

WORLD-RADIO



AND FOREIGN



DOMINION

PROGRAMMES

WITH WHICH IS INCORPORATED "THE RADIO SUPPLEMENT"

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Two Pence.

PRINCIPAL CONTENTS.

The Microphone.

By Captain Eckersley.

Wireless Step by Step—III.

A Mediterranean Melody.

Continental Broadcasting.

Via Ether.

Which Station Was That ?

WORLD-RADIO

Station Identification Panel

(No. 64.)

MARSEILLES (France).

Wavelength: 300 m. Power: 500 watts.
Approximate distance from London: 620 miles.

Call: "Allô! Allô! Ici le poste radio-téléphonique de Marseille."

No interval signal.

At opening and end of transmission a few bars of an old Provençal folk song from Bizet's opera *L'Arlésienne* are played.

Apart from own concerts, relays at times from PTT, Lyons and Paris (Ecole Supérieure).

Closes down as usual with French stations: "Bonsoir, Mesdames," etc.

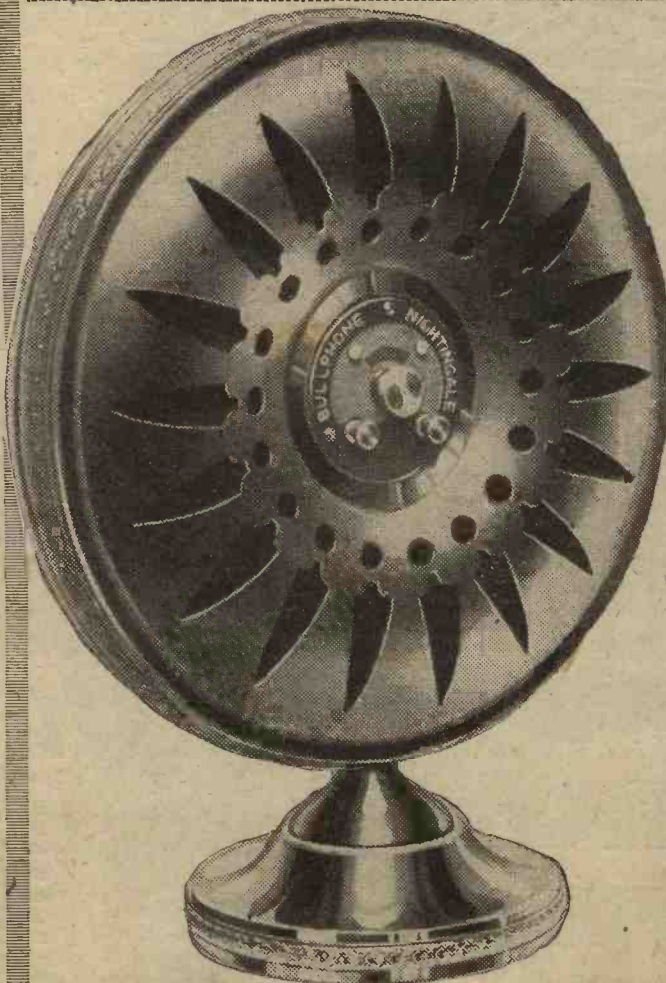
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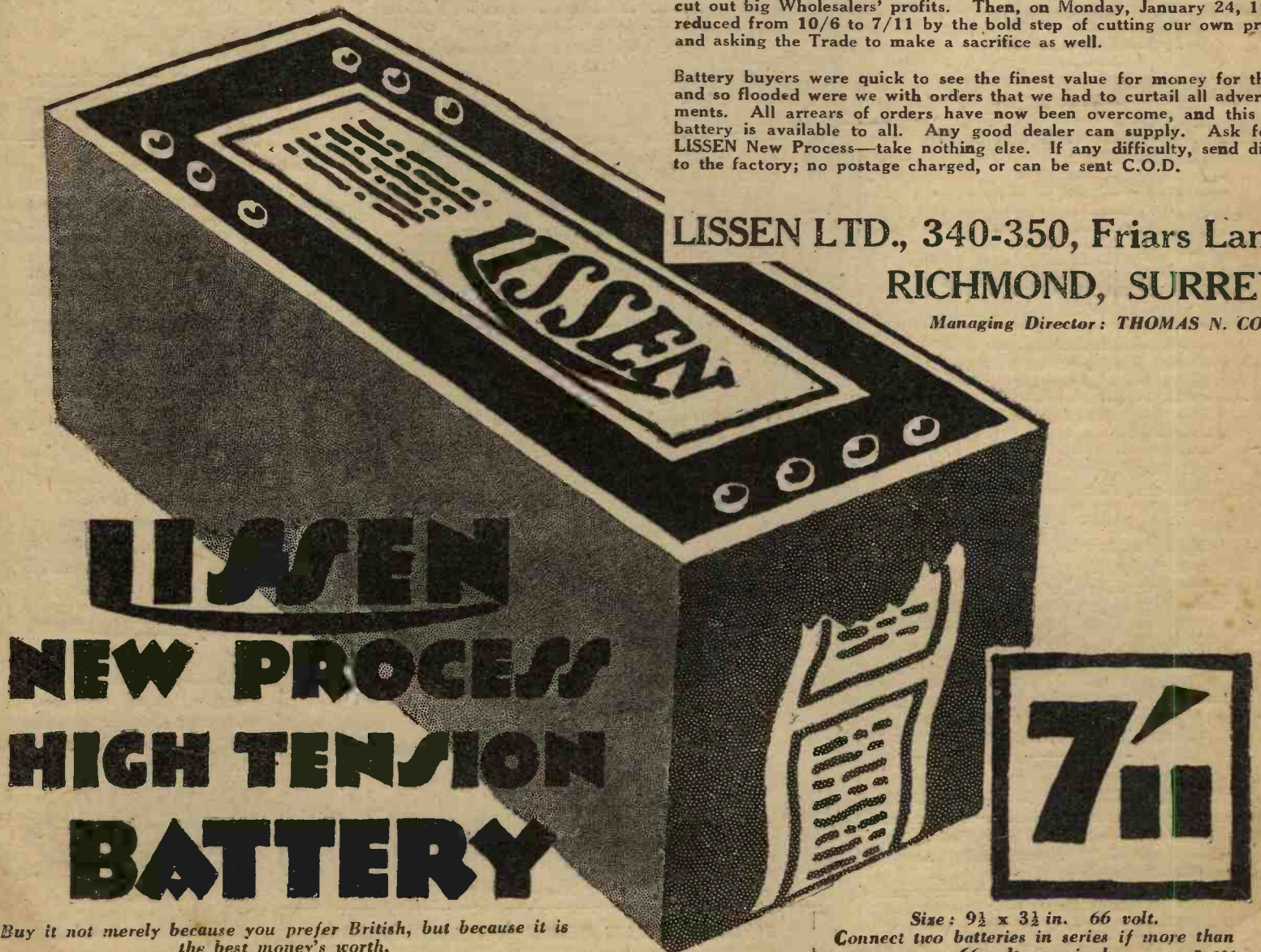
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TECHNICAL CONSIDERATIONS.

By Capt. P. P. ECKERSLEY.

IV.—The Microphone.

THE microphone converts the impulses of higher and lower pressure in the air (which gives our ears the sensation of sound) into corresponding impulses of higher and lower electrical pressure.

The relative performances of various types of microphone can be assessed in terms of the following qualities:—

1. The exactness of response over the whole frequency scale from lowest to highest audible frequency;
2. The degree of background noise;
3. The robustness and reliability of the device.

In general there are three types of microphone: one using the electromagnetic, the second the electrostatic, and the last the variable resistance principle.

In the electromagnetic type of microphone the sound impinges upon some moving armature which either cuts a flux or causes variation in a flux. It is, in fact, a "dynamo" microphone.

In the electrostatic type of microphone the impinging sound moves an armature which forms one plate of a condenser. The condenser is charged through a resistance, and this causes variation of potentials due to the variation of charging current.

In the variable resistance type a moving armature increases or decreases the pressure upon a layer of carbon, and this proportionately increases and decreases the resistance of the carbon and hence the currents flowing through it.

Frequency Characteristic.

We have seen that in all cases an armature or diaphragm moves. The diaphragm has mass, elasticity, and resists motion. This means that it must have a resonance limited only by the damping—that is, it must respond to certain frequencies more than to others. We do not want it to give predominance to any one frequency or band of frequencies, and we therefore have this first problem, which is endemic to all microphones—that we must eliminate resonance within the audible gamut. (Incidentally it is interesting to note that equations can be written down exactly corresponding to the common electrical equations for resonance, taking mass as inductance, elasticity as the reciprocal of capacity, and resistance as damping. It will then be found that the electromagnetic and electrostatic types of microphone require different forms of response.) It is said above that the general principle of getting uniformity of response is to eliminate

resonance in the movement within the audible gamut, or for practical purposes between 50 and 10,000 vibrations a second. The second general method is to introduce so much damping that the existing resonance is to all intents and purposes eliminated.

The Western Electric microphones use both in their carbon and electrostatic microphones a diaphragm so tightly stretched that it has a resonance above an upper limit which is, for practical purposes, above audibility. There is no marketed microphone which has an intentional resonance below audibility. It is more difficult to cut off the effects of resonance electrically—which, of course, must be done by filters or transformers, or in some way—at lower than at higher limits.

It might be said that, if we took a layer of carbon and talked at it, it could have no resonance—that is, if it had no diaphragm to press it in and out and was simply in contact with the air. This is not true; mass, elasticity, and damping are all present in the granules. Again, all that can be done is to choose a resonance point outside audibility. This is done in the Marconi-Reisz microphones. Proposals have been made to use flames which change their resistance when the air pressure increases or decreases around them. The flame too has mass and elasticity, but more usually the material which supports the device—the jet from which the flame springs, as it were, or the electrode at which it is made—has resonance. It must be remembered that in this resonance elimination nothing remotely connected with the device must resonate; hence rubber suspensions, massive fixed parts, &c.

Assuming that in some sort resonance can be eliminated in every sort of microphone, it must at once be realised that sensitivity is enormously reduced. The ordinary Post Office microphones that you speak into when you "ring up" anyone are very resonant, and therefore sensitive. They do not need for ordinary speech intelligibility to give an equal response over the whole frequency scale, and so they are made sensitive only between certain quite relatively small limits. But the broadcasting microphone, owing to peculiar requirements, must have no resonances, and therefore is insensitive; thus it has to have an amplifier associated with it.

