative is Mr. E. B. Chapman, of 34, Birkbeck Road, Sidcup, Kent. He is endeavouring to form a Sidcup branch so will any of you fellows in his area please communicate with him if you are interested?

The NORTHUMBERLAND AND DURHAM representative is Mr. George C. Castle, of 10, Henry Street, Gosforth, Newcastle-on-Tyne. He is an official of the Newcastle Radio Society which is now affiliated with out organization.

Mr. Ernest W. J. Field, of 36, Watford Heath, Watford, is our HERTS representative. He will be pleased to hear from Herts members.

G. F. Shepperd, of 287, Wragley Road, Lincoln, represents LINCOLN.

Well known DX'er Mr. Jack Hughes, of 11, Nelson Street, Coventry, is our WARWICKSHIRE representative. Ever seen Jack's QSL cards? They are worth seeing! He will be pleased to hear from you.

For SUFFOLK we have Mr. Charles R. Thompson, of The Chestnuts, Orford, Woodbridge, Suffolk. Charles doesn't bother to "veri" all his reports. Feels, as I do, that it can be an expensive hobby!

Mr. Charles Biggs, a member of the N.R.S. Committee is LONDON representative, and Mr. Leonard Berry is the MIDDLESEX representative, Mr.

Biggs deserves particular mention as his endeavours have helped tremendously.

SOUTH LONDON: Mr. C. J. L. Goldsworthy, of 185, Mitcham Lane, Streatham, S.W.16. Mr. Goldsworthy, who is a director of Universal Short-Wave Radio (1936) will be pleased to see members. His phone number is Streatham 0405.

ESSEX Representative: Mr. R. S. Stevens, 43, Pettits Lane, Romford, Essex.

● Social Representative

Many members have written saying that they felt that a social side to our club would be an advantage. The Committee agree and have consequently appointed a Social Representative, Miss Eileen G. Harris, of "Plemont," Greenway, Uxbridge.

And here are a few details from Miss Harris's log. She reports having received the following stations at good 'phone strength: W7BA, WTON (a ship), W2DS, W9BL, W4DC, and PY1FR (Brazil) on the 20-metre band and W2XAF, W2XAD, W1XK, W3XAU, COCQ, COCH and others on the broadcast bands. Good work—the W7 makes me particularly envious!

● Television-Dance

The National Radio Society and the Anglo-American Radio and Television Society recently co-operated in the organizing of a television dance at Denham Hall, Uxbridge.

The affair was a great success and over a hundred members watched the demonstration which was given by Mr. Leslie W. Orton. Messrs. E.M.I. loaned the receiver for the occasion and also fixed up a special aerial.

Nearly all those present saw high definition television for the first time on this occasion and the enthusiasm of the audience was great.

● American Tour

Arrangements have been completed for a lecture to be given by Mr. J. Louis Orton, psychological consultant of the Anglo-American Radio and Television Society upon his return from America. The lecture will be held under the auspices of the Anglo-American Radio and Television Society and National Radio Society.

Members may like to listen to the broadcasts that Mr. J. L. Orton is making from W2XAF and W2XAD, Schenectady. Whilst in the States he is also broadcasting from WPG, Atlantic City and many other stations.

The lecture will deal with his experiences in America and should be of particular interest to short-wave listeners.

● Club Co-operation

Little has been done to obtain club co-operation as yet. We wish our friends to realise that they are co-operating with a worth while club before approaching them. We shall be pleased to hear from any secretaries who would like further details of our co-operation schemes.

As you know, the World Friendship Society of Radio Amateurs, Anglo-American Radio and Television Society, International Radio Society and Newcastle Radio Society are already co-operating. I'm also pleased to be able to say that the British Short-Wave League will probably have co-operated 'ere this is printed.

● Reception Reports

Of necessity this report has few reception reports and we would like to take this opportunity of inviting members to send in details of interesting reception, schedules, and so forth so that we may publish them for the benefit of less fortunate enthusiasts.

Before me is a report from Mr. F. S. Darlington of W2XAF. He advises us that between April 25th and September 26th the two stations 2XAF and 2XAD broadcast short-wave news, programmes, etc., from 10.35 G.M.T.

Members are advised to listen for the cross-country test being conducted by Leslie W. Orton on Saturday, July 17th, between mid-day and 7 p.m. Some fifty amateur stations will call the car in which he will be travelling from Uxbridge to South Wales. Listeners will get quite a thrill by listening for the amateur stations who will call dead on every hour. Some thirty radio clubs are co-operating in the experiment.

● Next Month

And now, friends, please remember that you have some treats awaiting you next month. Firstly, details of the short-wave and county competitions. And then—but that's a secret until next month!

If you are not already a member why not fill in the form below (or a card) and join?

Until next month, 73's. NRS1 closing down for to-day.

I wish to become a member of THE NATIONAL RADIO SOCIETY

Name .....

Address .....

.....

My outstanding DX reception of the month is

.....

.....

.....

I enclose p.o. for 1s.

Signature.....

Please write in block letters your name and address.

BROADCAST PROGRAMMES FOR JULY

(a) W2XE (Wayne)	21,520 kc,	13.9 m.	(h) 2RO (Rome)	11,810 kc,	25.40 m.
(b) ,,	15,270 kc,	19.6 m.	(i) ,,	9,635 kc,	31.13 m.
(c) W2XAD (Schenectady)	15,330 kc,	19.5 m.	(j) TPA2 (Paris)	15,243 kc,	19.68 m.
(d) W3XAU (Philadelphia)	9,590 kc,	31.2 m.	(k) TPA3	11,885 kc,	25.27 m.
(e) ,,	6,060 kc,	49.5 m.	(l) TPA4	11,720 kc,	25.60 m.
(f) W3XAL (Bound Book)	17,780 kc,	16.8 m.	(m) W1XAL (Boston)	11,790 kc,	25.45 m.
(g) W2XAF (Schenectady)	9,530 kc,	31.5 m.	(n) ,,	6,040 kc,	49.67 m.

SUNDAY

a.m.

9.15 News in French, English and Italian (daily) (k)

11.00 Concert—relayed (daily) (j)

11.43 Various Programmes from Italian Stations (daily) (h)

p.m.

12.00 News in English (daily) (j)

12.15 Concert—relayed (daily) (j)

1.00 Organ Reveille (a)

1.20 Mediterranean Hour (daily) (h)

1.30 Lyric Serenade (a)

1.45 Radio Spotlight—The Week in Preview and News of the Stars (a)

2.00 "Coast to Coast on a Bus"—programme for Children with Milton Cross (c)

2.00 "Sunday at Aunt Susan's"—Children's Programme (a)

2.20 Gramophone Records (daily) (j)

2.30 Concert—relayed (daily) (j)

2.55 Press Radio News (a)

3.00 Russian Melodies, directed by Alexander Kiriloff (f)

3.00 Press Radio News (c)

3.05 Ward and Muzzey—Piano Duo (c)

3.15 Bravest of the Brave (c)

3.30 Children's Hour (a)

3.30 "Give us the Funnies"—Variety Programme (f)

4.00 Press Radio News (f)

4.00 The Hour Glass (c)

4.20 Varied Programme for Italian East Africa (h)

4.30 University of Chicago Round Table Discussion (c)

5.00 Dorothy Dreslin—Soprano (c)

5.00 Concert—relayed (daily) (k)

5.30 Dreams of Long Ago (c)

5.30 Radio City Music Hall (f)

5.30 Salt Lake City Tabernacle Choir and Organ (c)

6.00 Church of the Air (c)

6.20 Varied Programme from Italian Stations (i)

6.30 News Report (f)

6.30 Thatcher Colt Mysteries (c)

6.40 Our Neighbours—Jerry Belcher interviewing families in their own homes (f)

7.00 Magic Key Symphony Orchestra, directed by Frank Black (f)

7.30 The Widow's Sons (c)

8.00 Romantic Melodies (c)

8.30 International Broadcast from B.B.C. (f)

9.30 Variety with Jerry Sears and his Orchestra (f)

9.30 Devotional Period (m)

9.30 Smiling Ed. McConnell (c and g)

10.30 Guy Lombardo and his Orchestra (b and d)

11.00 Joe Penner (Comedian) with Gene Austin (Radio and Screen Recording Artiste) and Coco and Malt (Harmony Team) with Jimmy Grier's Orchestra (d)

11.00 Jack Benny and Mary Livingstone (c and g)

11.00 Echoes of New York Town (f)

11.15 Concert from Radio Paris (l)

11.30 Rubinoff, Jan Peerce, Virginia Rea and Orchestra (d)

11.30 Fireside Recitals (c and g)

11.45 Morin sisters and Ranch boys (c and g)

12.00 Variety Programme with Don Ameche (c and g)

12.00 Columbia Workshop (d)

p.m.

12.30 Phil Baker: Oscar Bradley's Orchestra (d)

1.00 "1937 Edition of Twin Stars," Victor Moore & Helen Broderick (e)

Arline sees double

Arline Blackburn, radio actress, sees herself as others hear her in her characterization of "Pretty Kitty Kelly."

MONDAY

p.m.

12.30 Organ Reveille (daily except Sunday) (a)

1.00 Morning Almanack (daily except Sunday) (a)

2.00 Metropolitan Parade (a)

2.10 French Women's Chronicle—by Mrs. Decaris (j)

2.00 Near and Far East—News in English and Italian, and Concert of Music (daily, except Sunday) (h or i)

2.30 Richard Maxwell—Songs of Comfort and Cheer (daily, except Sunday) (a)

2.40 Press Radio News (a)

2.45 Bachelors' Children (daily, except Sunday) (a)

2.55 Press Radio News (daily, except Saturday and Sunday) (f)

3.00 Tim Healy—News Commentator (daily, except Sunday) (f)

3.00 David Harum (daily, except Saturday and Sunday) (c)

3.15 Back Stage Wife (daily, except Saturday and Sunday) (c)

3.15 "Ma Perkins"—dramatic sketch (f)

3.30 How to be charming (c)

4.00 "The O'Neill's"—dramatic sketch (daily, except Sunday and Wednesday) (f)

4.15 Personal Column of the Air, featuring Inez Lopez) (daily, except Saturday and Sunday) (f)

4.20 Italian East Africa—News in Italian; Orchestral and Vocal Concert (daily, except Sunday) (h)

4.30 "Vic and Sade"—Comedy Sketch with Art Van Harvey, Billy Idelson and Bernardine Flynn (f)

4.30 WGY Farm Programme (daily except Sunday) (c)

4.45 Edward McHugh — the Gospel Singer (f)

5.00 Joe White (tenor) (c)

5.00 "The Gumps"—Dramatic Sketch (daily, except Sunday) (d)

5.15 Your News Parade (daily, except Sunday) (d)

5.15 Dan Harding's Wife (daily, except Saturday and Sunday) (c)

5.30 "Romance of Helen Trent"—Dramatic Sketch (daily, except Sunday) (d)

5.30 Arabian Hour—News in Arabic, Concert of Arabic Music (daily, except Sunday) (d)

5.45 "Our Gal Sunday" — Dramatic Sketch (daily, except Sunday)

6.00 Travelogue of the United States in French (c)

6.00 Five Star Revue—Variety Programme: Morton Bowe (Tenor), Meri Bell (Popular Songstress), Ray Sinatra's Orchestra, and Bill Johnstone (Hollywood Reporter) (d)

6.30 "The Wife Saver"—Allen Prescott (d)

6.40 News in German (daily, except Sunday) (h)

6.45 Aunt Jenny's Real Life Stories daily, except Sunday) (d)

6.55 News in French (daily, except Sunday) (h)

7.00 Pepper Young's Family (daily, except Saturday and Sunday) (c)

7.00 News Through a Woman's Eyes (d)

7.05 Varied Programme from Italian Stations (daily, except Sunday (i)

7.15 Ma Perkins (daily, except Saturday and Sunday) (c)

7.15 Jack and Loretta—Songs and Patter (daily, except Sunday) (c)

7.30 Vic and Sade (daily, except Saturday and Sunday) (c)

7.45 "Myrt and Marj" — Dramatic Sketch (daily, except Sunday) (d)

8.00 Colonel Jack Major's Variety Show (b and d)

8.00 Lorenzo Jones (daily, except Saturday and Sunday) (c)

8.30 Relay (k)

8.30 "Pop" Concert, directed by Howard Barlow (b and d)

9.00 Club Matinee. Orchestra directed by Harry Kogen; Ransom Sherman, Master of Ceremonies. Sair Lee and Robert Getely, Cadets Quartette (f)

9.15 The Dictators (b and d)

9.30 Playdays (d)

10.15 Travelogue of the United States in English (c and g)

10.30 The Singing Lady — Nursery Jingles, Songs and Stories (f)

10.30 Press Radio News (daily, except Sunday) (c and g)

11.00 News Reporter (daily, except Sunday) (f)

11.00 American Hour—News in Italian and English; Opera; 2RO Mail Bag (i)

11.05 U.S. Army Band—Capt. Thomas F Darcy, Conductor (f)

11.15 Gramophone Records (l)

11.15 Four Stars, Girls Vocal Quartette (d)

11.15 News in English (daily, except Sunday) (h)

11.30 Press Radio News (daily, except Sunday) (f)

11.35 Sports Resume—Paul Douglas (daily, except Sunday) (d)

11.45 Lowell Thomas—News (daily, except Sunday) (f)

a.m.