As it is impossible to deal adequately with the microphone in the limited space of this article my next one will continue the subject. In the meanwhile we have seen that there are in general three principles for conversion of sound to electrical impulse, but that in all resonance must be eliminated. When this is done sensitivity is cut down, and every broadcast microphone therefore requires an amplifier.

Stations Worth Trying For.

By THE SEARCHER.

THE week just passed has provided one of those amazingly bad patches which come at times, though fortunately not very often. If one had not had experience of long-distance reception in past years, one might imagine that the fact that stations could not be heard at all, or came through very weakly, was due to the lengthening of the daylight hours and to the coming of summer time. Though these causes, naturally, do not improve matters from the point of view of the seeker after far-away stations, they are not entirely responsible for the melancholy state of affairs prevailing in the ether at the moment of writing; in a short time we shall probably find that we are hearing stations quite well again. To my mind, these dead periods make long-distance work all the more interesting owing to the very fact that they add to its difficulties. One feels far more satisfaction over the capture of a single distant station, when conditions are bad, than over the logging of a dozen when they are particularly good.

To Combat Summer Time.

Meantime, we must realise that similar bad patches are likely to occur, at intervals, during the summer, and it is as well therefore to take what steps one can to counteract their effects. So long as atmospheric conditions are not troublesome, one can use an increased amount of amplification with beneficial results. My own preference is for an additional stage of low-frequency amplification, rather than for high. It is very much easier to add a note—magnifying stage, which may take the form of a small separate unit connected to the output terminals of the set. With the valves and the interval couplings that are available to-day, it is by no means difficult to obtain a low-frequency magnification in the neighbourhood of forty per stage. Though it has frequently been stated that the addition of low-frequency amplification does not increase the range of a set, this is actually far from being correct. In the past week, for example, I could hear absolutely nothing of Joenkeoping with one high-frequency valve, a gridleak rectifier and a single stage of note-magnification; the station might not have been there, for there was not a sign of his presence. The addition of a fourth valve, working as low-frequency amplifier, made the signals clearly audible at good telephone strength.

Shorter Waves More Reliable.

One of the best stations, during the rather poor period under review, has been Toulouse PTT, which on several evenings has come through with extraordinarily good strength. Speaking generally, the shorter waves have been less affected than the longer, and one has heard pretty well such stations as Kiel, Dortmund, Gleiwitz, and Muenster. Late at night, when interference is usually at a minimum, numbers of the Spanish stations have come through very well considering the circumstances. The majority of those appearing in the list in *World-Radio* are worth trying for at such times, Barcelona, San Sebastian, Cadiz, Bilbao, Seville, and the Madrid stations being amongst the best. Langenberg reception has been curiously weak of late, though Stuttgart, Leipzig, and Breslau continue to be good. Hamburg is uneven. On several evenings I have had Porsgrund better than Bergen, and the Lafayette station at Bordeaux has given respectable signals. Gothenberg has been receivable at times at fair strength, but Bern is not up to his usual reception form. Prague has occasionally shown something like his accustomed strength, but Bruenn I found usually rather faint. Brussels has not been affected to the same extent as other stations, and Witzleben continues to be a good signal. Toulouse Midi has been suffering from heterodyne troubles, and spark interference of a particularly powerful nature has often ruined the programmes of Frankfurt and Fredriksstad.

U. S. A. Notes

(From our New York Correspondent.)

Half Radio Stations to Go?

A plan for the reduction of the number of broadcasting stations in the United States from 733 to 364 has been submitted by the American Engineering Council to the Federal Radio Commission, which is now engaged in an attempt to solve the problems of the American radio field. Under the scheme there would be 64 national stations and 300 local stations. The national stations would operate in the band between 550 and 1,250 kilocycles—that is to say, from 240 metres to 545 metres. The local stations would be confined to the remaining lower range of the broadcasting band, from 150 kilocycles to 1,500 kilocycles, or from 240 down to 200 metres. The proposal has the support of many radio engineers and was worked out by the Radio Broadcasting Committee of the Engineering Council.

Baseball Broadcast Daily.

Radio has now taken over professional baseball. The games played each autumn by the winners

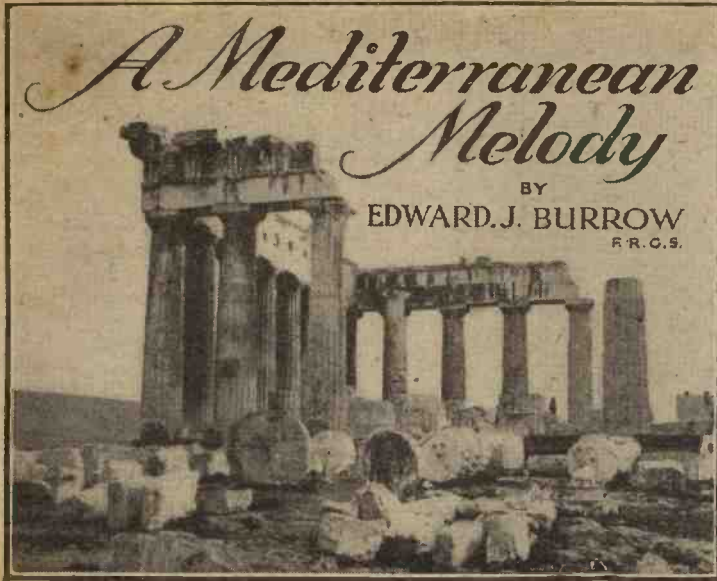
in the American League and the National League for the national championship have, of course, been broadcast, but now comes the announcement that Station WMAQ will broadcast all games played by the Chicago White Sox (American League) and the Chicago Cubs (National League) in Chicago daily during the season just opened.

S.M.G. I

The newly appointed Federal Radio Commission has received a tart letter from a fiery radio fan demanding that steps be taken immediately to eliminate static.

Round the World for Dinner.

Yale University's first "Round-the-World Dinner" will be held on April 20, Chief Justice William Howard Taft, of the U.S. Supreme Court, addressing members of the Yale alumni in nearly two hundred American and foreign cities, being enabled to do so by a "hook-up" of some eighteen stations. He will speak at the dinner given by Yale men in Washington, D.C. The dinner is to open a \$20,000,000 endowment campaign, and London, Paris, Honolulu and Tokio are cities at which Yale men gathered at dinner will listen.



MY first picture is of a Compagnie Transatlantique steamer ploughing her way across the blue-black waters of the Mediterranean. In the distance, faintly outlined against the sky, almost like a low-lying belt of clouds, shine the snowy peaks and shoulders of the mountains of North Africa.

On the fore-castle deck squats a motley crowd of Arabs, Jews, Kabyles, and swarthy Moors, picturesque in their burnouses, many of them evidently home-sick and sea-sick simultaneously. One of the Arabs rises and yawns, then, suddenly, as if impelled by some unseen force, breaks into song—a weird, barbaric melody, full of strange semitones and tinged with unimaginable sadness. Soon others take up the refrain; and the call of the desert expresses itself in a vague yearning, melodic theme, as if the sight of those distant mountain peaks had awakened memories of white-walled cities,



The First Sight of Africa.

green oases girt with waving palms, and the tinkle of the bracelets on the waving arms of Ouled Nail dancing-girls.

In, and through, and beyond the ship, its passengers, Europeans, Arabs, Moors, and Jews, and its crew, pulses the radio-energy of far-off stations; and on the upper deck, in the little wireless cabin, the valves of the receiver glow faintly in the semi-darkness, as the operator tunes into the opening

chords of an overture wherein, by a strange phantasy, the theme of the Arab song seems to be strangely woven into the fabric of the music, like a blood-red thread in an Eastern carpet.

Again, another scene, still on the Mediterranean, but in the Ægean Sea, comes to my mind. It had been a choppy, uncertain night, and, as I wake from a fitful slumber, the porthole of my cabin is just on a level with my eyes; and as the great heaving plane of the sea rises and falls from top to bottom, bottom to top, of the circle of vision, with the rocking of the swell, I see we are in a bay. The shore is not far distant; suddenly a shaft of sunlight breaks through the clouds somewhere, and, on a tiny hill, midway between the sea and a

majestic line of mountains, gleams the white colonnade of a wondrous Temple, poised, as it seems, between heaven and earth, in the effulgence of the morning light. And my blood thrills, as I call to mind that this morning we are in the Bay of Salamis, where the greatest sea-fight of ancient history was fought between Greeks and Persians; while those mountains are Olympus and Parnassus, and the abodes of the Immortals; and that gleaming marble temple is the Parthenon—the dream and inspiration of Pericles and Phidias, of old.

Later in the day I climb the majestic incline that leads through the great Propylium to the top of the Acropolis, and I see where Paul strove with the Athenian philosophers of his day, and understand something of the spirit of the men who designed this wonderful architecture—still beautiful in its ruin after more than twenty centuries have passed. Below is spread out modern Athens, a medley of streets and squares, as far as the eye can see; and it was down in that rather squalid city, before the day was over, I caught a faint whisper of Daventry, on a powerful receiver, and the boom of Big Ben blends strangely with the voices of a queer little band of Armenian refugees in the square outside, strumming on weird instruments, singing a sad, haunting, not uncomely, air. Yes! Again it is the air the Arabs had chanted on the fore-castle of that Algerian steamer: a little westernised, and with a tendency to settle into more sedate harmonies and fewer semitones, but the same soul-stirring, restless, barbaric theme, bringing a sensation of wild and primitive life into the commonplace atmosphere of modern Athens.

* * * *

My third picture is of the City of the Seven Hills—modern Rome. I have come up from Sicily, where the almond and cherry blossom flings its petals like snowflakes on the ground and the ice-clad peak of Etna shines magnificent in the spring sunshine, save where a pall of dusky smoke creeps over the rim of the crater and rolls down the mountain side.