12.00 Poetic Melodies (daily, except Sunday) (d)

12.30 Modern Radio Course (n)

12.30 Voice of Fireside Concert (c and g)

TUESDAY

p.m.

2.00 "Dear Columbia" — Fan Mail Dramatization (a)

2.10 Social Topics, by Mr. Rives (j)

2.40 Press Radio News (a)

3.30 Mystery Chef (c)

3.45 The Wife Saver (c)

5.00 Cleo Brown—Songs (c)

6.00 Jack Berch and His Boys (d)

6.30 The Merrymakers (d)

6.30 It's a Women's World (c)

8.00 Theatre Matinee (b and d)

8.45 Have You Heard?—Dramatization of Interesting Facts (f)

9.30 Club Matinee—Variety Show (f)

10.00 Del Casino (b and d)

10.15 Three X Sisters (c and g)

10.30 St. Louis Syncopators (b and d)

10.35 Short Wave Mail Bag (c and g)

11.00 News in English (i)

11.00 Amos 'n' Andy (c and g)

11.15 Vocal Varieties (c and g)

11.20 Latin American Hour (i)

a.m.

12.00 Harvard Glee Club Concert (n)

12.30 Wayne King's Serenade (c and g)

1.30 Al Jolson Show—with Martha Raye, Parkyakarkus, and Victor Young's Orchestra (from Hollywood) (e)

2.30 Jack Oakie's College—with Benny Goodman's Band, Collegiate Talent and Guest Stars (from Hollywood) (e)

Brothers Three

The Dalton Brothers—Kelly, Pete and Jack specialize in close harmony and comedy songs with vocal instrumentation.

WEDNESDAY

p.m.

2.00 Music in the Air (a)

5.00 Three Rancheros (c)

6.00 Make Believe—Ruth Carhart, Bill

6.00 Make Believe—Ruth Carhart, contralto; Bill Perry, tenor; Novelty Orchestra (d)

6.00 Fantasy in Rhythm (c)

6.45 Music for the Moment (c)

7.00 News Through a Woman's Eyes (d)

8.00 Manhattan Matinee—Variety Programme (b and d)

8.15 Continental Varieties with Celia Branz (Contralto) (f)

8.30 Current Questions Before the House (b and d)

9.00 Chick Webb and His Orchestra (c and g)

9.45 Academy of Medicine (b and d)

10.00 Re-Broadcast for Europe (m)

10.15 "Four Stars"—Mixed Quartet (b and d)

10.35 Cappy Barra's Swing Harmonicas (c and g)

11.00 North American Hour—News in English (i)

11.00 Del Casino—Songs (d)

11.00 Amos 'n' Andy (c and g)

11.05 Harry Kogen and His Orchestra (f)

a.m.

12.30 Time for Gogo De Lys (d)

12.45 Boake Carter (d)

1.30 "Laugh with Ken Murray"—Ken Murray (Comedian), "Oswald" Shirley Rosee (Vocalist), Marlyn Stuart, and Sud Gluskin's Orchestra (e)

THURSDAY

p.m.

2.00 As You Like It—Variety Programme (a)

2.30 Greenfield Village Chapel (a)

2.10 Life in Paris, by Mr. Henri Bellamy (j)

3.45 The Wife Saver (c)

5.00 Marguerite Padula—Songs (m)

6.00 Jack Berch and His Boys (d)

6.30 It's a Women's World (c)

7.00 Ramble; in Rhythm (d)

7.45 Piano Recital (f)

8.00 N.B.C. Light Opera Company; Harold Sanford, Conductor (f)

8.00 Theatre Matinee (b and d)

8.30 "Do You Remember"—Old Favourites (b and d)

9.00 Bob Byron—Piano and Patter (b and d)

9.15 Carol Deis, soprano (c and g)

9.30 U.S. Army Band (b and d)

10.00 Re-Broadcast for Europe (m)

10.15 All Hands on Deck (b and d)

11.00 Amos 'n' Andy (c and g)

11.00 Patti Chapin—Songs (d)

11.00 North American Hour—News in English (i)

11.05 Harry Kogan and His Orchestra (f)

11.20 Latin American Hour—News in Italian, Spanish and Portuguese (i)

11.35 Chuchu Martinez—Tenor (f)

a.m.

12.00 "Easy Aces" — Comedy Sketch, featuring Jane and Goodman Ace (f)

12.00 Poetic Melodies — Jack Fulton (Tenor), Franklyn MacCormack (Reader), and Carlton Kelsey's Orchestra (d)

12.45 Boake Carter (d)

1.00 A. and P. Bandwagon—starring Kate Smith, with Jack Miller's Orchestra (e)

2.00 Major's Bowes' Amateur Hour (e)

FRIDAY

p.m.

2.00 Metropolitan Parade (a)

2.10 Events of the Moment (j)

2.40 Press Radio News (a)

3.30 How to be charming (c)

6.00 Make Believe—Ruth Carhart, contralto; Bill Perry, tenor; Novelty Orchestra (d)

6.00 Show Time Matinee (c)

7.00 News Through a Woman's Eyes (d)

9.00 Among our Souvenirs (b and d)

10.00 Salvation Army Staff Band (b and d)

10.15 Barry McKinley—Songs (c and g)

10.30 Doris Kerr—Songs (c and g)

11.05 Harry Kogen and His Orchestra (f)

11.05 North American Hour—News in English and Italian; Concert of Request Numbers (i)

11.15 Hobart Bosworth—Dean of Hollywood (d)

a.m.

12.00 "Poetic Memories"—Jack Fulton (Tenor), Franklyn MacCormack (Reader), and Carlton Kelsey's Orchestra (d)

12.00 Mary Small—Songs (f)

12.30 Hollywood News (d)

12.30 WGY Farm Forum (c and g)

12.45 "The Little Theatre" (n)

1.00 "Broadway Varieties"—Oscar Shaw (Baritone), Master of Ceremonies, Camela Ponselle (Mezzo Soprano), Elizabeth Lennox (Contralto), Victor Arden's Orchestra, and Guest Stars (e)

SATURDAY

p.m.

2.00 Breakfast Club (f)

2.00 Ray Block at the Piano (a)

2.10 Judicial Talk by Mr. Henri Del mont (j)

2.15 Dalton Brothers—Male trio (a)

2.45 Mellow Moment (a)

2.55 Press Radio News (a)

3.00 Our American Schools (c)

3.15 Home Town (c)

3.30 Mystery Chef (c)

3.45 Dixie Debs (c)

4.00 Chasin's Music Series (c)

5.15 Orientale (d)

5.30 George Hall and His Orchestra (d)

6.15 Bob and Vera (d)

8.00 "Down by Herman's" (b and d)

8.00 Chick Webb and His Orchestra (f)

8.30 Ricardo and His Caballeros (f)

8.45 European Post Box (m)

9.00 Monitor Views the News (m)

9.00 The Dictators (b and d)

9.30 The Dancepaters (b and d)

9.30 Ann Leaf at the Organ (b and d)

10.00 World's Youth Speaks (m)

10.00 Top Hatters (c and g)

10.45 Religion in the News (c and g)

11.00 El Chico—Spanish Revue (c and g)

11.00 North American Hour—News in English (i)

11.20 Latin American Hour (i)

a.m.

12.00 Saturday Jamboree (c and g)

1.30 Johnny Presents—Russ Morgan's Orchestra; Charles Martin's Circumstantial Evidence Thrills, "It Might Have Happened to You" (e)

GETTING THE UTMOST FROM SHORT-WAVE RECEIVERS

THE OTHER Sunday I called on a friend who recently acquired an expensive all-wave receiver. He was complaining bitterly that there was no low-brow programme on, so I suggested trying one of the Yank short-wavers. To my surprise he told me that he never listened on short waves, because he could never find a station of real programme strength value. I went over to the set and tuned in W2XAD, turning out a fine programme, and asked my friend what he considered wrong with that. He replied that I was an expert, but that the ordinary man could not normally get reception as clear, and that he was fed up with trying.

Many listeners have no doubt had the same experience, so in this article I am going to try and explain some of the points in getting good short-wave reception.

● Fading

In normal broadcast reception, the station to be received is usually a comparatively short distance away, and uses very high power. All we do to receive it is to turn the dial to its wave, and increase the volume until it is loud enough. But if we go through the same procedure with short waves, we often find that fading is bad, or quality worse.

We get fading on the broadcast bands, that gradual dying away and equally gradual return to full strength of the station. On short waves we not only get this fading, but also another type, called "selective fading." This selective fading is one of the main causes of distortion. It causes certain frequencies to fade more than others, and as these frequencies may be very close it ruins the quality of reception. Put in non-technical language, the high notes of a short-wave station may fade, while the low notes are unaffected. If this fading is very rapid, that is occuring several times a second, it can easily be realised how badly quality may be impaired.

● Using the Controls

Let's try playing with the tone control. As we turn this control the top notes are reduced. If selective fading is affecting these top notes, and we can reduce the top notes in reception, then we must at the same time reduce the fading. The ear will scarcely notice this reduction of top note response, but it will notice a tremendous improvement in fading, and the reception will sound far better.

Some receivers are fitted with "variable selectivity." Use of this control also has the same effect, and by a judicious use of this control and the tone control, a station which is apparently coming in poorly can be turned into quite a decent programme.

The ordinary type of "up and down" fading, the sort we get on medium waves, is supposed to be taken care of by the automatic volume control (A.V.C.) incorporated in the receiver. This is entirely automatic, and is operated by the signal reaching the receiver. When this signal fades, the receiver is automatically turned up, and when the signal regains its full strength once again the receiver is automatically turned down, thus obviating any effect of fading. There is a limit to the amount the receiver can be turned up, and if the signal fades so much that turning the receiver full on still does not make is readable, fading will be noticed. Fading as bad as this is seldom experienced on medium waves, and so we are used to the A.V.C. smoothing out all of it. Going down to short waves, we find that fading is rarely as bad as this, but occurs far more rapidly.

● Use Controls Carefully

Thus although on medium waves it may take up to three minutes for a station to fade from full strength to minimum, on short waves it usually takes only a matter of seconds, and this gives us reception in a series of "bursts." If we have the volume control turned up full, the loudest part of the signal will most likely overload the set, whereas when it fades to minimum, as our ears have been deafened by the previous burst of volume, we shall have difficulty in hearing, although the signal may still be perfectly readable. When fading of this type occurs a good tip is to reduce volume, and the effects will be nothing like so apparent as when the receiver was turned full on. It all sounds very complex, but if you work it out on the law of averages you will see the logic of it.

Many experienced amateurs fall into this trap of too much volume, especially those using communication receivers. They hear a weak signal, turn up the volume, and are annoyed to hear it swamped out by noise. Receivers of this type have R.F., I.F. and L.F. volume controls, as well as variable selectivity and tone controls. Don't turn all the volume controls up full and expect good results, because you won't get them. Try the effect of reducing each of these volume controls in turn, and you will be surprised at the improvement in reception.

● Control Filters and Ganging

This volume business is particularly noticeable with receivers equipped with crystal filters. There is so great a reduction of background noise when the crystal is switched in that we think the signal has also dropped in strength, and so turn on the volume.

(*Please turn to page* 27.)

Charles Wheeler's

JUNE LOG

ONCE AGAIN the Japs are in the news, and it is becoming even easier to listen to "the Land of the Rising Sun." J2J is still in use for European transmissions on 25 m., but J2K (15,160 kc.) has replaced JVM. The former is heard every evening with very fine signal strength, and free from that annoying fade which used to spoil JVM.

● More Japanese News

Since April, news has been given in French and German as well as English. The Nippon Hoso Kyokai send a very attractive photo of their station as a QSL.

If you like to hear something unusual the music of the East is sure to interest. Each evening JZK gives a concert of various types of Japanese music: the strangest I ever heard was announced as "Court Music!" From HS8PJ (Siam) comes something more like our idea of music, and their almost fairy-like tunes are very entertaining. This, however, cannot be said for the average Indian song: hear for yourself through VUB, or, on a Saturday, from VQ7LO at Nairobi. The latter has not been heard so well lately, as summer conditions are prevailing, and 7LO is a winter station. Coming nearer home, 2RO is the best source for Arabic music, which is included in their propaganda to Africa and Palestine. Of actual European programmes, Belgrade's and Sofia's are the strangest. The former station is willing to send their weekly programme in return for reports, and has been heard to offer newspapers to listeners.

Europeans have been very active, especially those in Scandinavia, KJ1 on his new frequency (6,130 kc.) is one of the loudest stations on the band, while a newcomer—I think Danish—is on 15.150 kc. and causes some QRM to JZK.

According to an announcement from EOQ2, their call has been changed to EAR; their schedule also has been altered. Belgrade is not quite so strong as during the winter, but still quite good for their 1 kw. A communication gives the call as YUA.

CT1AA (Lisbon) gives some interesting folk music recitals about 9.30 p.m. and is almost as loud as I2RO. Another Portuguese station is operating on 5.7 mc. but no English announcements are made.

● Multi-frequencies of OLR

The OLR transmitters use 13 different frequencies in all; two fresh ones are -2B (6,030 kc.) and -5C (15,160 kc.). -5A is working on 15,230 kc. now. All those heard are still very loud and have excellent quality. Prague uses a very distinctive horn interval signal.

Commercial phones have provided some unusual reception, especially those below 16 m. Brazil is not very difficult to receive, but it does seem unusual to hear it on the loudspeaker in broad daylight. This has been done when PPU was calling Lisbon. Ethiopia now possesses several powerful stations which may be heard, calling home, any afternoon: IUG is about the best of these. JVA (18,910 kc.) is used in the Tokio-Berlin telephone circuit, while DFN or DFZ are the German stations. English is used by the engineers. Canada, during the past month was represented by CGA.

A particularly interesting transmission is made by the American Bureau of Standards, through WWV. He transmits a standard note of 440 cycles, on a frequency guaranteed to be correct to better than one part in a million. Frequencies of 20,000, 15,000, and 5,000 kcs. are used.

● South Americans

South Americans are as active as ever on 49 m. and 31 m. Any morning at 5 a.m. a dozen or more can be heard, and even if their programmes do consist of gongs and rumbas, interspersed with Spanish advertisements for tooth paste, they are quite interesting.

HJ3ABX is truly "La Voz de Columbia," and can be identified by frequent mention of the slogan.

YV5RD, one of the loudest of all S.A.'s, is no longer heard in the evening, but comes in very well up to 6 a.m.

The Cubans are still well heard with the exception of COCH. COCQ is now on the air until 7 a.m. with programmes of Cuban dance music.

● U.S.A. and S.A.

Except for the 19 m. trio there has been very little in the evening from U.S.A. However, early mornings give a little better luck. W3XAL is the best on 49 m., while W8XK is only a shadow of his former self, and W8XAL is usually jammed by a South American.

On the 12th of May, the direct telephone link between South Africa and U.S.A. was opened. A special programme was broadcast from ZSS on that occasion, consisting of a description of the Cape bushmen, 50 of whom were in the studio. These people who, we were told, have been nearly exterminated, still live in the Stone Age. They chanted before the microphone, and Ako (pronounced with a click) their leader, spoke in a very shrill voice, reminding us of a people over whom the radio has no influence.

Before closing I have an apology to make. Last month it was suggested that SU1KG was a Mancunian, whereas he hails from Yorkshire. In doing so I nearly started a second War of the Roses.

If you hear any interesting programmes or new stations I shall be very pleased to hear from you; meanwhile, goodbye.

On the Amateur Bands

"Ham" News by G5GQ

THE LURE of fone has again dragged me on to the 7 mc. band for local rag-chewing, and so this month the column will be somewhat more personal than usual.

First of all, in case any readers heard me, I was not using the battery transmitter for phone, but a 6A6 crystal oscillator, followed by an RK20 suppressor grid modulated. The speech equipment was a condenser microphone with four stages of R.C. amplifiers.

● Over-Modulation

Chatting to G5KJ on the general subject of 7 mc. fone, we discussed the prevalent fashion of over-modulation. He remarked that ever since class B modulators had come into use, the 7 mc. band had developed this craze for over-modulation. What most people are doing is to adjust their transmitters for 100% modulation by humming near the mike, and leaving the gain set there. Actually 100% modulation is only intended for peaks, the normal voice level being in the neighbourhood of 70% modulation. Adjusting the rig for 100% modulation during normal voice level means that it will be modulating about 170% at peaks, and that is what causes all this spreading and splashing on 7 mc.

Using Heising modulation it is difficult to notice over-modulation from the quality aspect, because of the characteristic of a class C modulated amplifier, but with control or suppressor modulation distortion is apparent immediately over-modulation occurs. The part that amazed G5KJ and myself was that so many of these stations were so certain that they were not overdoing things. The trouble is that reports from other stations are so unreliable and unless measuring equipment is used it is difficult to believe that one is guilty of this mis-adjustment.

I carried out a series of tests with G6QN, in which I increased modulation from 100% at peaks to 100% normal. 6QN reported that while the strength of the signal came up, the quality definitely went down, which shows that a marvellous report from a DX station does not prove the transmission to be perfect.

● Duplex Working

My neighbour, G5HI, has been doing a lot of duplex work with me recently. A particularly interesting bit was when I relayed his signals to EI9D, owing to QRM on his frequency. We all got rather tied up in our announcements as EI9D and G5HI were picked up from the receiver via the mike and so out on the air again!

This duplex work is simple if you know the dodge, which is to use manual control instead of A.V.C., and also to use a small indoor aerial. Only one station can use loud speaker reception, as the use of them at both ends causes "singing back."

● Oscillation

G2US called at my shack last Saturday. Hadn't seen him for years so was very glad to hear he is coming on the air again. He said that he was pleased to note that someone had at last had a shot at the "Hi, hi" merchants mentioned in this column last month. Remember working him on 180 metres with a receiver pushed into oscillation. R7 at about six miles I think it was, which shows the damage an oscillating receiver can do if allowed to radiate.

● Microphones

Late last year I had a long chat with G8BA on microphones, particularly the Reisz type. The factors in the design of this type of mike are the distance between the diaphragm and the back plate, and the quality of the granules used. The smaller the gap, the more sensitive is the mike. The tension of the diaphragm varies with the depth of the gap, and so quite a lot of experiments can be made building various designs of Reisz mike.

Anyhow, G8BA has been doing a great deal of experimental work, constructing different Reisz types, and is putting out a very fine transmission. Hams who do not feel inclined to spend large sums on commercial mikes should listen to G8BA and have a shot at making their own.

Incidentally, Reisz mikes bring to mind a tip, which most of the old hands know, but which may be fresh to some of the newly licensed ones. Never put the input transformer of a microphone within a couple of feet of a mains driven amplifier, otherwise you will get tons of hum. It may mean a two-foot grid lead, but try it and you will be surprised at the difference to the hum level.

More of the 14 mc. DX crowd are turning to 7 mc. for local work. G2PL made one of his rare appearances on 7 mc. fone the other day. He told me that conditions on 14 mc. at Cambridge had been excellent, with every country in the world coming in. 28mc. has not been so hot, however, but perhaps they will improve during the Autumn.

G2PL is visiting Paris during July, so maybe we shall at last hear a true and authentic account of how the F stations do produce the weird noises we hear.

● W1AW

Had an interesting letter from F. E. Handy, Communications Manager, A.R.R.L., in which he tells me that they are looking for a site for the

(*Please turn to page* 27.)

A SHORT-WAVE AUTODYNE CONVERTER

TUNING FROM 6 METRES UPWARDS

By D. NILEN

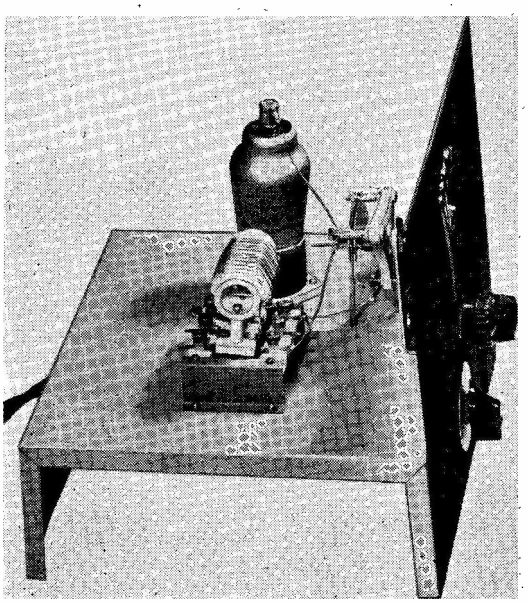
THIS CONVERTER will be found to be sensitive and will receive the television sound transmission very well although the sensitivity falls off below 10 metres. The American Police transmissions have been well received. The actual cars have been heard as well as the station transmitters.

The 10, 20 and 40 metre amateur bands, of course, are received well, the only disadvantage being double-tuning points.

● Coil Winding

The coils are wound with 18 S.W.G. enamelled or tin-covered wire on Formo ceramic formers, which allow the connections to be made without taking them through the centres of the coils. For the coil down to 6 metres four turns, with the cathode tap about $1\frac{1}{4}$ turns from the earth end, are necessary, and for the 18-40 metre coil use ten turns with the cathode tap at $3\frac{1}{4}$ turns. The contact strips will need to be unscrewed to wind the coils.

The grid and earth ends are joined to the two outer contacts on one side, the cathode tap is connected to the contact on the other side, opposite to the earth contact.



A Mullard SP4B valve is used, the top cap being the grid. A cathode bias resistance of 200 ohms shunted by a mica condenser of .01 mfd. is used; the screen potential is derived from a 20,000 ohm resistance in series with a wire-wound potentiometer of 25,000 ohms, the moving contact going to the screen and shunted with a .1 mfd. condenser.

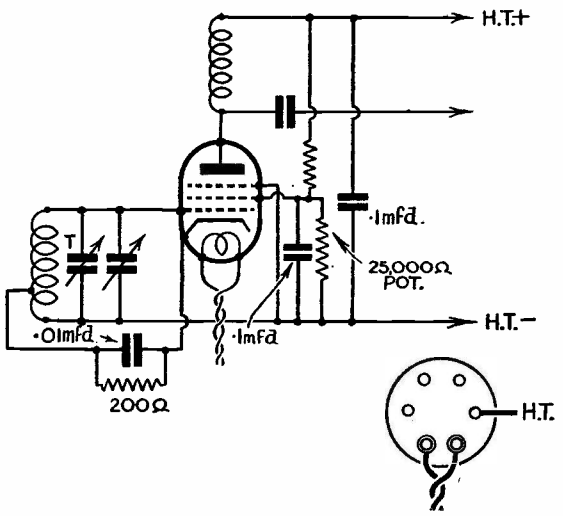
In the anode circuit is a 200-2000 metre choke with the output to the broadcast set taken through a .0003 mfd. condenser. The tuning is by means of an Eddystone tank condenser of 140 mmfd. in ten steps, in parallel with a condenser of 15 mmfd. driven by a reduction drive of 5 to 1.

● Connecting to Broadcast Set

The filament and high tension are taken from the broadcast receiver through a 4-way lead either by means of an adaptor between one of the valves and its holder or to the power socket as fitted to most sets.

It is most important that all screws and metal parts are thoroughly cleaned in order that they will make good contact with the chassis, especial care being needed with a cellulosed chassis.

The filament leads, which should be twisted, are brought right to the filament pins of the valve holder and a .01 mfd. condenser taken from each pin to the common earth point, a tag under the screw fastening the valve holder. The earth screen and the metallising are also connected with this point.



The cathode dial resistance and shunting condenser are fastened direct to the cathode pin and the wire from the other side passes through the hole (which is left vacant when fastening the coil base) to the cathode tap soldering tag on the base.

The wiring is very straightforward and is easily followed from the photograph of the chassis.

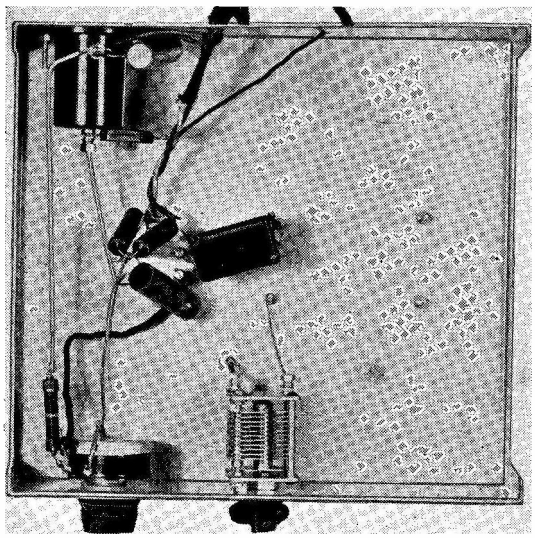
The reason the aerial is taken direct to the cathode tap instead of through a small condenser to the grid is that, in the writer's experience, it gives much greater signal strength and no trouble due to blind spots. Should, however, one get this trouble it is worth trying a small variable condenser in the aerial.

● Operation

To operate the converter transfer the aerial and earth leads from the broadcast set, which should be tuned to about 1800 metres, the earth to chassis of the converter and the aerial to the cathode tap terminal on the coil base.