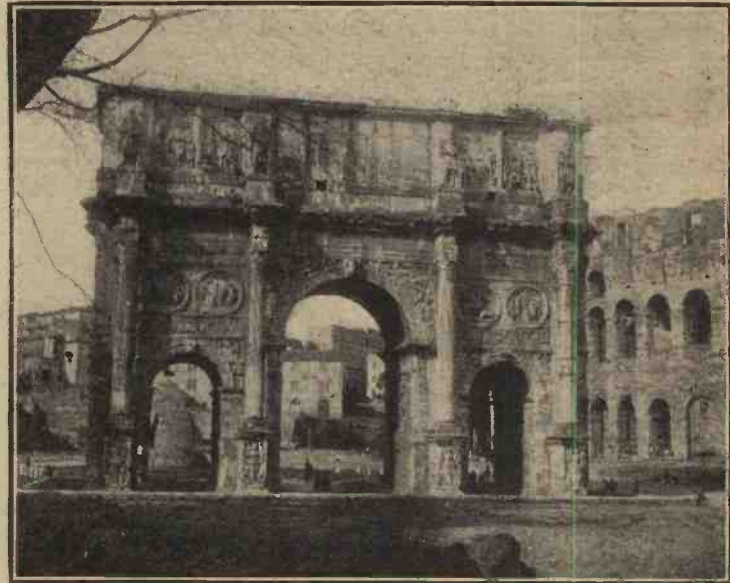
As the train creeps across the broad plain of the Campagna, on the one hand are the towering arches of the aqueducts built by the Cæsars of

Rome's great days—mute monuments of her former splendour; on the other rise the masts and aerials of the broadcasting station of Rome, and over the roof-tops one can glimpse the towering mass of the Colosseum and the Arch of Constantine.

I have hurried northwards, to be present at a great orchestral concert in one of Rome's great concert-halls. The concert is to be broadcast, and I know that my friends in Sicily, the operators out on the Mediterranean, and many men and women in far-off towns and villages will hear the flood of melody that seems to pulse and throb, to swell and diminish at will, under the conductor's baton. As I sit there, entranced by the beauty of the orchestration, I find my mind once more recalls that haunting air—the song of the Arabs as their country hove into view on the horizon, the song of the exiled Armenians in the streets of Athens, and now the same melody, vibrating and wailing through countless variations and harmonies. A glance at the programme shows me *Scheherazade* (Rimsky-Korsakoff). Then I know at once where that great Russian culled the haunting melody of the pipe that introduces and bids farewell to the wonderful score—the very incarnation and spirit of the mingled savagery and sensuousness of the East.

* * * *

So comes it to pass that a great composer weaves the threads of musical romance, translates the crude themes of primitive man into the language of modern music, and radiates the themes back into the consciousness of those from whom came the original melody! Thus goes the wheel of melody full circle through the wonder of the wireless waves.



The Arch of Constantine and the Colosseum, Rome.

Broadcasting and Copyright.

(From our Vienna Correspondent.)

The interesting action brought in Vienna against the Ravag by the heirs of the German poet, Rudolf Baumbach, who died in 1905, claiming royalties on a 50 minutes' reading of Baumbach fairy tales, and further compensation for this infringement of copyright as permission was not previously obtained, has resulted in a verdict for the plaintiffs, though the Ravag has given notice of appeal. The claim is for 800 lines read, at 40 pfennigs, about fourpence, per line (the rate paid in Germany by stations which broadcast copyright works being from 30 to 59 pfennigs), making 320 marks, plus 300 for compensation, or 620 marks (£31) in all. The whole question of such copyright, especially as regards the works of deceased authors, is to be dealt with at the international congress in Rome next September.

Broadcasting and Languages.

EN BRETAGNE: LE PARDON.

Par E. M. STÉPHAN.

Si vous avez la bonne fortune de vous trouver dans un village breton à l'occasion de la fête annuelle, vous y verrez des choses que vous n'oubliez pas de si tôt, choses qui vous amuseront, ou qui, tout au moins, vous intéresseront.

Vous avez sans doute entendu parler des pardons bretons; peut-être avez-vous assisté à une de ces fêtes où se révèle dans tout son éclat, l'âme simple, naïve, mélancolique, et rêveuse des habitants de l'Armorique.

Le pardon est essentiellement une fête religieuse. La veille du pardon personne ne travaille, excepté les ménagères qui passent la journée entière dans la cuisine, car sachez-le, tout paysan qui se respecte tient table ouverte le jour du pardon. Les crêpes de froment, qui sont de rigueur à l'occasion de la fête, s'empilent sur les rayons du dressoir; les viandes qu'on servira froides le lendemain: bœuf, lard, jambon, andouilles et saucisses cuisent dans toutes les fermes. N'oubliez pas les "caillibotes," sans lesquelles il n'est pas de vrai pardon.

Aux environs du sanctuaire du Saint ou de la Sainte en l'honneur de qui se tient le pardon on a dressé d'immenses bûchers de branchages, d'ajoncs, de fougères, et de fagots. Quelques jeunes gens de bonne volonté ont fait le tour de la paroisse pour la "quête des fagots." Riches et pauvres contribuent selon leurs moyens, et donnent aux quêteurs, qui un, qui deux, qui trois fagots ou davantage. De sorte que les bûchers atteignent souvent des proportions assez respectables. On ne manque jamais de surmonter le bûcher d'une grande couronne de laurier ou de mousse piquée de fleurs.

L'allumage des bûchers se fait le soir, au chant des psaumes et des cantiques. C'est le curé de la paroisse qui généralement met le feu à ces bûchers. Le moment solennel c'est celui où les flammes atteignent la couronne et commencent de la brûler. Enfin elles s'attaquent aux cordes qui fixent la couronne à la perche; tous les yeux se lèvent, un silence de mort règne sur l'assemblée, tout le monde retient son haleine pendant cette terrible et courte lutte; mais, comme bien vous le pensez, les flammes triomphent, et la couronne s'effondre au milieu du bûcher. Alors une grande clameur s'élève, et les pèlerins se précipitent. On se fait un devoir d'emporter les tisons du bûcher, et de les garder soigneusement comme préservatifs contre la foudre et contre l'incendie.

Les moindres paroisses bretonnes ont leurs pardons; toutefois les "Grands Pardons" de Bretagne ne sont guère qu'au nombre de dix. En voici les principaux: le pardon de Saint Yves à Tréguier, celui de Notre-Dame de Bon-Secours à Guingamp; celui de Sainte Anne à Auray, celui de la Troménie à Locronan, celui de la Clarté à Perros-Guirec, celui de Notre-Dame de la Palud, et celui de Rumengol. La tradition veut, que pour assurer son salut éternel, tout dévot Breton ait entendu la messe, au moins une fois, à l'un des sanctuaires vénérés où se tiennent les "Grands Pardons."

Les jeunes filles de la paroisse n'ont pas manqué de décorer l'église de guirlandes et de fleurs; tout a été balayé et épousseté avec le plus grand soin; et dans les pays maritimes un peu de la poussière saorée, recueillie dans l'église du Saint, a été jeté aux quatre vents du ciel, de cette façon les habitants des îles seront sûrs d'une bonne traversée.

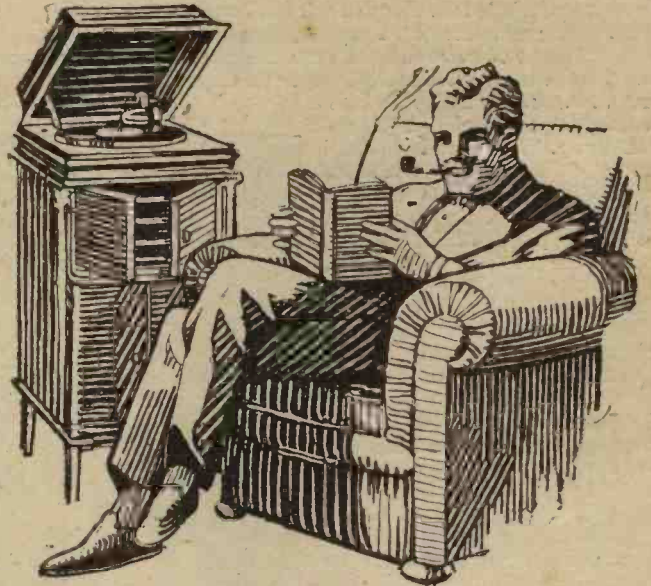
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MAX PEMBERTON writes: "I would very warmly commend your records to all who are studying the languages in question. The great value is that the student can repeat them again and again. He will find at first that he hardly comprehends a word of them, but gradually his ear will attune itself and he will begin to acquire both accent and the ability to apprehend."

H. G. WELLS writes: "Your Lesson Records in French and Italian are admirable. You have made it possible for an attentive student with a very moderate expenditure of energy, and without a teacher of any sort, to understand spoken French and to speak it intelligibly. Nothing of the sort has ever been possible before."

COMPTON MACKENZIE, the well-known novelist, and Editor of "The Gramophone," writes: "So amusing is it to learn a language by this method that I was tempted to try Afrikaans; and in defiance of the thirty-six letters of the alphabet I shall certainly indulge myself in Russian when the course appears. The prospect is as pleasant as that of oysters coming into season."

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La plupart des pèlerins qu'on rencontre aux "Grands Pardons" sont étrangers à la paroisse ou à la ville. Ils viennent fréquemment de très loin, quelquefois de l'autre bout de la province. Toute la nuit l'église reste ouverte, et toute la nuit les bons pèlerins arrivent, les uns à pied, les autres à cheval, d'autres encore en voiture. Du plus loin qu'ils aperçoivent le sanctuaire, éclairé par la flambée d'innombrables cierges, ils se découvrent avec respect, et entonnent à pleins poumons le cantique du Saint Patron. Arrivés près de l'église, ils en font le tour en récitant à haute voix les prières d'usage. J'en ai vu, qui par esprit de pénitence, étaient leurs chaussures et, pieds nus, faisaient trois fois le tour du sanctuaire en égrenant leur chapelet; d'autres qui, à genoux, remontaient lentement jusqu'à l'autel en se frappant la poitrine, et en priant le Saint d'intercéder pour eux et pour leurs morts. Car, il faut vous dire que les morts ne s'oublient jamais en Bretagne. Dès qu'ils ont fini leurs dévotions, les pèlerins déposent leurs offrandes sur des tables disposées dans la nef et c'est généralement à faire dire des messes pour le repos des âmes, que ces offrandes sont destinées.

Beaucoup de pèlerins passent la nuit entière dans l'église à prier et à chanter des cantiques. Dès le petit matin les cloches se mettent en braule, et le pardon proprement dit commence. La matinée est consacrée à des exercices religieux. Tout le monde assiste à la grand' messe. Heureux ceux qui ont trouvé place dans le sanctuaire et qui pourront entendre le sermon. L'église est trop étroite pour la foule grouillante. On envahit le cimetière et la place, et on suit l'office du dehors. Mais on se console en pensant qu'on se rattrapera à la procession. C'est le clou de la fête. Tout le monde y prend part. Drapeaux, bannières, étendards flottent au vent. Les hommes et les jeunes gens portent les lourdes statues et les reliquaires, des petits garçons habillés en marins portent les bateaux, qui hier encore, pendaient à la voûte de l'église, des jeunes filles habillées de blanc portent l'image de la Vierge. Ce ne sont que prières et chants. Toute la foule s'y donne à cœur joie. A la limite du parcours se dresse un bûcher souvent plus grand que celui de la veille.