COMPONENTS

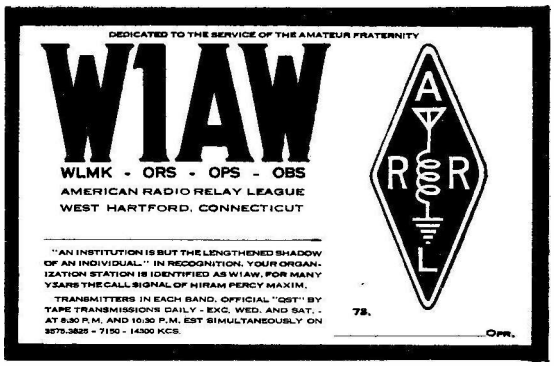
Valve, Mullard SP4B.
1 Peto-Scott Chassis drilled to specification.
1 Formo single short-wave coil stand.
2 Formo plug-in short-wave coil formers.
1 Clix 7-pin valve holder (V.5).
1 Bulgin 25,000 ohms potentiometer (V.C. 46).
1 Eddystone tank condenser (1042), dial and knob.
1 B.T.S. U.S.W. condenser .000025 (STC 425).
1 Ormond S.M. dial.
1 200 ohms and 1 20,000 ohms Franklin resistors.
1 .01 mfd. condenser, 2 .1 mfd., 1 .0003 (Franklin).
1 Bulgin H.F. choke (H.F. 12).



"ON THE AMATEUR BANDS"—*continued from page 25.*

new headquarters station. This has been allotted the call WIAW since the anniversary of the death of Hiram Maxim (the original WIAW), and the new station will be a memorial to him.

The QSL card of the memorial station is shown below, so let's show our respect to "The Old Man" by not copying it, but rather letting its distinctive style remain exclusive as a memento to his memory.



● VS2AK

Mention last month of hearing VS2AK on phone at the unusual hour of midnight brings a letter from Mr. Harold Taylor, of Bridgend, in which he says that he received VS2AK on his first QSO with a G station (G5PD) at 15.20 G.M.T., 15.2.37.

● Finale

We have got to finish off gracefully now, so has anyone any results to report on the eclipse? If so, write us a card, letter, article, anything to let the rest of us hear about it.

"USING SHORT-WAVE RECEIVERS"—*continued from page 23.*

When using a crystal filter the first thing to realise is that the weakest possible volume must be used, otherwise the advantage of the filter is lost. Try it on a weak signal when interference is bad.

Finally there is the question of whether the set is in gang, which means whether the receiver circuits are all tuned properly. This is done when the set leaves the factory, but receivers often get rough handling in transit which ruins the ganging, reducing reception enormously. If there is any doubt about this point, any competent service man will re-gang the set for a matter of a few shillings, well spent money. Crystal filter receivers are particularly prone to this trouble, for, unless the intermediates are tuned to the actual crystal frequency, use of the crystal will only result in a drop in signal strength. The crystal should be removed from the receiver, placed in a crystal oscillator circuit, and the receiver ganged from the oscillator. Only by this means can it be certain that the receiver is accurately ganged.

A SIMPLE FREQUENCY METER MONITOR

By A. J. DEVON

A WAVEMETER or frequency-measuring device of some kind is nowadays a necessity in every amateur station—whether transmitting or receiving—which lays any claim to being at all efficient and up-to-date. In present amateur practice, such an instrument usually takes the form of a combined heterodyne frequency meter and listening monitor, working on the harmonic principle. It is, in fact, nothing more than a valve oscillator, stable enough to maintain its calibration within reasonable limits, which can be used as a shielded monitor for listening to the CW output from the transmitter and as a calibrated oscillator in conjunction with the receiver.

● General Application and Design

While it is possible under some conditions to check telephony transmission in the same way, it is generally better to use a separate listening circuit for speech work, such as diode valve, a crystal detector or a Westinghouse rectifier. Though the meter happens to provide a convenient means of monitoring CW, it should be regarded primarily as a frequency *measuring* instrument, and its operation as monitor secondary and incidental to this.

In the same way that the transmitter can be heard on the frequency-meter—due to the beat or heterodyne between the radiated signal and the oscillating meter valve—so the latter can be picked up in the receiver. This in turn means that the meter calibration can be referred to the receiver, and it is likewise possible to locate the transmitter frequency *exactly* on the receiving tuning dial, a very valuable point when working through QRM; again, the frequency of any incoming signal within the meter tuning range can be obtained by heterodyning the meter with the receiver.

Where ECO and master-oscillator drive circuits are used for transmission, it is obviously necessary to set the frequency exactly and not just "somewhere in the band," and for this purpose some sort of calibrated oscillator, such as the meter here described, is absolutely essential.

The accuracy of calibration which can be obtained depends on a number of factors which there is not space here to discuss at length. Briefly, the tuned circuit must be exceptionally stable and unaffected as far as possible by voltage and load variations, while the tuning range must be such that the amateur bands are spread over the whole dial. Since the bands are approximately in harmonic relation, and the circuit is arranged to generate strong harmonics, it is not necessary to provide for coil-changing, because an oscillation at, say, 1,790 kc. on 1.7 mc. can also be heard at 3,580 kc., 7,160 kc. and so on. Therefore, if the instrument is designed to cover the 1.7 mc. band, its harmonics will automatically cover also all other amateur bands. In the same way, when used as a monitor, it will pick up the transmitter signal on any band.

All this will be made clearer by a study of *Fig.* 1, where the meter tuning range falls between L and H, thus obtaining full coverage. There is, however, an objection to this—the cramping of the HF bands. In a simple circuit, this can only be overcome by so arranging things that the full tuning range falls not between L and H, but from M to J. Thus, the HF bands are spread out, but the LF and HF ends of 1.7 mc. are not covered. It therefore becomes a matter of individual requirement as to which is likely to be the most useful range, depending on relative activity on the different bands. In most cases, where transmission is chiefly on 7 and 14 mc. the range M to J will be chosen, though the tuned circuit in the particular frequency meter described here can be adapted to give any required spread.

● Circuit Details

In *Fig.* 2 is given a very suitable circuit—the electron-coupled oscillator using a battery screen-grid valve, an inherently stable arrangement. All values are given in the table, and it is recommended

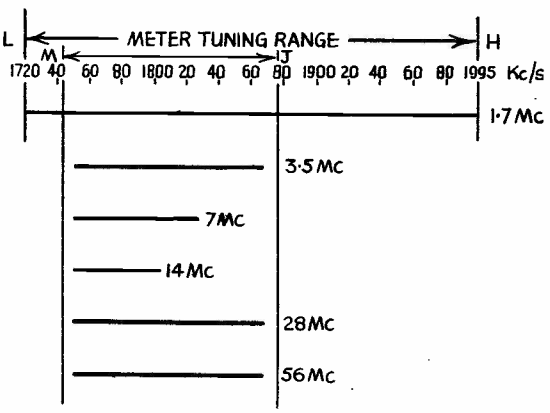


FIG. 1.

Scale drawing showing relative widths of British Amateur bands. Frequencies in true harmonic relation lie between vertical lines drawn through the LF end of 3.5 Mc and the HF end of 14 Mc. Meter tuning range M-J gives most useful coverage with the maximum band-spread. Range L-H gives full coverage of all bands, but cramps HF bands.

that the specified parts be used, as they just fit nicely the aluminium chassis and box—the necessary dimensions for which are shown in *Fig.* 3—resulting in a neat and compact assembly.

The photographs illustrate the general appearance and construction, the most important part of which is the coil, L1—L2. Since there is no coil-changing, a plug-in former with its associated holder is not necessary—there is no room for it anyway—and the coil is therefore wound on a small piece of ribbed ebonite rod, 1 inch diameter by $1\frac{1}{4}$ inch long, mounted by means of a strip of aluminium bent into a bracket, about $\frac{3}{4}$-inch each way. This is bolted to the chassis, and the coil former has a hole tapped 4BA at one end to take a fixing screw. Ribbed ebonite rod is quite cheap and has a number of applications in amateur work; it can be obtained from Messrs. Lumen Electric Co., Scarisbrook Avenue, Liverpool, 13, who also market many useful items for the constructor.

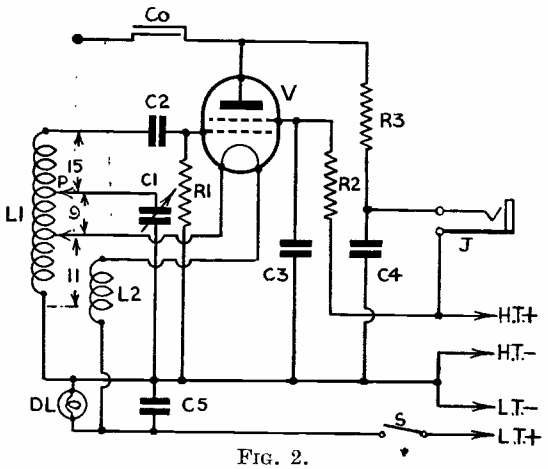


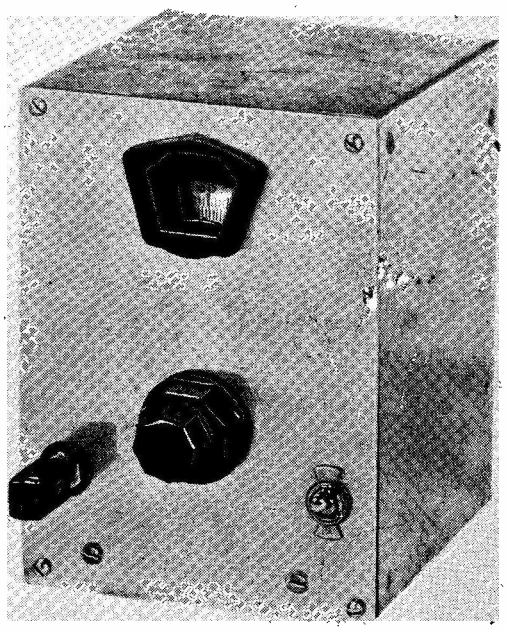
FIG. 2.

Circuit of electron-coupled heterodyne frequency meter. L2 is wound over cathode section of L1. See table for all values and text for full details.

The connections from the coil are taken straight off the former into the circuit, the taps being protected with sleeving. They are made by looping the wire back far enough to reach the required point, with a few twists to hold them in place. The ends of the winding L1 are secured through small holes drilled in the shoulder of one rib. The second cathode (filament) coil L2 is wound over *the corresponding part of L1*. A piece of gummed paper should be laid over the 11 cathode turns of L1, with a hole for the tap, and then, with the sleeving on, the top end of L2 is anchored by making a turn or two round the sleeving, taking care not to allow any contact between L1 and L2. Each cathode winding is respectively in series with one leg of the filament, and if the enamel cracks, there will not only be a short between them but also across the LT supply. L2 is wound on in the same direction as L1 and the end terminated through a hole in the former, thence to the switch. No. 26 enamelled wire is specified for these windings because it is easy to work on a small former and will carry the LT for the valve with the minimum of voltage drop. It is also a useful gauge for all sorts of amateur work, and though only a few feet are required for this coil, a $\frac{1}{2}$-lb. spool will be found very handy.

The coil values given in *Fig.* 2 will, if the construction is reproduced as closely as possible, be found to spread the whole 100 degrees of the dial over the range M to J in *Fig.* 1. If the entire 1.7 mc. band is to be covered, the condenser tap P can be moved up the coil towards the grid end (and turns added to the grid winding) till the required range is obtained—about four turns up should be right, making the values in *Fig.* 2 15, 13, 11, total 39. Note that this coil assembly and tapping is somewhat critical, and it is necessary to be prepared to do some adjusting to tap P and the total turns value to get the spread just right. If the range M to J is to be used, and P has to be altered, it is only necessary to set the receiver oscillating just outside the LF end of 7 mc. and then, having made sure it will pick up the monitor, adjust P till the beat-note is heard with the frequency meter dial reading about 90 degrees. One turn is enough to move the point 10 or 15 degrees, so care is indicated.

As the design requires that the meter be completely shielded to maintain stability and calibration and to prevent indirect pick-up, some means of bringing in the transmitter signal and feeding into the receiver must be provided. This is done by the small output coupling condenser Co, illustrated in *Fig.* 4, which can easily be home-made from two strips of aluminium and a piece of ebonite; alternatively, a midget trimmer can be used, but both



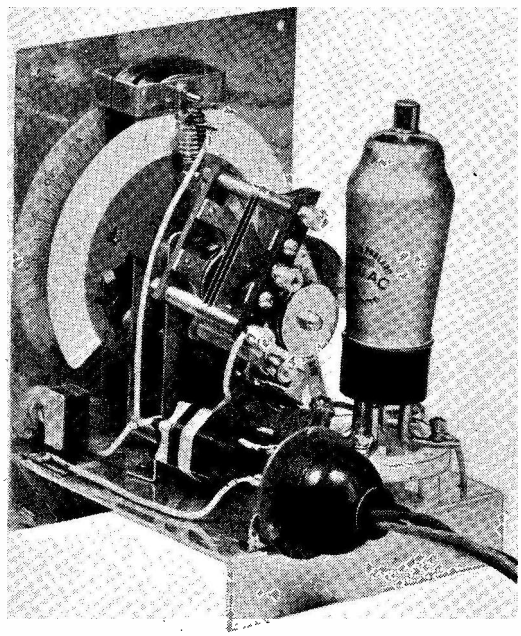
sides must in either case be insulated from the box. This output condenser is bolted to the inside of the back panel, over to the right to clear the valve, and connected between a midget stand-off insulator on the outside of the back panel and the top cap of the valve. For constructional convenience, this lead is about 5 inches to 6 inches long, so that it can be fitted with the chassis and front-panel withdrawn. A few feet of wire to the insulator then gives all the coupling required between the meter and receiver or transmitter.