Ces pardons sont marqués par des superstitions dont quelques-unes sont en train de disparaître. Le clergé les interdit. Mais le Breton est païen dans le fond de son âme, et très fidèle aux coutumes de ses pères, et il continue à jeter des clous ou des épingles dans les fontaines sacrées: des clous pour se guérir de rhumatismes, et des épingles pour savoir s'il se mariera au cours de l'année.

Voilà quelques-uns des traits caractéristiques d'un pardon breton.

N.B.—Listeners are advised to provide themselves beforehand with paper and pencil, as a short dictation test in Spanish and two English sentences for translation will be given at the end of the talk.

The text of the dictated matter and the translation of the sentences will appear in the next issue of "World-Radio."

In order to encourage the study of languages, *World-Radio* will hold a foreign language essay competition, and will award for the best essays the following prizes:—

- 1st prize £50
- 2nd ,, £25
- 3rd ,, £10
- Five prizes of £1 each
- Twenty consolation prizes of 10s. each.



All the village takes part in the annual religious ceremonies. A Breton "Pardon."

The newsagents whose customers win any of the above prizes will also receive a prize of 10 per cent. of the amount received by the customer or customers.

There are no entrance fees.

The conditions will be found below.

CONDITIONS OF ENTRY.

- (1) Entries must be received not later than the first post on Saturday, October 1 next.
- (2) The competitor must hold the Post Office listener's licence.
- (3) He must have been a registered reader of *World-Radio* for at least 6 calendar months.
- (4) No member of the B.B.C. staff is eligible.
- (5) No competitor shall write the essay in his mother tongue.
- (6) Qualified competitors can select their subjects from a list of six which will be published in the issue of *World-Radio* dated Friday, July 1 next. The subjects announced will bear upon the talks given throughout the preceding period.
- (7) The decision of the Editor of *World-Radio* shall be final.
- (8) Entry into the competition involves acceptance of these conditions.

Note.—Registrations are accepted through bona-fide newsagents. Direct subscription can be accepted only in cases when the reader has no local newsagent.

USE THE REGISTRATION COUPON BELOW.

To the Editor *World-Radio*,
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Please register me as a regular reader of *World-Radio* and enrol my name for the Languages Essay Competition. I am studying the following languages:
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(Write in Capital Block Letters.)

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WARNING TO NEWSAGENTS.—No prizes can be awarded to you, if one of your customers is successful, unless you can produce this coupon.

From Sea-bed to Aeroplane.

Those of our readers who on April 18 were fortunate enough to pick up the broadcast experiment from the Island of Sylt, when a diver spoke from the bottom of the sea to the pilot of an aeroplane circling above, may be interested to know some details of this experiment, which is the first of its kind that has ever been carried out.

All manner of "helping hands" were active to ensure the success of the experiment—cables, transmitter, receiver, minute wires, high aerial masts. The space between the speakers was infinitely larger than that from the sea-floor to the aeroplane. A great stretch of country and towns lay between them, for as the diver spoke into the microphone which was fixed in his helmet, his speech was carried through a cable to the stations of Kiel, Hamburg and Berlin, and by wireless to aeroplane. The diver was connected (a) to a boat by rubber tubing, which acted not only as air conductor, but also contained a telephone line; (b) by the receiver on the boat which terminated in one of the diver's headphones; and (c) the cable connection with the microphone in the diver's helmet.

The aeroplane carried a short-wave transmitter, working on a wavelength of 900 metres; its transmissions were picked up by the receiver on the boat and conveyed to the diver by head wires.

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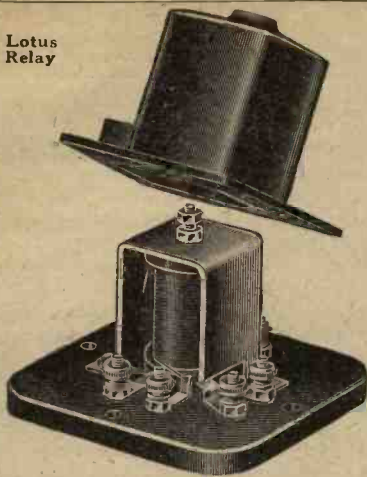
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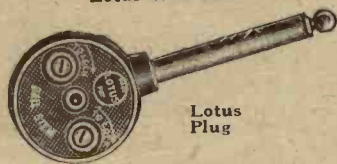
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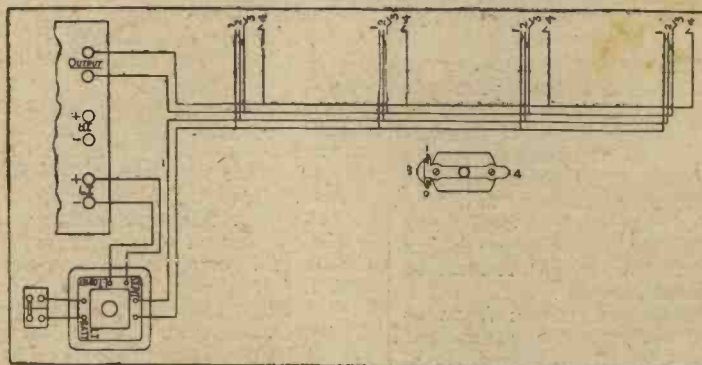
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Wireless Step by Step.

By "DICTRON."

III.—Units of Measurement.

IN the preceding instalments we considered the three essential factors of a simple electric current and the application of Ohm's Law expressed in the formula:—

$$E=C \times R$$

where E=Electro-motive force,

C=Rate of flow of current,

R=The resistance of the circuit to the flow of current.

This is very valuable knowledge, but has no practical application in this form. It is of little use to know that the price of a commodity is proportionate to its weight. We only know its value proportionately. To know the actual value of the commodity we must be able to say that the price in shillings is proportionate to the weight in pounds, or that the price of the whole quantity is equal to the weight in pounds, multiplied by the price per pound in shillings.

The shilling and the pound are units of measurement, each applicable in its own particular scale of values and in no other sphere whatever. The effect of applying a unit of measurement to a scale other than its own is as meaningless as it would be to say that one had purchased two shillings of sugar at a price of one ounce. Similarly, there must be units of electrical measurement.

Units.—We have considered various forms of what may be termed stationary electricity or charged bodies. The first unit to be considered, then, is the unit of electrical quantity. This is called the "coulomb." To say that a certain body is charged with five coulombs of electricity implies something analogous to the statement that a tank contains five gallons of water. We shall not require to refer to the coulomb as a unit, since practically all the matters with which we are concerned relate to movement of electricity in various forms. Now we set this charge in motion and a fresh set of units are required to describe the manner and effect of its movements. We have talked of the rate of flow of current. If one were to pass a continuous flow of water through a pipe it would be observed that a greater number of gallons of water passed a certain point in the pipe during one hour than passed during one minute. The passage of electricity along a conductor takes place in a certain time and it, therefore, becomes necessary to take time into account. The unit of current is called the "ampère," and when one coulomb of electricity has passed a certain point in the circuit in one second it is said that a current of one ampère flows. The unit of electro-motive force is the volt. It is analogous to pounds pressure per square inch. The unit of resistance is the ohm.

Power and Work.

The unit of electrical power is the "watt," which is exactly parallel to the unit of mechanical power. It will be as well to consider the essential differences between "power" and "work." The amount of work which a man must do to push a wheelbarrow along a level path will depend upon two factors—namely, the force with which he pushes the barrow and the distance he has to push it.

A mechanical engineer says, therefore, that the two factors of work are force and distance, and he has evolved a unit known as the "foot-pound" to express the amount of work done when a force equal to a weight of one pound is exerted through a distance of one foot. A force equal to a weight of half a pound exerted through a distance of two feet is also equal to one foot-pound. Conversely, a force equal to a weight of four pounds exerted through a distance of three inches is equal to one foot-pound. This, then, is the definition of work.

Frequently one hears the same remarks applied to what is known as energy. Energy may be defined as the capacity for work, and can, therefore, only be measured as work either done or capable of

being done. The two terms "work" and "energy" may, therefore, be regarded as interchangeable and synonymous. Power, on the other hand, is defined by the engineer as the rate at which work can be accomplished or is accomplished.

A unit was evolved by James Watt, the pioneer of mechanical engineering and the first practical steam engineer, who assessed the power of a horse as being sufficient to accomplish continuously 33,000 foot-pounds of work per minute. This has been taken as a standard and is now universally accepted as the unit of mechanical power called "horse-power."

Electrical Power.

The relation between power and work should now be clear, and it should be obvious to the reader that there can be no power where there is no work done or to be done. Power is purely an expression of the rate at which work can be or is accomplished. It is simply a matter of observation of such modern conveniences as the tram and the electric railway to realise that work can be done by an electric current. If work can be done, then there must also be power. The work done in an electric circuit is the product of the electro-motive force and the current. Since, as we have already seen, the unit of current (i.e., the ampère) is assessed on a time basis, it is obvious that the power in any electrical circuit can be calculated by multiplying the electro-motive force expressed in volts, by the current expressed in ampères. Thus the current of two ampères at a pressure of five volts represents a power in the circuit of ten watts. The name of this unit of power is not its only association with the unit of mechanical power, since the electrical watt is merely a different-sized unit for expressing precisely the same physical quantity, just in the same way as a pint and a gallon are different-sized units for measuring the same physical quantity.

A watt is $\frac{1}{746}$ of a horse-power; thus we may say that the power represented by a current of 7.46 ampères at a pressure of 100 volts, being 746 watts, is equal to one horse-power.

A multiple of the unit "watt" to which we shall frequently refer in future articles of this series is the "kilowatt," which is the term used to express 1,000 watts.

There is also a unit of electrical "work." This is called a "joule" and is equal to the work done in one second by one watt, or may alternatively be expressed as being equal to 0.737 foot-pound.

There are other electrical units with which we shall need to be acquainted in the course of our study, but it will be best to leave the discussion of these until later.

(Continued from Column 3.)

The Yodellers.

I wonder how many English listeners have picked up Berne or Zurich on a Saturday night and heard the Swiss Yodellers in full song, an item well worth trying for if your set is able to reach these places.

In Switzerland nearly every little *chalet*, even in the smallest mountain hamlet, is supplied with electric light, and many a Swiss peasant works his valve set from his lighting main by using an alternating current adjuster.