● Assembly

The "J.B." slow-motion dial and tuning condenser fit together and when mounting the latter—the rotor of which ties to the chassis through the dial frame —note that two or three washers are required under each of the condenser fixing screws, which are rather on the long side for the pillars, also that the condenser frame should be put in vertically instead of horizontally, i.e., when the plates are all-in, they are nearly vertical. The visor escutcheon is a little too deep for an aluminium panel, so that it is necessary to pack it with spacers under the outside ears to a depth of about 1/12th-inch. These small points will be more evident on examination of the components.

Looking down on the chassis from the front, the valve-holder goes on the left towards the rear, so that the moving plates of the condenser clear the valve when it is in position. The coil fits almost under the condenser, with its LT end towards the front panel, thus facilitating wiring. The fixed condenser, and grid-leak are wired in under the chassis, with the voltage dropping resistors R2 and R3 near the valve-holder. Sleeving should be used where wire-ends pass through the chassis.

The filament switch must be insulated from the panel, also the 'phone jack; with the Bulgin switch specified, the control arm is already so insulated, but if any other type is used, this point should be checked, while in the case of the Bulgin jack, either their insulated bushes or home-made fibre washers are necessary. The HT and LT connections can be taken to a row of insulated terminals on the back sub-panel or, as in the model, to a four-pin valve-holder mounted to the rear of the chassis by means of small brackets—Meccano brackets are very suitable. A hole is then required in the back panel, as shown in *Fig.* 3, into which this valve-holder makes a snug fit; a four-way battery cable with an Eddystone 4-pin connector plugs into the holder and completes a neat job.



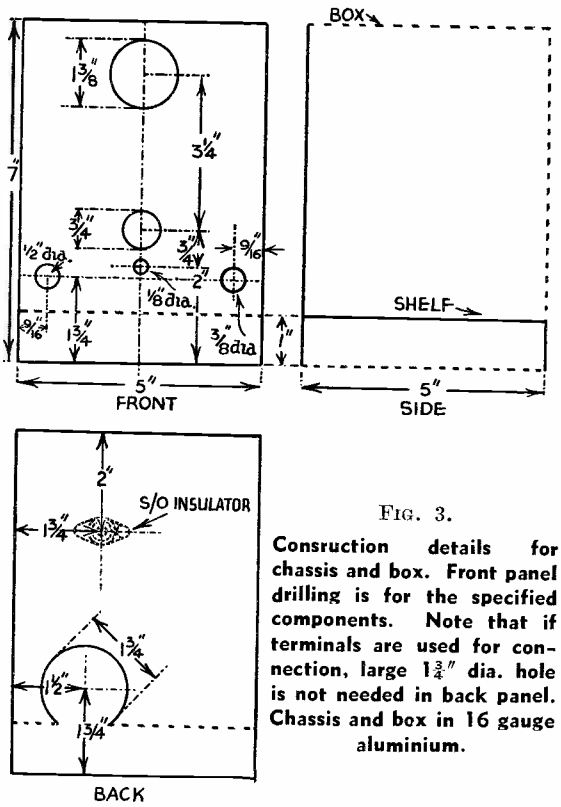


FIG. 3.

Consruction details for chassis and box. Front panel drilling is for the specified components. Note that if terminals are used for connection, large 1¾" dia. hole is not needed in back panel. Chassis and box in 16 gauge aluminium.

● Testing

Before switching on, a pair of 'phones should be jacked in and the instrument then checked for oscillation all round the dial by touching the grid side of the tuning condenser. If a high-pitched howl is heard, either the grid-leak value is too great or the cathode turns too many, though it is not likely that these troubles will be encountered unless there is a wide deviation from specification. The next test is to beat the meter with the receiver on

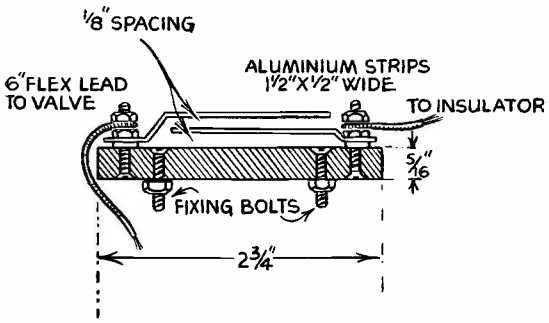


FIG. 4.

Constructional details of output condenser Co. Screws should be well countersunk. Dimensions are not critical.

3.5 mc. (the meter fundamental) to ascertain if a good pick-up is being obtained—the wire from the stand-off insulator on the meter should be brought near or even wrapped round the aerial lead to adjust this—with the required coverage and a clean note. If there are a cluster of beats, either HT or cathode turns must be reduced, or the grid leak taken to LT positive, though here again values have been carefully chosen to permit of satisfactory operation on anything from 70 to 120 volts HT. The total HT current consumption ranges from 1.1 to 1.9 ma. at these voltages.

Next month the calibration of the frequency meter will be dealt with, also various points in connection with its operation and use.

TABLE OF VALUES.

V—Battery SG valve, Hivac SG215.
C1—Jackson Bros. 50 mmfd. S/W Special; "J.B." S/W slow-motion Dial.
C2—.0002 mfd., Dubilier 690W.0002.
C3, C4, C5—.01 mfd., Dubilier 4421/E.01.
R1, R3—50,000-ohm ½-watt, Bulgin H.W. 23.
R2—100,000-ohm ½-watt, Bulgin H.W.25.
J—Close-circuit jack, Bulgin J.7; plug to match, Bulgin P.38.
S—On-off switch, Bulgin S.147.
DL—Dial light, Bulgin B.210 bulb.
4-pin Valveholder, Eddystone 949.
4-pin Valveholder, Eddystone 953.
4-pin lead connector, Eddystone 1030.
Midget stand-off insulator, Eddystone 1019.
L1—35 turns No. 26 enamelled wire on 1 in. dia. ribbed ebonite rod, tapped as shown. (See Text).
L2—11 turns No. 26 enamelled wire wound over L1. (See Text).
Co—Output coupling condenser (See Text).

DECIBELS

THE PURPOSE OF this short article is to disillusion those who think that the use of the decibel can only be understood by mathematicians.

The first thing to remember about the decibel is that it is a unit of ratio, and not of intensity of sound. For example, the statement: "the output of my set is 20 decibels" is meaningless. On the other hand, definite information is given by saying that a set's output is 20 decibels above hum level.

A difference of one db. is defined as the smallest difference in sound level that can be detected by the human ear. Experience shows that an increase in acoustic power of about 25% just produces an appreciable difference in sound level, so a gain of one db. corresponds to a power amplification of 25%.

As an illustration of the use of decibels, let us consider the effect of varying the power supplied to a loud-speaker. For simplicity, the arbitrary zero (0 db., the standard of comparison) can be taken as the output corresponding to an input of one watt delivered to the speaker. To raise the output by one db., the power would have to be increased by 25%, i.e., to 1.25 watts. A further increase of 25% in power, raising the sound level to two db above zero, would bring the power up to 1.56 watts. This process can be repeated to find the power ratios to increase the sound level by 3, 4 db., and so on.

As this process soon becomes very tedious, logarithm tables are generally used for these calculations. It can be shown that the decibel gain is equal to 10. log R, R being the power ratio.

Example:—Find the decibel gain caused by amplifying the power from a microphone 10000 times.

Here R=10000; log. R=4.00.

Therefore, decibel gain=10 log R=40 db.

The table below is made up from a number of similar calculations.

Power Ratio.	Decibel Gain.
1	0
1.6	2
2.0	3
2.5	4
4.0	6
6.3	8
10	10
16	12
40	16
100	20
1,000	30
10,000	40
1,000,000	60

For all amplifier work the zero (0 db.) level is taken as 6 milliwatts. Thus, a microphone rated at –85 db. requires an amplifier having a gain of 85 db. to give an output of 6 milliwatts.

Note that for powers below the zero level (that is under 6 mw.) the minus sign is placed before the figure as in this case: –85 db.

To obtain voltage or current ratios multiply power decibels by two.

ON TEST and CATALOGUES RECEIVED

BULGIN TAPPED CHOKE, TYPE L.F. 43.

Makers: A. F. Bulgin, Ltd., Abbey Road, Barking, Essex. *Price*: 5*s*. 6*d*.

Here is a choke having a variety of uses. It has a maximum inductance of 3 henries with tappings permitting the use of .5, 1, 1.5, 2, and 2.5 henries.

The most obvious use to the short-wave experimenter is in audio oscillator circuits, such as those employed for Morse practice and amplifier testing. Using only the 1 henry tapping, capacities of between .1 mfd, and .001 mfd. allow frequencies of between 500 and 5,000 cycles to be generated, a cheaper method than that of adapting an L.F. transformer.

The choke is primarily intended for L.F. tone correction circuits, and in particularly suitable for needle "scratch" filters. As a tone corrector it can be used to reduce top response in a short-wave receiver, helping to reduce atmospherics when they are troublesome. A further use is as a tuned L.F. circuit for C.W. reception, in which it can be used to "peak" one note while attenuating others. In cases where the exact value of a choke is doubtful, this tapped choke will enable the value to be determined.

When used in circuits where the current is large. parallel feed should be employed.

LEXINGTON VALVE TESTER

Makers: The Lexington Instrument Laboratories, Ltd., 155-157, Great Portland Street, London, W.1. *Price*: 10 *guineas*.

This very complete valve tester is equipped to test any type of British or American valve, including the latest "Octal" types.

Two different tests can be applied to a valve, an inter-electrode insulation test, and a cathode efficiency test.

The insulation test, which the makers suggest should be carried out first, is done by means of a neon leakage indicator, sensitive enough to show up a leak as small as 50 megohms. Cathode/earth and cathode/heater insulation tests are made with power applied to the heater, a useful feature as so many defective valves do not show this defect when the heater is "cold."

The emission test is obtained by turning a switch from the "leak" to "test" position, when a $3\frac{1}{2}$-inch scale meter indicates whether the valve is good, questionable, or bad. This test measures the total emission of the valve, and hence the cathode efficiency. A valve which in operation acted perfectly when first switched on but gradually "died" away was shown up under this test by a "creep" on the meter.

The method of testing a valve is rather interesting. On the right of the panel is a filament switch which allows filament voltages of between 2 and 40 to be selected. On the left of the panel is a "selector" switch, having a dial calibrated in numbers. The setting of this switch varies according to the valve to be tested, and a table of settings is provided for most of the valves on the market. Should a new type be produced, all that is necessary to calibrate the instrument is to obtain a new specimen which is known to be perfect, and to rotate the selector switch until the meter reads 100% good. The reading of the selector switch can then be recorded and the instrument thus kept up to date.

Apart from testing valves, the meter can be used for measuring voltages, there being two ranges, 10 and 250 volts,, with a full scale deflection of 1 milliamp. (1,000 ohms per volt).

External continuity and capacity tests can be accomplished by means of the neon tester.

The instrument is supplied complete with carrying case, the lid of which is removable for counter use.

SOUND RECORDING

From the V.G. Manufacturing Co., Ltd., Gorst Road, Park Royal, N.W.10, we have received an interesting booklet on "The Simplat Sound Recording Disc." Although really intended as an instruction book for users of this type of record, much valuable information is given on the general subject of sound recording for amateurs, such as the type of cutting head and amplifier required, and the various surface noises and means of reducing them.

It may be obtained from the address given above, and the price is sixpence.

NEW FERRANTI RECEIVERS

Three new all-wave superhets are announced by Messrs. Ferranti, Ltd., Radio Works, Mostyn, Manchester, 10. The first two are universal, 7-stage models, model 1037U, priced at $10\frac{1}{2}$ guineas, and model 1137U at $11\frac{1}{2}$ guineas. Three wave ranges cover 19-51, 200-550, and 900-2,000 metres, and the Ferranti Magnascopic Dial, providing an effective tuning scale of over 6 feet, is incorporated.

The third, model 1137A.C., is for A.C. use. It is a four-valve table model superhet, having an undistorted output of $2\frac{1}{2}$ watts, and wave ranges of: 16.7-53, 200-550, and 1,000-2,000 metres. A feature of this set is the new three colour all-wave tuning scale and improved Magnascopic dial. The price is 11 guineas.

VARIABLE DIRECTIONAL AERIALS

From A. W. Mann, A.Inst.P.I.. we have received details of his variable directional aerials. These aerials, which can be rotated to increase directional effect, can easily be fitted to any house, no matter how confined the space.

Two models are available, priced at 19s. 6d. and £1 8s. respectively. Further details may be obtained from A. W. Mann, 62, Costa Street, Middlesborough.

WELLINGBOROUGH RADIO & TELEVISION SOCIETY

59 Members added during First Year

[*Photo by permission "Evening Telegraph and Wellingborough News."*

The members concluded their first session with a supper and junk sale at the Exchange Hotel. Mr. A. E. Fletcher (President), who is seen on the extreme right, presided. G5LP is fifth from the right in the first row.

The Society was founded by Mr. L. F. S. Parker, G5LP, BSWL54, in March, 1936, and commenced its active life with a nucleus of nine short-wave fans.

The inaugural meeting was a tremendous success and amateurs from far and near came to the meeting to give the Society a hearty send-off. Over thirty members were enrolled and it was obvious to all that the proposed club was going to have a good start. The subscriptions were fixed at 5s. per annum, payable 2s. 6d. half-yearly, and although this sum represented the most that could be reasonably expected, it should be pointed out for the benefit of others that the facilities enjoyed by some societies, such as a clubroom, receiving and transmitting apparatus, cannot be obtained with this subscription without some period elapsing during which club finances can be allowed to accumulate. This is the position with the Wellingborough Society, we have no clubroom as yet but our cash balance at the bank is growing steadily, and it is hoped that in time sufficient funds will become available to realise our hopes.

● Public Interest Fostered

The inaugural meeting unanimously elected Mr. A. E. Fletcher as President of the Society, and Mr. L. F. Parker (G5LP) was appointed honorary secretary; both officers were re-elected at the annual meeting of the present year. Since the inaugural meeting the membership has grown steadily and now stands at 68. Immediately following the inaugural meeting, a series of lectures were arranged by the hon. sec., and these were held fortnightly until the end of May, 1936, after which date the Society ceased activities until October, 1936, when lecture meetings were again commenced fortnightly.

These meetings have met with considerable success and the general public have been invited by press advertisement to attend. The public have not been pressed to join the Society—new members have joined voluntarily. By this means our meetings receive considerable support from the general public and from whom a collection is gathered to cover the costs of each meeting, this allowing the subscription, in a large measure, to be banked for future need and expansion of the Society's activities.

● Wanted !

Four members of the Club hold transmitting licences, these being G5LP, G6BF, G2VU, G2MD. Several of the members are aproaching the stage where the application for an artificial aerial transmitting licence becomes possible. The Society is, however, sorely in need of a lecturer who would undertake a series of lectures say once monthly to the members covering the theory of radio from the initial stage, and by way of the electron theory, magnetism and induction, etc., lead up to practical radio as we try to understand it to-day. Such lecturers are, however, difficult to obtain, but should anyone read this whom could help in this way, we shall be exceedingly grateful.

The Society is affiliated to The Radio Society of Great Britain and also to the British Short-Wave League, and quite a number of members are also members of the B.S.W.L. and receive the monthly REVIEW from the headquarters of that body.

In conclusion I would like, on behalf of the Society to thank THE SHORT-WAVE MAGAZINE for the interest they have displayed in club activities, and through the columns of the Magazine would invite all readers in the Wellingborough locality to write or call at 127, Jubilee Crescent, Wellingborough, for information as to the Society's meetings or particulars as to joining; also an invitation is extended to radio manufacturers to arrange lectures to the Society and to submit their catalogues to me for inclusion in the library.—*L.F.S.P.*

Energising the Aerial

Some Practical Feeder Systems and their Applications

By AUSTIN FORSYTH (G6FO)

PART I.

IF THERE IS one subject of greater importance in amateur transmission than any other, it is that connected with aerials. While many amateurs feel vaguely helpless when it comes to the design and adjustment of an effective radiating system, nearly all realise that it is the vital factor in getting out. Unfortunately, there is also the small minority—and not all beginners—who still cling to the idea that if a piece of wire of approximately resonant length is hung up somehow and sufficient RF energy generated at the business end of it, DX should follow. And it often does, owing to the strange and incontrovertible fact that in radio, particularly amateur radio, almost anything can be persuaded to give results of a kind.

As all who have had the experience will agree, not only is the subject of aerials a very wide one on which text books can be (and are) written, but it is possible with quite low-power and a properly designed aerial to do very much better than with hit-or-miss methods and high power. Further, it is obvious from the purely economic aspect that paying attention to the radiating system with a view to working as efficiently as possible is very much worth while.

It is scarcely possible within the scope of this article to go very deeply into the question of aerials in general, so that it is proposed to deal now with practical feeder systems only in such a way that the reader will be able to understand the operation of the commoner types and so more readily appreciate and follow the fuller technical descriptions which he may encounter.

● Fundamental Principles

The first point to grasp is that a Hertz aerial—the type with which we are chiefly but by no means solely concerned in amateur working—is in itself nothing more than an oscillatory circuit taking the form of a wire suspended in space, with all the properties of such a circuit. A Hertz aerial can be adjusted to resonate on a given frequency, and its harmonics. Where in a tuned circuit adjustment of the resonant frequency is by means of its associated variable condenser, the only method of similar variation possible in a Hertz aerial is by alteration of its physical dimensions—height or length, and almost always the latter. Again, since the fundamental wavelength of a Hertz aerial (the longest wave to which it will tune by reason of its size) is 2.1 times its length in metres, the well-known formula connecting length and resonant frequency can be derived,

$$L = \frac{468{,}000}{\text{Freq. Kc.}} \text{ where L is in feet.}$$

Now, it is generally believed that a Hertz aerial, when cut for the lowest frequency on which transmission is to take place, say 7,100 kc., can also be operated with equal efficiency on 14,200 kc. and 28,400 kc. Actually, however, the resonant frequencies on the harmonics are *not* exact multiples of the fundamental, and the multiplying factor should in this case be 2.052 and 4.158 respectively, making the harmonic frequencies of a 7,100 kc. aerial 14,570 kc. and 29,510 kc. Note the wide divergence from the usually accepted figures!

It is therefore clear that in order to get good average performance, the aerial should be cut to resonate effectively at the highest harmonic frequency at which it is to be used, since the divergence from the required frequencies on the other bands will not then be so great. In other words, suppose a 7 mc. aerial is to be erected for operation on 7, 14 and 28 mc. the final frequency on the latter band being 28,200 kc., which means that a 7,050 kc. crystal is being used, the formula becomes

$$L = \frac{468{,}000 \times 4.185}{28{,}200}$$

giving a length of 69.5 feet. On 7 mc., this aerial resonates at 6,735 kc. or 315 kc. below the crystal frequency.

This looks bad, but consider how much greater the divergence would be on 28 mc. if the length was made correct (66.3 feet) for 7,050 kc.—over 1,100 kc.! As the aerial must be operated harmonically, it is better to be 315 kc. out on 7 mc. than 1,100 kc. on 28 mc., hence the reason for working from the highest frequency to be used. These effects are of course similar on 14 mc., but fall between the two extremes quoted.

So much for theory. In practice, it is found that a Hertz aerial has a somewhat flat resonance curve (though it is always better to get it absolutely correct if possible), which means that the aerial radiates almost equally well plus or minus 100 kc. its fundamental frequency. Furthermore, since in the example taken 28 mc. would probably not be

much used, and then only when conditions were good enough to compensate for any slight aerial inefficiency, the length of 69.5 feet could be reduced to 68 feet, bringing the resonant frequency nearer the crystal on 7 mc., though moving it off on 28 mc. The actual divergence figures for a 68 feet aerial operated on 7,050, 14,100 and 28,200 kc. would be respectively 168, 21 and 415 kc., which could be regarded as a very good compromise, particularly as the 14 mc. frequency is brought so close to that required.

There are a number of other points which could very well be discussed in connection with Hertz systems—such as wave-form, determination of resonance frequency, site errors, loading up for operation above fundamental, and so on—but if for the moment the foregoing has been grasped, a good foundation will have been laid for the understanding of aerial theory in general.

Before dealing with feeder systems, it is also essential to realise that the effect of impedance plays a highly important part in the function of all Hertz systems. Without going into the question fully here, it can be said that a half-wave or fundamental aerial in space has a gradually increasing impedance from the centre towards the two ends. For practical purposes, this impedance gradient is taken to be from 70 ohms at the centre to 2,500 ohms at either end.

● The End-Fed Hertz

This in its simplest form consists of nothing more than an aerial, half-wave at the lowest frequency used, tapped directly on to the transmitter tank coil, as shown in *Fig.* 1. The total length AB should be

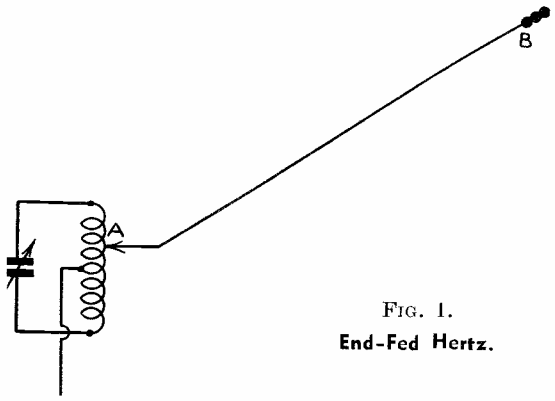


FIG. 1.
End-Fed Hertz.

arrived at in the manner already described, remembering that the calculated figure is very dependent upon the local site effect. In other words, calculations notwithstanding, a certain amount of trimming may be necessary to get the best results.

The operation of the end-fed Hertz is simplicity itself. With the aerial disconnected, the PA tank is tuned to minimum plate current. The aerial is then tapped on and the tapping point varied till the PA is fully loaded, as indicated by a rise in plate current to the normal for the valve, or the licenced input power is reached, whichever occurs first! No, or only very slight, variation of the tank condenser should be necessary to get resonance with the aerial on. If, with about 40 ma. plate current and the aerial connected, it is possible to reduce this reading to 30 ma. or so, the length AB requires adjustment. Remember when making any alterations to the aerial that its harmonic operation will be affected, as explainly previously. If tank tuning has to be decreased under load conditions, the aerial is too short, and vice versa.

Fig. 1A shows a method of getting the length-adjusting effect electrically. The condenser C can be 200 mmfd. and L about 10 turns of aerial wire on a 3 inch diameter former. The tapping point A and the condenser C are varied till it is possible to get exact resonance (indicated by a plate current read-

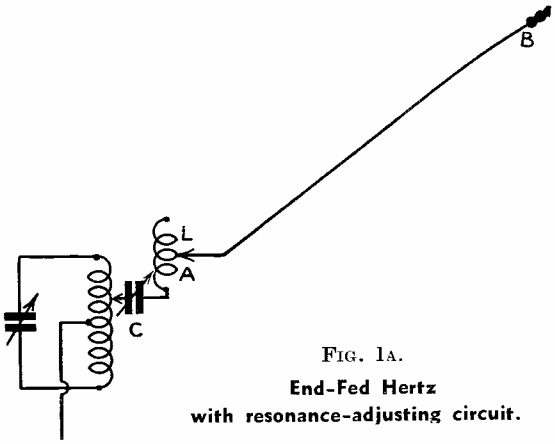


FIG. 1A.
End-Fed Hertz with resonance-adjusting circuit.

ing on load which cannot be reduced by adjustment of the transmitter tank condenser) with C as near maximum capacity as possible. The value of L cannot be exactly specified as it depends upon how much electrical adjustment is required in the aerial, but the figures given are about right for average conditions on 7 mc. If the discussion on harmonic operation has been understood, it will be seen that this system lends itself to correct working on harmonics, since the aerial can be brought exactly to resonance irrespective of whether its physical length fits the crystal harmonics.

Note that no current or voltage indication of any value as a guide to tuning can be obtained with this system, and it is therefore necessary to rely on the plate meter entirely; if the end B of the aerial can be reached, a neon touched on at this point should glow brightly.

The main disadvantage of the end-fed Hertz is that part of the aerial itself must be brought into the station. As the ends A and B are at maximum voltage, losses can be considerable. Careful insulation will obviate this to some extent, and if the inside run is short, will not out-weigh the utility, ease of operation and certainty of adjustment of this type of aerial-feeder system.

● Single-Wire Feed

Coming to feeder systems proper, the whole idea is so to arrange things that while the aerial itself is erected in the most advantageous position possible for radiating energy into the ether, the feeder supplies it with power in such a way that the Hertz characteristic is preserved—undistorted wave-form and perfect matching to the transmitter frequency—with the minimum of loss.

This ideal is not too easily achieved in practice, but a simple step in the right direction is to use the single wire feed arrangement shown in *Fig.* 2. AB

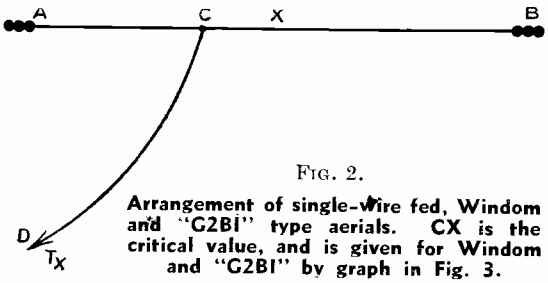


FIG. 2.