Crystal sets are almost unknown in Switzerland, and would be very little use, as the Swiss stations are low powered, and the distance between each is much greater than is the case in England. In conclusion, let me say that, in my opinion, while broadcasting on the Continent is good, yet England still leads the way in the purity of transmissions, the general excellence of programmes, and the rigid punctuality with which the published time-tables are adhered to.

Continental Broadcasting.

By an Englishman on the Continent.

[The writer, who lives in the Swiss Alps at an altitude of 5,000 feet, and possesses a good 4-valve receiving set with an efficient aerial, records his impressions of the European stations heard by him.]

IN some ways Switzerland is almost ideally situated for the radio "fan," and all the Continental stations come in with very little trouble.

It might be supposed that the Alps, with their huge peaks encircling one, would have a very bad screening effect, but this is not the case; on the contrary, reception is exceedingly good. One disadvantage in this altitude is that during the summer months there is a terrible amount of "static" and, on occasions, terrific thunderstorms, which entail an immediate dash to the window to throw the aerial lead out to the garden.

Another fault that one notices is that amongst the Continental stations much fading occurs, but happily I find that this seldom happens to the Daventry transmission, which comes in splendidly. Some of the smaller English stations, such as Bournemouth, Cardiff, Newcastle, Glasgow, and even Aberdeen, can be made to work a loud speaker by using four valves, but are rather difficult to pick out from the higher-powered, less distant ones.

Recognising Stations.

At first, with so many stations to choose from, it was very difficult to identify announcements made in so many different languages, but one soon became familiar with the different announcers and their little peculiarities.

In addition, many of the stations have adopted distinctive signals which make them easier of recognition.

It is surprising how familiar the voices of the Continental announcers become after a while, one of the most distinctive being the Vienna gentleman with his slow, deliberate, and very pure German, and the peculiar trumpet effect before each announcement.

Again, the Italian announcers with the soft, liquid tones are quite unmistakable, yet for some time I was not at all certain as to whether they were men with very beautiful voices, or women. Berne has a lady announcer who always gives out each item in German and French; and Zurich's announcer with his gruff voice, whose *staccato* "Allo Zurich!" is easily understood.

"Hallo! Praha!"

The Prague station is, I believe, quite familiar to English listeners with his "Hallo! Praha!"; but I doubt whether Brunn, also in Czecho-Slovakia, is quite so well known, although I consider it one of the best in Europe. I remember the first time I picked up Brunn I heard, much to my astonishment, a Russian Balalaika orchestra playing "It's a long way to Tipperary," with great verve and vigour.

Another night I tuned in to another station, which shall be nameless, and found them doing the *Geisha*, and heard "Shack's ze poy for vork" and "Sheep ahoy! Shak's shust ze poy," which sounded very quaint to English ears.

Most of the Continental stations give lessons in English, a very popular language out here, and many teach Esperanto for at least one night a week.

From the German stations one hears some very fine brass band music, and some of the old German folk songs sung by unaccompanied male voices are very beautiful.

I expect that Langenberg, their new high-power station, can be easily picked out in England, and out here it does not seem to interfere with smaller-powered ones, a fact which surprised me not a little.

Before the change in wavelengths on the Geneva plan the Spanish stations came in with great strength and purity, especially Barcelona, but now for some reason or other they can be picked up only with great difficulty.

(Continued at foot of Column 2.)

“Via Ether.”

WHEN tuning-in to Frankfort-on-Main the other night I was at first under the impression that I had picked up a relay of an outside broadcast, but, after listening for about five minutes, realised that it was a studio transmission in the presence of a large audience. What was advertised as a request programme turned out to be a very excellent presentation of the true Continental cabaret, complete with *conférencier*. Now this individual, in Germany especially, is more than the old-time chairman of the music hall, for not only does he actually introduce the different artists to the audience, as, perhaps, might an announcer, but he is given full liberty to make observations of a nature calculated to put the house in good humour. The performances consist as a rule of vocal numbers, comic turns, short sketches, even thrillers; and the different items are interwoven by the *conférencier*, a man who is capable of extemporisation, and who between the consecutive items holds the audience amused with a sort of “carpenter’s act,” that species of entertainment in front of the curtain which gives the stage hands time to set the next scene. I must say that on these evenings when such a performance is given by the Continental broadcasting stations, except by calibration, it is difficult to identify the transmitter, for in no case are details given in the programme. Such cabarets also are very popular with the Swedes, and on many occasions you may hear them from the Stockholm station.

* * *

Koenigsberg of recent date has been connected to its Municipal Theatre, and, according to the programmes, has taken considerable advantage of the very excellent performances which are being given there. On Sunday, April 24, at 7.30 p.m., the studio will relay Tschaiikovsky’s three act opera *Pique Dame*. On the same evening Vienna will give you a revival of *If I Were King*, by Adam. The Vienna station, by the way, has now concluded arrangements for the relay of several performances from the State Opera House, and on April 26 will give you an opportunity of listening to Dr. Richard Strauss’s *Woman without a Shadow* (“Die Frau ohne Schatten”); on April 30 it will relay from the same theatre Verdi’s opera *Falstaff*.

* * *

As a rule, on Sundays, I devote the interval between 6 and 8 p.m. to the search of broadcasters which, in the ordinary way, are difficult to hear when our home stations are in operation. Usually, I turn to my super-het. as soon as the London station has temporarily closed down. But to say that listening in these circumstances is pleasant would be stretching the long bow to its fullest extent, for during that “silent” period—silent as regards the B.B.C. only—it is possible to hear every description of noise which can be produced by wireless receivers. No matter which station you tune in, be it on a high, medium, or low wave, you will find reception accompanied by howls, whistles, gurgles, hums, and

buzzes, to which is generally added a fair amount of mush, and the eternal spark transmissions. Turn to Hamburg, Frankfort, Brünn, Milan, or any other transmitter, you pick up speech and music, and straining your ears to decipher the words, you are immediately interrupted by all the Ham Handed Henrys and Oscillating Oscars of your and other neighbourhoods. They buzz around your station as do wasps around a honey-pot, with the difference that unfortunately they never settle on that pot for one single moment! Apparently every owner of a wireless receiver, be he licensed or not, be he the possessor of an anæmic single valver, or of a 60 h.p. super-het., is on the warpath. Everybody is reaching out, some successfully, most of them in vain, and the little chap with his fierce reaction on the aerial twirls his condensers in the hope of ultimately getting something. (If he got what he deserved many of us would feel satisfied!) Is it not a curious fact that, notwithstanding all the informative articles regularly published in radio journals, these inveterate oscillators cannot grasp that when their receiver is in this state of violent oscillation, not only do they spoil the reception of stations for many more serious amateurs, but that they prevent themselves from satisfactorily hearing any transmission?

* * *

For the reasons given, it is obvious that, notwithstanding the desire of some for a silent period on the part of home stations, any advantage which in theory might be derived from these few hours would be seriously counteracted by the oscillators in question. So long as it is not understood that oscillation affects all listeners alike, so long is the advantage of a silent period for the purposes of hearing distant transmissions a negative one. Personally, I find these Sunday hours useful only for logging the stations which I decide to tune in at other times; as to enjoying their broadcasts—well, it is an impossibility in the present circumstances.

* * *

If, as we have always been told, the looker-on sees most of the game, the eaves-dropper—or wireless enthusiast—may be said to hear most of that which takes place in the ether. There can be but few transmissions made in Europe which are not received by some listener or other in the British Isles, and almost nightly new stars are discovered in the radio firmament. The new comer, in this instance, hails from Lisbon, Portugal, and on a recent date a concert programme was picked up by one of our readers on a wavelength of about 303 metres. The call was definitely identified as Lisbon, and the letters as heard were PIAA. This is interesting news, inasmuch as although for some months I have not been told of broadcasting developments in Portugal, at the beginning of the year information reached me to the effect that the Portuguese Government proposed to instal a small transmitter in the capita]

(Continued on page 409.)

This Plan Will Bring You £250 A YEAR FOR LIFE—FROM AGE 55

Ninety-nine men out of a hundred have to provide for their own future. They have no rich relative to take the burden from their shoulders, and no business pension scheme to fall back upon. They stand or fall on their own efforts.

Are you satisfied with the progress you yourself are making? Have you saved anything like enough to justify a belief that at 55 years of age you will be in a position to take things easier? What about your family, should you, the breadwinner, be taken from them? The plan about to be explained will, if adopted without further delay, relieve you of all anxiety about the matter.

It is the best, the easiest, and the surest way of providing both for your own later years and for your dependents.

Assuming your age to be 35 and you would like to provide for a private income of £250 a year for life commencing at 55, this is how the plan works out. You make the yearly or half-yearly deposits to the Sun Life of Canada (the great Annuity Co.) of an agreed sum. And this is what you will get in return.

£250 a Year for Life.

At 55 years of age the Sun Life of Canada will start paying you an income for life of a fixed sum—about £250 per annum—and you’ll receive this income every year as long as you live. Or, if you prefer it, you can have a cash sum down of about £3,000. Of course, you haven’t deposited anything like that sum. It’s the profits that make it so large—profits heaped upon profits accumulated over the entire period of the arrangement.

Income Tax Saved.

For every deposit you make you receive rebate of Income Tax—a concession which will save you nearly £250 during the period, assuming the present rate of tax to continue. This is additional profit on the transaction.

£20 a Month if unable to Work.

If through illness or accident you lose the power to earn a living, and the disability is permanent, you are excused from making any further deposits, and £20 per month will be paid to you until the £250 a year for life becomes due.

£2,000 for Your Family.

Should you not live to the age of 55, £2,000 will be paid to your family, and, in addition, half of every deposit you had made to date. If death result from accident, the sum would be increased to £4,000 plus half the deposits.

Any Age, Any Amount.

Though 55, and £250 a year for life has been quoted here, the plan applies at any age and for any amount. Whatever your income, if you can spare something out of it for your and your family’s future, this plan is the best and most profitable method you can adopt.

£70,000,000 Assets.

The Sun Life of Canada has assets of over £70,000,000, which are under Government supervision. It is in an impregnable position. Do not, therefore, hesitate to send for particulars of this plan, which may mean great things for you and yours.

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London, W.C. 2 (Nr. Temple Station).

Assuming I can save and deposit £..... per
..... please send me—without obligation on
my part—full particulars of your investment plan
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Occupation

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(Mr., Mrs., or Miss)

Address W.R.

Dominion and Foreign Broadcasting Intelligence

CANADA

(From our Montreal Correspondent.)