Arrangement of single-wire fed, Windom and "G2BI" type aerials. CX is the critical value, and is given for Windom and "G2BI" by graph in Fig. 3.

is the half-wave aerial (its length and performance depend on the factors already outlined) which is slung in the clear, and CD is the feeder, which can be any length as may be required. The distance CX is the critical part of the whole thing, and it is here that the first practical example of the importance of impedance matching comes in. As has been mentioned, the impedance of the aerial can be taken to be about 70 ohms at the centre X and 2,500 ohms approximately at A and B. The characteristic impedance of a single-wire feeder is represented for practical purposes by the value 600 ohms. In order that the feeder line can properly perform its function of supplying power to the aerial and not itself acting as a radiator—thereby distorting the field and introducing enormous losses—the tapping point C must be chosen such that there is at that part of the aerial an impedance which equals the feeder impedance. If the distance CX is correctly adjusted, the aerial acts simply as a load on the feeder and so on the transmitter and there are no "standing waves"—which cause losses and feeder radiation—on the feeder itself.

This ideal state of affairs is dependent on two things—CX being correct for the frequency used, and operation on one band only.

As at most stations one aerial has to be used for working on several bands, the feeder tap C immediately introduces difficulties, because if it is exactly right for 7 mc., changing to 14 mc. alters the wave-form on the aerial and therefore the impedance value at C; in other words, the feeder is mismatched on 14 mc., and to such an extent as to make the whole system useless as an efficient radiator on that band.

When the aerial is operated as a single-wire fed Hertz on one band only, it is commonly called a Windom, and the curves in *Fig.* 3 can be used to determine the roof-length AB and tapping point C for any particular frequency. If 3.5 mc. working is to be designed for, multiply figures for AB and CX by two. Similarly, or 14 mc. divide by two.

A variation of the Windom which can be made to give good results as a multi-band aerial is that due to Col. W. L. Palmer (G2BI). In this, the roof length AB and feeder tap C are determined as above for, say, 7 mc. The feeder *length* CD is chosen such that the total span BCD is either 66 or 132 feet. Under these conditions, on 7 mc. the aerial

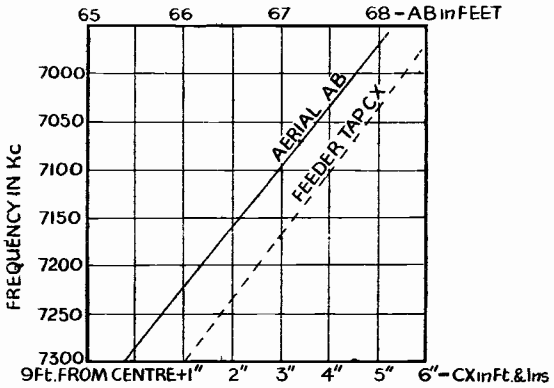


FIG. 3.

Chart for determining distance CX for Windom and "G2BI" type aerials. Values are 9′ plus ins. from centre as given by curves.

works as a Windom with single-wire feed, and on 14 mc. (with a length of 66 feet for BCD) it would be a full-wave end-fed Hertz, similar in all respects to *Fig.* 1. In the same way, if a long feeder was necessary such that the total length BCD was about 132 feet, the aerial could be half-wave end-fed on 3.5 mc., Windom characteristic on 7 mc., and double-wave end-fed on 14 mc. The basic principle of the G2BI aerial is that when it is not working as a Windom, the piece AC is an odd length out of resonance.

A third type of single-wire fed Hertz is that where the feeder tap C is so placed that it is at the mean position for matching on two or three bands. That is, while the best transfer is not obtained on any one band, the system can be used quite effectively on several by sacrificing a certain amount of efficiency. If a 7 mc. top is used for AB, and the feeder distance CX made 11 feet, the aerial will work quite well on 7, 14 and 28 mc., but there will be small standing waves on the feeder, due to the slight mis-match on each band. Any length feeder can be used, but near-resonant lengths should be avoided if possible.

As all feeder systems must have a "return line" of some kind, it is important to note that any single-wire arrangement of the types described depends upon the "mirror effect" of the ground for balance. This means that it is essential to use a

good earth on the transmitter, with loose-coupling of the feeder (preferably by link) to the tank circuit. If the feeder tends to carry standing waves or the system as a whole is non-resonant, RF feedback is liable to occur, which not only does all sorts of damage but by finding its way into the mains causes unnecessary and avoidable BCL interference. The signs of mis-matching are the fact that definite wave-form is traceable on the feeder line—this can be checked by running a sensitive neon along it, which goes out at intervals—together with the fact that it is difficult to persuade the system to load up; in other words, that it will not "draw."

Unless the feeder is required to radiate under G2BI conditions (when it is no longer a feeder) its disposition is not of great importance. So long as it is well insulated and as far as possible from earthed objects, good efficiency is obtainable. Note, however, that it is very necessary at the aerial end to arrange the feeder so that it goes away from the roof at right angles for as much of its length as can be managed, and in any case not less than about 20 feet. The idea of this is to prevent as far as possible distortion of the field due to the presence of the feeder.

● Two-wire Matched Impedance Aerial

This, sometimes called the Y-matched system, is a derivative of the single-wire arrangement already described, and as before a 600-ohm feeder impedance figure is used as a basis for the calculations.

Since the line is balanced, it is more efficient than any single-wire system, but the Y-matched aerial suffers from the serious disadvantage that it can only be used for one band—that for which the top is cut—and all dimensions are critical for maximum transfer of energy from feeder to aerial. *Fig.* 4 shows the general arrangement.

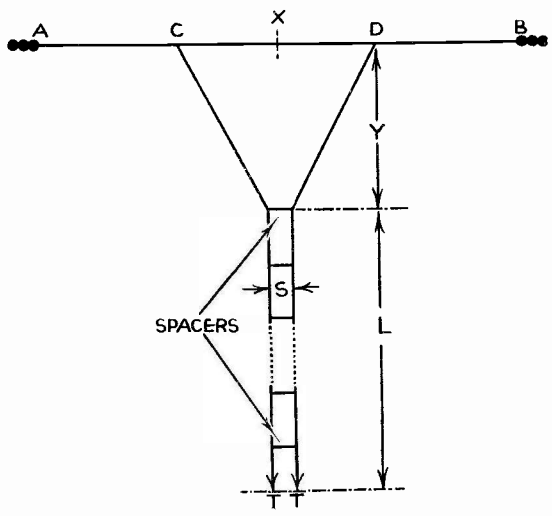


FIG. 4.

Two-wire matched impedance aerial (Y-matched). Formulæ are given in text. Note that distance S is measured between the centres of the wires.

The roof length AB is calculated as follows:

$$AB \text{ (feet)} = \frac{492{,}000}{F} \times 0.95.$$

The tapping distance CD is given by:

$$CD \text{ (feet)} = \frac{492{,}000}{F} \times 0.24.$$

and CX = XD, X being at exact centre of AB.

The dimension Y is obtained from:

$$Y \text{ (feet)} = \frac{147{,}000}{F}$$

In all three of these formulæ, F is the transmitter output frequency in kc.

The feeder spacing S is derived from:— $S = 75 \times d$, where S is the centre distance between the wires in inches and d the diameter of the wire in inches.

L, the distance from the root of the Y to the transmitter, can be any length and, as before, the feeders should come away from the aerial at right angles for at least 20 feet. The whole thing should be taut, and the value S kept constant by means of suitable spacers. These can either be purchased from advertisers in this paper, or can be home-made by boiling wooden rods of the length required in paraffin wax, the wires being held in to the ends with staples.

As in the case of the single-wire matched-impedance feeder, some adjustment of the top AB and the position of C and D will probably be necessary. The symptoms of mis-matching are the same, and if possible the feeders should be checked for standing waves. This is difficult with low power, even if they can be reached, and about the only test of any value is to insert a good RF ammeter at C and D, and also at the transmitter taps T, T, to see whether equal—or substantially equal—readings are obtained; as the aerial must be lowered to reach C and D, the ground will affect the balance of the system, but if the transmitter delivers power to the aerial after all the taps have been adjusted to show equal current, it may be taken that it is working reasonably well. It is also possible to check voltage distribution while the aerial is within reach, this being done with a small neon, which should glow brightly at the two ends of the roof, and with diminishing intensity for an equal distance from A and B towards C and D.

A further check can be made on the feeder itself if the first quarter-wave of length can be reached. If this span shows more or less constant current—as indicated by a bulb or preferably a sensitive RF ammeter bridged across a foot or so of wire—the feeder line is probably free of standing waves.

(To be continued.)

STRAIGHT *and* SUPERHET

THE 1-v-1 (Pen) FIRST CHOICE BUT SUPERHET TO FOLLOW

THIS MONTH has brought an influx of letters from supporters of the straight receiver, with the result that this type of receiver is by a very small margin the favourite.

First of all we have had many suggestions for a straight three having one stage of R.F., detector and one audio stage, with a demand for A.V.C. Now with only one stage of R.F. it is a pure waste of time to attempt A.V.C., because the gain from one R.F. amplifier is insufficient to obtain worthwhile A.V.C. results. At the very least two stages would be required and preferably three. The "lining up" of a receiver having three tuning R.F. stages would be far more difficult than that involved in a superhet, and so the addition of A.V.C. in a straight three will have to be ruled out as valueless.

● Merits of Tuned R.F.

From P.B. (Grimsby) comes a suggestion that the R.F. stage should be untuned. From the technical point of view the only use of an untuned R.F. stage is to obviate aerial "pulling" effects. To tune this stage means to get a really worthwhile amount of amplification without any sacrifice of simplicity. There is no need to gang the R.F. and detector tuning circuits, and so plug-in coils can be used enabling almost any wave-range to be used between 5 and 2000 metres. Another suggestion of his is class B output, but so far is the only suggestion in this direction.

Examining the suggestions of the straight receiver exponents the following points appear to be desirable :—

1. Tuned R.F., detector, pentode output.
2. Battery or mains operation.
3. Provision for headphones or speaker.
4. Plug-in coils from 10 to 90 metres.
5. Output calibrated in "R's."
6. Full bandspread on all ranges.
7. Cheapness.
8. Provision for doublet or broadcast aerial.

This last point appears to be the keynote of most of the supporters of the straight. Perhaps this is why none of them has suggested a separate beat oscillator for C.W. reception, a feature which, incidentally, makes for far greater selectivity.

In performance the straight three takes a lot of beating. It is doubtful whether the large superhet brings in much more DX, but the main disadvantage of the straight receiver is lack of selectivity. A powerful local station has the effect of blocking the R.F./detector, but in localities where local interference is low, this type of receiver will do all that the larger super will.

THE SHORT-WAVE MAGAZINE is accordingly designing a receiver on these lines and full details will appear in our September number.

● The Superhet

Owing to the closeness of the number of suggestions for the straight and the superhet, we have decided to start on the design of one of these to be published after the straight receiver. It appears that the supporters of the straight receiver are mainly in favour of an economical unit, whereas those in favour of the superhet care more for the ultimate in performance than for cost.

From the specifications received the following seem to be the main points :—

1. 1 pre-selector stage, triode-hexode changer, optional number of I.F.'s, A.V.C. detector, power output.
2. Provision for beat oscillator.
3. Provision for crystal filter.
4. Calibrated tuning.
5. Full bandspread.
6. Variable selectivity.
7. Tone control.
8. Wave-range from 10 metres upwards.
9. Battery or mains operation.
10. Unit construction.

From this it will be seen that the desire is for a receiver with, say one I.F., but built on a unit system so that extra I.F.'s and a crystal filter may be added later if desired.

● Later Additions

Of course a receiver of this type leaves room for far more refinements than does a straight receiver, and so it must be designed to leave room for improvements as finance and progress permit.

However, as soon as our constructional staff has published details of the straight receiver, work will immediately be commenced on the superhet to these specifications, and it is hoped that it will be ready for publication in the early autumn.

Meanwhile, should there be any other suggestions for this superhet, there is still time to write to us, but please remember that this only applies to the superhet, not the straight receiver.

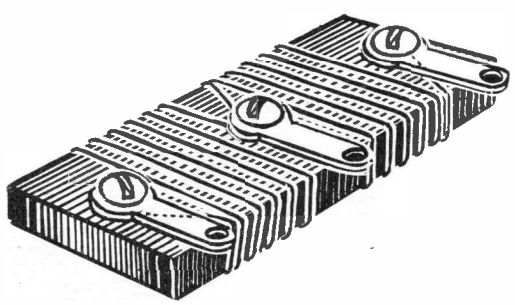
HUM-DINGERS

How to make and use them

Removing the last traces of A.C. hum from a receiver using indirectly-heated cathode valves is important, especially for short-wave 'phone work, and it is often found that hum is caused by the centre-tap of the heater winding of the power transformer not coinciding with the electrical centre. For this reason many constructors prefer to use adjustable hum-dingers which also have the very definite advantage of being able to be positioned close to the valves.

While more or less any wire-wound variable resistance from which a centre-tapping can be taken, such as an old-fashioned rheostat of anything between 30 to 50 ohms resistance, can be used, there are several neat adjustable hum-dingers marketed which can be suspended in the wiring, the nearer to the valve the better.

With these hum-dingers it is usually found that the adjustment is not critical; one does not have to



get the contact arm adjusted to a single wire, it is usually found that the hum is still "tuned-out" even when the contact arm is just a shade either side of the dead centre.

Constructors can make their own hum-dingers with a fixed centre-tap which will give complete satisfaction. Three soldering tags are mounted on a strip of fibre or other suitable material (about 2 in. by ½in.) as illustrated. If able to obtain hollow rivets for attaching them so much the better for the sake of lightness, but if not, you will have to use solid rivets or small bolts.