100 Miles for a Radio Message.

The interest taken in world affairs by those who work in the Grenfell Mission in Labrador has been considerably quickened by the installation of radio receiving-sets which bring them the news of the day as well as personal messages. That they fully appreciated the messages that were broadcast in the middle of January from Station KDKA is shown by the receipt of a letter from the Northwest River, Labrador, to the Canadian Westinghouse Company, Montreal. "I wish that you might have seen the group ranged around the loud-speaker in the Social room of the small hospital here on last Saturday night, January 15, awaiting the messages to the Far North which you so kindly arranged to be broadcast," the writer says. "Our staff group was there, doctor, dentist, nurse, and teachers, and a dozen or more trappers who were in from their fur paths, some of them having come for a hundred miles by foot over snowy wastes and through forests."

The Wavelength Problem.

Commenting on a dispatch reported to have been sent out from Washington to the effect that the Federal Radio Commission notified the country's radio users that for the present the limitations of wavelength bands will be unchanged, Mr. Alex Johnston, Canada's Deputy Minister of Marine, said: "I do not believe the dispatch is accurate. We were given every assurance at Washington that operating on the six wavelengths assigned to Canada would cease, and we have no reason to believe the Commission has changed its mind." The Canadian problem is said by members of the Federal Radio Commission to be one of the most difficult the Commission has to solve. The last negotiations ended about a month ago. They will be reopened in the near future.

SOUTH AFRICA

Death of Mr. A. N. Dickson, of Capetown Station.

We regret to record the death, on the 4th inst., of Mr. A. N. Dickson, formerly of Nottingham, Director of the Capetown Broadcasting Station, and Business Manager of the Capetown Municipal Orchestra. In the latter capacity he came to London in May, 1925, when the Capetown Orchestra broadcast from the 2LO studio.

AUSTRIA

(From our Vienna Correspondent.)

Competitive Wireless-Picture Systems.

Professor Ludwig Tschoerner, whose experiments in transmission of pictures by telegraph were attracting world-wide attention before the Great War, has now come before the public again with a "simple and inexpensive" outfit for wireless picture transmission in which he has been assisted by the radio expert, Herr Friedrich Horny. He claims

that his apparatus is far cheaper, and relatively more efficient, than any that has yet been used. The first semi-public demonstration will be given here in a few weeks. Since 1908 he has been working hard at his inventions, and latterly has concentrated his efforts on the "Fernkino," or wireless cinema. The enormous difficulties of the problem of transmitting moving pictures, which so many

"May Day."

Sunday, May 1, will be celebrated with especial enthusiasm in Vienna as "Labour Day." When it falls on a weekday, it is observed here more rigorously as a day of rest than any Sunday, no tramcars being allowed to run till the afternoon, and all shops being kept closed. It being on Sunday this year, the business world will be less inconvenienced than usual. Labour Day is a statutory national holiday and festival. The Vienna Symphony Orchestra will give a special concert in the morning, in the Ravag studio, and the ceremonial in the afternoon will be broadcast, including the declamation of "Liberty" poetry by distinguished actors and actresses. On Saturday, April 30, Verdi's *Falstaff* will be relayed from the State Opera.

Next Week's Programmes.

On Sunday, April 24, the day of the General Election in Austria, the feature of the Ravag evening programme will be a performance of Granichstaedten's operetta, *Der Orlow*, in the studio at 8 p.m. At 5.35 there will be a jazz band concert, to cheer Austria up after a day of rigid abstinence, so far as the sale of liquor is concerned, for there is prohibition in Austria only on election days. Sil Vara's *Woman of Forty*, a play adapted from a British novel by Hubert Wales, will be given in the Ravag studio on Friday, April 29. There is no Summer Time in Austria, as the farmers object to getting up unnecessarily early in the morning, and say that it doesn't suit their cows and pigs either, so that London time is now, since April 10, the same as Vienna time.

DENMARK

(From our Copenhagen Correspondent.)

Danish Relays.

A week or two ago the erection of a new relay station in Glostrup, some miles from Copenhagen, was finished. The station belongs to the Danish Post Office, and has two receiving sets, one for long waves and the other for short waves. In Denmark retransmissions from foreign stations—usually Daventry and Königswusterhausen—are

arranged several times every week, and the results obtained so far have been good. The English Boat Race was retransmitted with comparatively good results, and Danish listeners were much interested in the contest. The relay station has three different aerials, two for directional work—namely, a Beverage aerial, similar to that of Keston, and a Bellini-Tosi—as well as a third for general purposes.

GERMANY

(From a Correspondent.)

April 1 "Leg-Pulls."

As is customary in Germany the morning after—or, in the case of a weekly newspaper, the week after—the *Deutsche Rundfunk*, the most prominent offender in this respect, has confessed its many wireless sins on the first of April. It appears that quite a lot of its readers were taken in by its various

Foreign Radio Humour

U.S.A.



THE MAN WHO MARRIED A WIDOW.

[Bronx Home News, New York.]

inventors are tackling with all their might at the present time, are certain to be surmounted very soon, and Professor Tschoerner confidently hopes to be the winner in this competition, which will revolutionise the picture palace throughout the world. At the beginning of the World War, Professor Tschoerner perfected a telegraphic plan and map-drawing apparatus, of which the Austrian War Office ordered a number of copies, and the German War Office ordered 200. He has visited America to show his invention to experts. The Austrian public has heard very little of him for some years, but his latest invention has brought him at once into the forefront of popular and scientific interest. Captain Fulton is now back in Vienna, hard at work on experiments with his new apparatus for wireless picture transmission in the laboratory of the Telegraph Company here, and he intends to make some very interesting semi-public demonstrations shortly.

April jokes, and most by the account of the new Rhineland station, which was exposed in your last week's issue, and which we are now informed "ins Wasser gefallen ist"—or, in other words, has been liquidated. Hardly fewer were the enquiries by letter and telephone concerning another sensational affair reported on the same date—the collapse of one of the masts at the great Nauen wireless station. This terrible incident, which fortunately caused no loss of life or material damage, seems to have resulted in some little reflection upon a local rabbit-shooter, who still sturdily maintains—and in this he is supported by the *Deutsche Rundfunk*—that the shot he let off at the moment of the collapse of the mast was in no way responsible for its fall. In fact, the paper admits that the whole story was its own artful invention. The masts at Nauen are doing well, as usual, the photographs reproduced by the paper relating to an accident caused by a storm during alterations fifteen years ago.

American Methods of Reception.

The views expressed by Captain Eckersley on the subject of sane reception of distant stations receives striking confirmation in an interview published by a Berlin evening newspaper with a prominent member of the German industry, lately returned from America. This representative calls attention to the system of joining several high-frequency stages so that they may be easily worked by a single control. The American sets he finds extraordinarily selective—a quality which is particularly necessary in the States, and especially in New York City, with its thirty-odd transmitting stations. The surprisingly simple "hook-ups," however, prove equal to the task set them. He finds, however, that they are very dear. He does not agree with the abandonment by Americans of the horn loud speaker, which he attributes to the exaggerated importance attached to reproduction of the deeper tones, but is definitely of the opinion that America is showing the way in "sane reaching-out." This is the opinion of the trade in general here. One of the biggest retail dealers in the City told me the other day that he confidently anticipated that in two or three years' time, if not less, there would be only multi-valve sets in Germany. At present, his business is still largely in crystal and other simple detector apparatus.

New Stations.

It is intended to build a new relay station at Augsburg, which will use a common wavelength. A new station is also projected in the neighbourhood of Cologne, which will use Dortmund's wavelength. Berlin Witzleben is to increase its power to 10 kw., or 5 kw. in the aerial.

ITALY

San Marino Convention.

It is interesting to hear that a Convention has recently been concluded between Italy and the small mountain republic of San Marino, which is in the heart of the kingdom. This Convention provides for the concession to Italy of the right to erect wireless telegraphic stations inside the boundaries of the San Marino Republic.

LITHUANIA

Wireless Progress in Kovno.

The first sitting of the Exploitation Commission of the Kaunas (Kovno) Wireless Station to examine the activities of the station took place recently. Owing to lack of resources it has not been possible to develop the wireless programme. The number of registered subscribers in Lithuania, at present, is 1,500, of whom 1,000 are in Kovno. Notwithstanding the regulations, there are still many unregistered sets. It is estimated that the total number of such apparatus is 10,000. On the basis of the recent Cabinet decision, 75 per cent. of the receipts from the working of wireless is assigned to the radio programme. The Commission therefore intends to undertake measures for the registration of all radio apparatus. Strict control will be enforced and those who fail to register in time will be fined.

All apparatus and wireless parts sold to the public will be registered. It is proposed to transmit periodically through the Kovno station the more interesting programmes of the chief European stations.

SPAIN

British Navy Broadcast.

On the night of March 30, Radio Barcelona broadcast the choir of H.M.S. *Barham*, who came ashore and visited the studio for the purpose. This choir consists of sixteen men, under the conductorship of Wireless Operator A. Brooks. The programme consisted of "The Sailors' Chorus," "Lovely Night," "An Evening Pastoral," "In Absence," "The Soldier's Farewell," "The Long Day Closes," and concluded with "God Save the King." The fine vocal product of this choir, says *Radio Barcelona*, which makes up in quality what it lacks in numbers, evoked much interest. Its style is called "de capilla," and recalls what may be observed of the Russian choirs and of other lands of the North, where the *fortissimo* of Spanish singers is unknown. This ship's choir was formed in October, 1926, and has sung in various ports of the Mediterranean, but, according to Mr. Brooks, it is the first time that it has sung into the microphone. So great a success was the broadcast that at the request of numerous listeners the crew gave a repeat concert in the open air on April 2. Letters of appreciation were received from all parts of Spain, as well as Great Britain and elsewhere.

Bilbao EAJ9.

Bilbao, having been improved, recently started operations, and admirable results were obtained from tests with Barcelona and Madrid. These rebroadcasts will coincide with Union Radio's time table—that is, from 10 to 11 p.m. on alternate days; while from 9.30 to 10 on the intermediate days will be devoted to the local programme. Prominent persons in Bilbao were actively interested in the formation of Bilbao Union Radio, and listeners of standing have offered their most

enthusiastic support. The rebroadcasts from EAJ7 Madrid, in conjunction with Union Radio's regional stations, will be the principal feature of the weekly programmes, which are of much interest to crystal set listeners in the distant provinces.

Additions to the Union Radio Group.

Union Radio, following up their plan of a unified transmission for Madrid, have now reached, according to their journal *Ondas*, a friendly agreement with Radio Iberica and Radio Madrileña, and only await official recognition to merge the Madrid stations in one.