In the accompanying table will be found the approximate lengths of the usual gauges of eureka wire used for this sort of work, for either a 30 or 50 ohms job. The exact value is not critical and the resistance would, of course, vary slightly at different temperatures.

After measuring off the necessary length of wire double it back to the exact middle, and after scraping away the insulation, solder the middle to the centre tag. Then wind each half back to the outer tags in the manner illustrated.

When used with indirectly-heated cathode valves the hum-dinger is wired with the two outer ends each to one of the heater pins (corresponding to the filament pins of a battery valve), or to the filament pins in the case of a mains directly-heated valve, and the centre-tap is connected to common negative. In the case of the former type of valve the cathode would be connected to the biassing resistance if the valve is biassed, and to earth when no bias is being applied, as in the case of the usual detector.

Gauge of Eureka Wire.	Approx. Length Required. 30 ohms.	50 ohms.
40	30 ins.	50 ins.
42	20 ins.	34 ins.
44	13 ins.	22 ins.
46	8 ins.	12 ins.

CLUB ACTIVITIES

BLACKPOOL AND FYLDE

The Blackpool and Fylde Short-Wave Radio Society is steadily increasing in numbers and activities and attendance is maintained even on warm evenings. G5SO recently demonstrated his new Hallicrafters Ultra Skyrider, and with G6MI's transceiver some 50 mc. tests were carried out.

Two members now have their A.A. licenses, 1CQQ and 2CRO, who are busy collecting gear, etc.

It is hoped that the Field Day on July 4 will be successful in solving several local 56 mc. problems, and that all participants will have a good time, and we extend this to all others who will be on 56 mc. on that day. Secretary: H. FENTON, 25, Abbey Road, Blackpool, S.S.

BRITISH SHORT WAVE LEAGUE

The British Short Wave League has now been in existence for about 16 months and during that time has enrolled nearly 700 members from all parts of the world, and representatives have been appointed in practically every county in Great Britain. The main objects of the B.S.W.L. are to provide authentic S.W., B.C. and amateur station news for the mutual benefit of its many members; to stimulate the interest in DXing throughout the world; to cater for those interested in U.S.W. reception, and above all to create international goodwill among DXers of the universe, and, to aid the B.S.W.L. in the latter, the W.F.S.R.A. co-operates with us very closely.

The League has its own publication—THE SHORT-WAVE REVIEW, which is sent free monthly to all corporate members, and which is also the official organ of the W.F.S.R.A. Although primarily a listeners' organization the League has decided to publish elementary transmitting articles, and these have already met with great success, and are written by Mr. P. G. Day, B.Sc., G6PD, who, in company with G6LX, shares the post of hon. technical adviser to the League. Anyone interested in short-wave reception or transmission is invited to write to the secretary, F. A. BEANE, W.F.S.R.A., Hon. Mem.U.R.A., Ridgewell, Halstead, Essex.

FARRINGDON

The Farringdon Short-Wave Club has been very active. A great interest was taken by members in National Field Day, most districts being heard. On Sunday, June 20th, a rehearsal of the 5 m. field day was held on the Marlborough Downs. A ten-metre was also brought along, but conditions were so bad that only one "W" was heard on C.W.

Most members report active. BRS1469 is expecting his A.A. any day and is busy collecting gear for his TX. 2AOQ is busy with rack construction. SWL's are busy logging 14 mc. DX. Several members heard an account of the landing of the Russian airmen, after their flight over the North Pole, in America. Meetings of the club are held every fortnight at members' QRA's, and all interested are invited to apply to the Secretary: D. T. BOFFIN, BRS1469, Market Square, Faringdon, Berks.

GUERNSEY

The Guernsey Chapter of the International Short-Wave Club meets weekly when attractive features are arranged, and at one of the recent meetings a paper on "The Early Experiments of Marconi" was delivered by Mr. C. De la Hulinière. The new Murphy all-wave receiver, kindly loaned by a local dealer, was tried out and demonstrated by Mr. F. E. Atkins.

A high-light of the programme for the month of July will be the visit of Mr. A. E. Bear, European and Colonial Representative of the International Short-Wave Club and Secretary of the London Chapter, who is coming to Guernsey on July 9 and will address a meeting on that date at the local chapter's headquarters, 5, Well Road, St. Peter-Port.

Morse instruction is being carried out under the direction of G8DO and G8MF, and all details of the activities of the Guernsey club may be obtained from the Secretary, Mr. F. S. LE PAVOUX (2BTP), 8, Upper Canichers, St. Peter-Port, Guernsey, C.I.

SOUTHALL

The Southall Radio Society's annual direction finding contest was held near Oxford on June 13 when over 30 competitors from all parts of the country took part in spite of terrible weather conditions. The continuous rain actually gave operators a chance to show what they could do under emergency conditions. The winner, Mr. H. G. Swann, of Southall, repeated his recent success in the Golders Green club's contest, and others in the first six were: Messrs. Black (Golders Green), Leister (Golders Green), Rapsey (Southall), Childs (Golders Green), and Pye Radio (Cambridge).

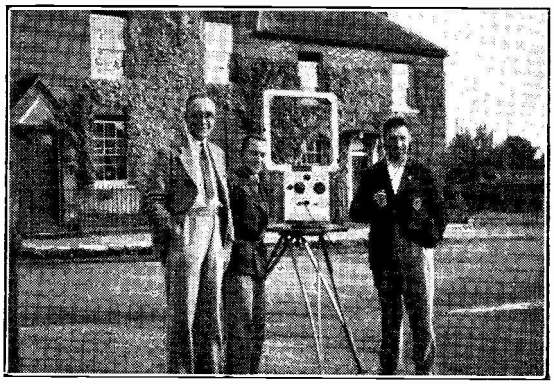


Photo shows the trophy winners, H. G. Swan (right) and his team.

The transmitter was Douglas Walters (G5CV) and the judges were Messrs. George Exeter (G6YK) and Tyler. Further experiments are now being conducted by the Southall Society to add to the valuable data on 40-metre direction finding which has already been acquired.

Readers in the Southall area who would care to assist in this work should communicate with the Hon. Sec., Mr. H. F. REEVE, 26, Green Drive, Southall.

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S.-W.M.	7/37.

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11" ,,	**2 9** ,,	12" ,,	**3 -** ,,
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400.0.400	**19 -**
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500.0.500 at 200 MA	**27 -**
600.0.600 at 250 MA	**33 -**
650.0.650 at 200 MA	**33 -**

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750.0.750 volts at 200 MA	**48 -**
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The list of short-wave broadcast stations given below will be added to and brought up to date each month. New stations of programme value, alterations in wavelength and frequency to be shown in heavy type, thus making the feature as complete as possible month by month.

Station	*Call*	*Wave*	*Freq.*
PITTSBURG	W8XK	13.93	21.54
DAVENTRY	GSJ	13.93	21.53
WAYNE	W2XE	13.94	21.52
DAVENTRY	GSH	13.97	21.47
BANGKOK	HS8PJ	15.77	19.02
BANDOENG	PLE	15.93	18.83
DAVENTRY	GSG	16.86	17.79
BOUNDBROOK	W3XAL	16.87	17.78
ZEESEN	DJE	16.89	17.76
WAYNE	W2XE	16.89	17.76
BUDAPEST	HAS3	19.52	15.37
ZEESEN	DJT	19.53	15.36
ZEESEN	DJR	19.56	15.34
SCHENECTADY	W2XAD	19.57	15.33
DAVENTRY	GSP	19.60	15.31
BUENOS AIRES	LRU	19.62	15.29
ZEESEN	DJQ	19.63	15.28
WAYNE	W2XE	19.65	15.27
DAVENTRY	GSI	19.66	15.26
RADIO COLONIAL (Paris)	TPA2	19.68	15.24
PODEBRADY	OLR5A	19.71	15.23
EINDHOVEN	PCJ	19.71	15.22
PITTSBURG	W8XK	19.72	15.21
ZEESEN	DJB	19.74	15.20
DAVENTRY	GSO	19.76	15.18
TOKIO	JZK	19.80	15.16
SOURABAYA	YDC	19.80	15.15
DAVENTRY	GSF	19.82	15.14
VATICAN CITY	HVJ	19.84	15.12
ZEESEN	DJL	19.85	15.11
SOFIA	LZA	20.24	14.88
WARSAW	SPW	22.00	13.63
REYKJAVIK	TFJ	24 52	12.23
MOSCOW	RNE	25.00	12.00
RADIO COLONIAL (Paris)	TPA3	25.23	11.88
PITTSBURG	W8XK	25.27	11.87
PODEBRADY	OLR4A	25.34	11.84
WAYNE	W2XE	25.36	11.83
LISBON	CT1AA	25.36	11.83
ROME	2RO	25.40	11.81
TOKIO	JZJ	25.42	11.80
BOSTON	W1XAL	25.45	11.78
ZEESEN	DJD	25.49	11.77
PODEBRADY ...	OLR4B	25.51	11.76
DAVENTRY	GSD	25.53	11.75
WINNIPEG	CJRX	25.60	11.72
RADIO COLONIAL (Paris)	TPA4	25.60	11.72
HAVANA (CUBA)	COCX	26.24	11.43
TOKIO (not for Europe) ...	JVM	27.93	10.74
BUENOS AIRES	LSX	28.99	10.35
RUYSSELEDE	ORK	29.04	10.33
MADRID	EAQ1	30.43	9.86
HAVANA (CUBA)	COCQ	30.77	9.75
LISBON	CT1AA	31.09	9.65
ROME	2RO	31.13	9.63
MOSCOW	RV96	31.25	9.60
CARTAGENA (COLOMBIA)	HJ1ABP	31.25	9.62
RADIO NATIONS	HBL	31.27	9.59
PHILADELPHIA	W3XAU	31.28	9.59

Station	*Call*	*Wave*	*Freq.*
SYDNEY	VK2ME	31.28	9.59
EINDHOVEN	PCJ	31.28	9.59
DAVENTRY	GSC	31.32	9.58
LYNDHURST	VK3LR	31.32	9.58
BOMBAY	VUB	31.35	9.57
MILLIS	W1XK	31.35	9.57
ZEESEN	DJA	31.38	9.56
PODEBRADY	OLR3A	31.41	9.55
ZEESEN	DJN	31.45	9.54
JELOY	LKJ1	31.48	9.53
TOKIO (not for Europe) ...	JZI	31.48	9.53
SCHENECTADY	W2XAF	31.48	9.53
MELBOURNE	VK3ME	31.55	9.51
DAVENTRY	GSB	31.55	9.51
CARTAGENA (COLOMBIA)	HJ1ABE	31.58	9.50
RIO DE JANEIRO ...	PRF5	31.58	9.50
HAVANA (CUBA)	COCH	31.82	9.42
BANGKOK	HS8PJ	31.85	9.35
BUDAPEST	HAT4	32.88	9.12
RADIO NATIONS	HBP	38.48	7.78
MOSCOW	RV96	38.89	7.52
TOKIO	JVP	39.95	7.51
SAN DOMINGO	HIT	45.25	6.62
VENEZUELA	YV4RB	46.95	6.36
MARACAIBO	YV5RP	47.81	6.27
HAVANA	COKG	48.39	6.20
MARACAIBO	YV5RD	48.78	6.16
WINNIPEG	CJRO	48.78	6.15
PITTSBURG	W8XK	48.86	6.14
JELOY	LKJ1	48.94	6.13
HAVANA (CUBA)	COCD	48.94	6.13
GEORGETOWN	VP3BG	48.94	6.13
BOGOTA	HJ3ABX	48.96	6.13
MEXICO CITY	XEUZ	49.02	6.12
WAYNE	W2XE	49.02	6.12
CHICAGO	W9XF	49.18	6.10
BOUNDBROOK	W3XAL	49.18	6.10
BELGRADE	YUA	49.18	6.10
HONG KONG	ZBW2	49.26	6.09
NAIROBI	VQ7LO	49.32	6.08
CHICAGO	W9XAA	49.34	6.08
MARACAIBO	YV1RD	49.42	6.07
PHILADELPHIA	W3XAU	49.50	6.06
CINCINNATI	W8XAL	49.50	6.06
COPENHAGEN	OXY	49.50	6.06
MOTALA	SBG	49.50	6.06
BOGOTA	HJ3ABD	49.59	6.05
BOSTON	W1XAL	49.67	6.04
ZEESEN	DJC	49.83	6.02
BOGOTA	HJ3ABH	49.85	6.01
HAVANA (CUBA)	COCO	49.85	6.01
PODEBRADY	OLR2A	49.92	6.01
GEORGETOWN	VP3MR	49.92	6.01
MONTREAL	CFCX	49.96	6.00
MEXICO CITY	XEBT	50.00	6.00
MOSCOW	RW59	50.00	6.00
VATICAN CITY	HVJ	50.26	5.97
MARACAIBO	YV1RB	51.28	5.85
CARACAS	YV5RC	51.72	5.80
KHARBAROVSK	RV15	70.20	4.27

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