Still Hope for the "Highbrows."

"The day has almost arrived," said the President of the National Broadcasting Company of America, in a recent address, "when broadcasting will have no more worlds to conquer in the field of musical achievement. We cannot put on the air stars greater than the greatest operatic singers which the world now knows." Studies being made by the National Broadcasting Company, he declared, are upsetting some time-honoured theories as to public taste. "Exalted critics who foresee the intellectual doom of the nation because of what they claim to be the great preponderance of 'lowbrows' over 'highbrows' might be led to dry their tears by our own discoveries," he said. "We find that it does not require a college or musical education to appreciate the best in music and entertainment by broadcasting; that both those in the cities and those in isolated country districts, that poor and rich alike, enjoy the best which we can bring into their homes. Lack of opportunity to hear the best in music, we find, rather than marked distinctions of taste, has held back general musical appreciation in the past. In so far as broadcasting is able to reflect a high standard of musical, educational, and cultural influences, it is destined to be a most beneficent influence for the entire country."

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purchase of Colvern Coils, which, being correctly designed for particular requirements, represent the highest efficiency at an economical price.

Issued FREE upon receipt of three halfpenny stamps, this free booklet gives the fullest information on coils for modern receiving circuits. It covers the use of Split Primary, Split Secondary, Tapped Secondary and Reinartz Coils, giving diagrams and pin connections for each type.

It shows that in the purchase of coils from the Colvern Range you will obtain—a higher degree of selectivity per tuned stage, a higher degree of amplification per tuned stage and a greater tuning range. These essential features provide you with the means of securing an extremely high performance from any receiver.

In the Colvern Range of coils, you purchase the highest efficiency on every point. Their design and specification is the combined consideration of the following factors:

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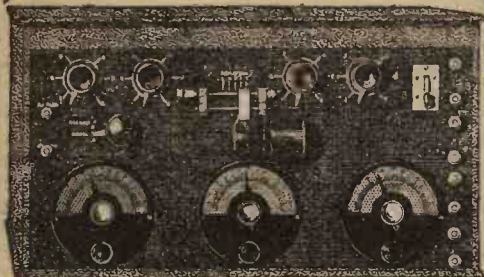
Particular notice should be taken by experimenters of the new Colvern Interchangeable Primary.

Copies of this booklet are to be obtained from Messrs. Collinson Precision Screw Co., Ltd., Provost Works, Macdonald Road, Walthamstow, E. 17. ADVT.



This illustration shows the attractive front cover of the Colvern FREE Booklet on modern coils.

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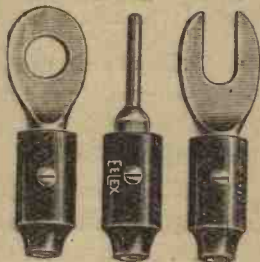
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(Continued from page 405.)

with a view to the dissemination of official, political, and news bulletins. To these would be added musical and other entertainments provided by a group of wireless enthusiasts. If I remember rightly, an exclusive wavelength of 267.8 metres was actually allotted to the projected transmitter by Geneva. Apparently, the station is now in operation, and it would be interesting to know whether any of our other readers have picked up its programmes. So far as I know the power of the station is about 500 watts, but there is no reason why, under favourable conditions and with a suitable set, we should not receive it at fair strength. I understand that Lisbon starts operations at about 10 p.m., as is customary with some of the Spaniards.

* * *

It is equally interesting to learn that one of our Middlesbrough readers picked up a telephony transmission which doubtless must be one of the greatest feats in the history of broadcasting. The Phillips experimental short wave transmitter at Eindhoven (Holland) on April 7 last was successful in bridging the distance separating the British Isles from the Australian Continent, and reception was so good that two of the Sydney (New South Wales) stations rebroadcast the short concert put over the ether for these tests. For fully two and a half hours our correspondent appears to have held the Dutch transmission, and logged successively, at 9.30 p.m., dance music, piano and mandoline solos. At about 11.30 p.m. an announcement in English was made to this effect: "Hello! Station 2BO [?]. We are very interested to hear of your rebroadcasting this station; we hope you are hearing us well. We send greetings to all Australian listeners." The call was PCJJ, and the wavelength in the neighbourhood of 30 metres. As a wireless relay it must have caused some sensation "down under"!

* * *

With the advent of spring, we may expect to hear from the Continental stations an increasing number of outside broadcasts. From a broadcasting aspect, much more use, on the Continent, is made of the local zoological gardens than on this side of the Channel. I am not at this moment referring to the special stunts recently offered to us from menageries, but to the pleasure gardens which in most cities such as Berlin, Amsterdam, or Hamburg, attract numerous visitors on fine evenings, and in which military or other bands give nightly performances. Most of the broadcasting concerns abroad have permanently installed microphones in these places. Hilversum, for an example, gives you a concert from the Amsterdam Zoo every Sunday afternoon. Within the next few weeks, from Berlin, via Koenigswusterhausen, you will be able to hear similar entertainments. There is, of course, a possibility that at some inopportune moment, say, in the middle of a ballad sung by a soprano, you may hear the roaring of a hungry lion, should the performance coincide with its feeding time. In that case, you would require no call sign to enable you to identify the broadcaster!

JAY COOTE.

Which Station Was That?

ANSWERS TO CORRESPONDENTS

Kilocyte (Middlesbrough): Phillips experimental transmitter Eindhoven (Holland). Billmac: (1) probably Le Bourget Aerodrome (France); (2) Belgrade (1,650 m.) testing. Careful (York): Motala, relaying Stockholm, *The Flying Dutchman* (Wagner). Programme advertised for 7/4, was altered to 8/4. F.G.N. (Reading): Belgrade (1,650 m.) testing. Abbeytonian: Radio Espana, Madrid (EAJ2). R. S. T. (Grantham): Surely Koenigswusterhausen relaying Berlin. Derek (Guildford): Motala, relaying Stockholm, *The Flying Dutchman* (Wagner). Programme advertised for 7th inst. was altered to 8th. Parkin (Nottingham): (1) WL must be wrong, cannot trace, (2) if 2BC amateur (Manchester). 3 Vavur (Camborne): Motala, relaying Stockholm, *The Flying Dutchman* (Wagner). Programme advertised for 7th inst. was altered to 8th. Bill Eden (Devon): Radio Espana, Madrid (EAJ2). Tally: (1) Milan, (2) Boden, relaying Stockholm, *The Flying Dutchman* (Wagner). Programme advertised for 7th inst. was altered to 8th, (3) Motala (1,304 m.) relaying Stockholm. Eral (Manchester): Item not given in programmes, but presumably Hamburg, relay from Café Wallhof in that city. R3 (Hexham): (1) Motala (1,304 m.) relaying Stockholm, (2) Boden (1,200 m.) relaying Stockholm, *The Flying Dutchman* (Wagner). Programme advertised for 7th inst. was altered to 8th. (3) Kovno. Sizaire-Berwick: (a) Possibly Belgrade testing; (b) Munich; (c) Barcelona (EAJ1). G. Turner (Taunton): Some trouble occurred with the headline between Eastbourne and London, and engineers changed over to another one. Jason (Malton): 5,260 m. W. K. Bell (Newton Abbot): Motala, the Swedish H.P. station on 1,304.5 m., relays the Stockholm programmes; when in regular operation will entirely replace Karlsborg. W.H.D. (South Chingford): Indication of WL too vague; possibly Radio Paris, which gives a transmission at that time. Curious (Birmingham): Koenigswusterhausen, relaying Berlin. J. J. Woods (Glouce): 6RL, R. Gregson, 2, Laurel Avenue, Blackpool. A.H.M. (Sheffield): Barcelona (EAJ1). Coupon must be sent for each enquiry. K.X.X.27: Leningrad. S.W.17 (Liverpool): (1) Cannot trace, apparently a test; (2) believed to be Lisbon (Portugal) testing on about 303 metres. Philiad (Harrow): If Spanish, Cartagena (EAJ16). Hopeful Novice (Acton): J.N. (Reading): Briermount; Smugger (Shalford): Cardiff. Relay of Presbyterian church service. Not advertised in programmes. Disabled (Hampton Wick): (1) a relay of Stockholm, possibly Karlskrona (196 m.); (2) Cardiff. Relay of Presbyterian church service. Not advertised in programmes. Disclose (Wandsworth): Bilbao (EAJ11). P. S. Verity (Golwyn Bay): Warsaw (1,111 m.). W. H. (North Lincs.): Yes, Hilversum. Spain (Kent): Cardiff. Relay of Presbyterian Church Service. Not advertised in programmes. Buzzer (Chester): Warsaw (1,111 m.). R. H. J. (Blackgang): Cardiff. Relay of Presbyterian Church Service. Not advertised in programmes. A. L. S. (Hucknall): If p.m. cannot trace, if a.m. possibly WGBS (New York). Radio Bugg (Tottenham): Possibly Radio Paris testing. 2 Valve (Bredon): Scheveningen-Haven, Holland (1,950 m.), news only. Verulam: Cardiff. Relay of Presbyterian Church Service. Not advertised in programmes. Horsey (Newark): Juan-les-Pins (230 m.). B. MacLeod (Hastings): Indication of WL much too vague; regret, cannot trace. Black Eagle (Hastings): Yes, Radio Agen. Mudlark: (11.50 a.m.) Motala, relaying Stockholm; (11 p.m.) Madrid (EAJ7). Pup (Peterborough): Yes, Bilbao (EAJ11). G. P. S. (Halifax): Marseilles PTT, relaying PTT Paris. Major H. F. Godington (Southsea): Hamburg (relay of foreign stations). Kester (Sewmoaks): Item not in programmes; if WL correct, Berlin (483 m.). K. Carnoustie: Motala (1,304 m.) relaying Stockholm. 2,000 Ohms: (1) Yes, Scheveningen-Haven (news only), (2) no time stated, possibly Radio Paris testing, (3) Koenigswusterhausen (Press) 2,525 m. Triple Rheostat (St. Missenden): Cardiff. Relay of Presbyterian Church Service. Not advertised in programmes.

NOTE.

Readers desiring a postal reply should enclose a postal order for sixpence and a STAMPED ADDRESSED ENVELOPE in addition to the coupon. Those who wish to take advantage of our free service by means of these columns must give a NOM DE PLUME, in addition to their own name and address. PROPRIETARY TRADE NAMES MUST NOT BE USED AS NOMS DE PLUME.

WORLD-RADIO (No. 90).

For replies to questions concerning the identity of stations heard, this coupon should be cut out and forwarded, together with particulars, written on a separate sheet of paper, to Editor, *World-Radio*, Savoy Hill, London, W.C. Particulars should include: Date and time, approximate wavelength, call (if heard), fading or not, signal strength, and details of programme. N.B.—Each inquiry must be accompanied by a separate coupon.

"Which Station Was That?"

The New Alternative Postal Service.

In response to numerous requests, whilst retaining in *World-Radio* the usual free published service of "Which Station Was That?" we have decided to initiate a paid postal service, which, we are confident, will enable a reply to be posted within forty-eight hours of our reception of a "Which Station Was That?" coupon.

The conditions are as follows:—

A charge of sixpence, payable by postal order or in postage stamps, will be made for each query specially answered by post; but six queries may be sent for a fee of 2s. 6d. Stamped addressed envelope must be sent, and each query should be accompanied by the coupon published in "World-

Radio." All queries should be numbered, in order to facilitate reply. Letters must be addressed to the Editor, "World-Radio," Savoy Hill, London, W.C.2; envelopes to be marked in left-hand top corner "Postal Query Service."

If, owing to paucity of details submitted, or for any other adequate reason, the transmission cannot be identified, a further query will be answered free of charge. In this event, the answer form sent to the reader must be returned with the new application.

We are convinced that this alternative postal service will be found of considerable interest to many readers who desire an earlier reply to their enquiries than can possibly be given by publication in a weekly journal.

Note.—In the event of queries received in which readers have not complied with the conditions published, replies will not be sent by post, but will be found at the foot of these columns.

Correspondence

Identifying Foreign Stations.

SIR,—Since many listeners find it difficult to identify foreign stations, the following system may help them in their search.

The majority of foreign stations have a daily time-signal which is noted in *World-Radio*.

When a time-signal is heard from an unknown station, the difference between the time indicated by the signal and Greenwich Mean Time should be accurately noted.

Every degree of longitude on a map corresponds to four minutes. Therefore, having found the difference between the time at the unknown station and at Greenwich, it can easily be found whether the station be East or West of England, and its approximate distance therefrom.

Example.—A clock is heard from an unknown station of wavelength between 400 and 440 metres. Time is 30 minutes in advance of Greenwich. Since time is fast, the station is East of England.

$$30 \text{ (minutes)} = 7\frac{1}{2}^\circ \text{ E.}$$

$$4 \text{ (minutes per degree, long.)} = 7\frac{1}{2}^\circ \text{ E.}$$

Therefore the station is $7^\circ 30'$ E. of Greenwich. Then by finding the meridian $7^\circ 30'$ east of Greenwich it is found that Berne, Switzerland, is the only station corresponding to the details.

I trust that this system may be of use to your readers.

PHILIP H. R. GHEY.

62, Whiteford Road, Plymouth.

[Due allowance must be made for the change from Greenwich Mean Time to British Summer Time.—Ed.]

Battersea and District (B.M.I.) Radio Society:

SIR,—May we ask the favour of space in the columns of your paper to draw the attention of your readers to the Summer Term of wireless lectures to be given at the above Institute on Tuesdays and Wednesdays (7.45 p.m. to 9.45 p.m.), beginning on April 26, when new members are cordially invited to join? Enrolment takes place on Monday evening, April 25, and throughout the first two weeks of the term. There are three separate courses, as follows:—

1. A new elementary class for beginners is being formed for theory and practice. (The syllabus is based on the series of articles entitled "Wireless Step by Step," published weekly in *World Radio*);
2. An intermediate class for theoretical electricity, magnetism, and wireless reception, including practical work and morse practice;
3. An advanced class for the study of short-wave reception and transmission, theory and practice, morse, and reception of foreign stations.

The subscription is one shilling per term (no extras). Further particulars may be had on application to the undersigned.

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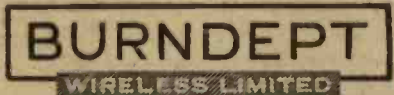
ALL-WAVE SUPER-HET A 7 VALVE RECEIVER For Home Construction

Specially designed by Burndept for those who desire to construct for themselves a Receiver similar in performance to the "Ethodyne." The design of the instrument is such that it will receive on all waves from 50 to 3,000 metres, and can be used either with a frame aerial or with an ordinary aerial. The aerial need not be large; twenty or thirty feet of wire twelve feet high will bring in stations from all over Europe, while a short length across a room, or tucked around the picture-rail, will enable one to receive many broadcast stations. Within ten miles or so of a broadcast station there is no need for any type of aerial whatsoever. You can easily construct this set for yourself if you



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EVERY GENUINE ENVELOPE BEARS THE NAME:—



BURNDDEPT

"ALL-WAVE"

HOME CONSTRUCTIONAL
SUPER-HETERODYNE RECEIVER

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| 10/1000 MET. DISCOUDED | 20/1000 MET. |
| WAVELENGTH PLATES | 1000 MET. |
| 10/1000 MET. DISCOUDED | 1000 MET. |

CAT No 152 PRICE 1/-

70, Clifton Hill,
London, N.W. 8.
22nd March.

Messrs. Burndept Wireless Ltd.,
Blackheath, London, S.E. 3.

DEAR SIRS,—I have now had many opportunities during the past week of thoroughly testing the All-Wave 7 Valve Super Het. I constructed with your components, and feel sure that the results obtained will be of interest to you.

Taking one page from my log book (Sunday, March 20th) I find the following entries: Stettin, Klagenfurt, Nuremberg, Langenberg, Breslau, Milan, Stuttgart, Hamburg, Radio Toulouse, Berlin (483 m.), Berne, PTT Paris, Brunn, Rome, Radio Espana, Madrid (EAJ 2), Frankfort-on-Main, Madrid (EAJ 7), Brussels, Aberdeen, Porsgrund (Norway), PTT Lyons, Aberdeen, Birmingham, Bournemouth, Hilversum, Radio Paris, Koenigswusterhausen, all loud speaker strength; in fact, these stations, most of which were heard when London was operating, were tuned in on the loud speaker without difficulty. Reception was made on an outside aerial, short indoor, and a frame aerial (which was not specially made for this receiver). But for the advantage of the directional properties of the latter and greater freedom from interference, there was but little to choose between them. Four facts particularly impressed me—namely: (a) remarkable selectivity of the circuit; (b) excellent reaction control; (c) smooth working of potentiometer (volume control), and lastly, but by no means least, the great purity of tone the reproduction on a cone loud speaker, with your LL 512 valve is all that can be desired.

As you are aware, my special work of searching the ether nightly calls for a first-class instrument, capable not only of reaching out, but of giving a clear reception of transmissions under all reasonable circumstances. In the "All-Wave" I have found a most trustworthy and reliable assistant.

Owing to the pressure of work I have been unable to "sit up for America," but have no doubt whatever that several of the U.S.A. stations can be added to my log.

The possibility, by means of interchangeable plug in coils, of covering all wavelengths is a feature of considerable utility, as, in this manner, the range of the receiver is greatly extended. In every way the All-Wave fulfils my very exacting requirements.

I might add that for the 2LO transmissions I need no aerial whatsoever, but have found it beneficial to connect the receiver to earth. In these circumstances I work two loud speakers to my entire satisfaction.

Yours faithfully, (Signed) J. GODCHAUX ABRAHAMS.

To BURNDDEPT WIRELESS, LTD.,
Eastnor House, Blackheath, S.E. 3.

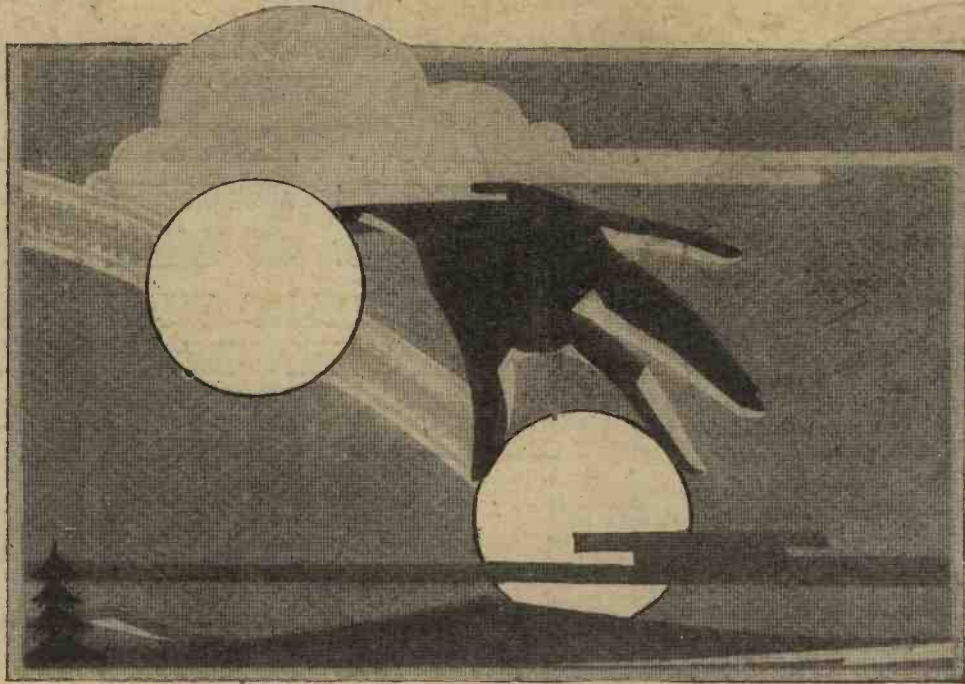
Please send me the ALL WAVE CONSTRUCTIONAL ENVELOPE. I enclose Postal Order for 1/- to cover cost.

Name

Address

Name & Address of Local Dealer

Date W.R.

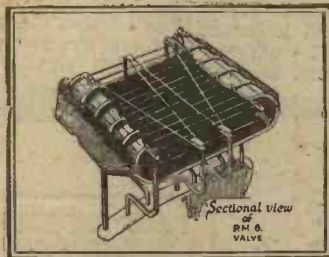


P.M. Emission corrects Summer Time losses

The long light evenings brought by the change to Summer Time need not reduce the volume of your radio reception or cause you to lose the programmes of more distant stations.

By using valves that have a huge emission an abundant reserve of power is available to compensate for the weakening of incoming signals.

This is where Mullard P.M. Valves with the wonderful P.M. Filament stand supreme. Their gigantic P.M. Emission is a huge source of power that has been proved by National Physical Laboratory Test to be constant and lasting.



Note the great length and thickness of the wonderful P.M. Filament, giving a huge emission surface.

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