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## The Possibilities of Empire Broadcasts

A cable message advises that Mr. Maclurcan, the well-known Sydney amateur, has expressed the opinion in Britain, after a direct investigation on the spot and particularly an inspection of the low-power plant used by Mr. Gerald Marcuse, that there are no insuperable obstacles in the way of Empire broadcasts. The following article will serve to give a general view of the possibilities.

**D**ESPITE definite difficulties everything points to a regular Empire broadcasting service before many months have elapsed. A recent cable message from London reports that Mr. Charles Maclurcan, the well-known Sydney amateur transmitter, who is visiting England, has stated that no great difficulties have to be overcome to accomplish Empire broadcasting, especially after inspecting Mr. Gerald Marcuse's low-power short-wave transmitter.

The scientific experimenters employed by the great valve-manufacturing concerns have now given us the wonderful shielded-grid valve which will tremendously increase the efficiency of short-wave reception, and it is by short-wave transmission and reception that Empire broadcasting will be accomplished. The time is now not very distant when, under favourable conditions, the Radio Broadcasting Company of New Zealand will be able to relay programmes and announcements from England, so that owners of the humble crystal set will be enabled to listen-in to London. This feat, as a matter of fact, was accomplished by 3YA in connection with Armistice Day celebrations.

At present the British Broadcasting Corporation is regularly relaying items from 2LO, London, by means of their short-wave station 5SW, Chelmsford, 50 miles from London. Reception at this side of the globe is not yet sufficiently satisfactory for the purpose of relaying except as a "stunt." True, the Australian stations occasionally relay the transmission from England, but it is admittedly only possible under most favourable conditions, and then it leaves much to be desired, owing to the unsteadiness of the volume.

An Australian writer says:—"In order to make a British programme audible the world over, the original programme from the London studio is at the same time radiated by a special high-power short-wave transmitting station situated 50 miles from the studio and main transmitter. So that, when you hear 2LO, London, relayed on this side of the world, you actually hear the London transmission taking place, but through the medium of 5SW, the special short-wave station of the British Broadcasting Commission. 5SW is situated at the works of the Marconi Company, at Chelmsford, in Essex. It is housed in the same building as the now historical 5XX, Chelmsford, which was superseded by 5XX, Daventry. The present station occupying this historical room transmits on a wavelength of 24 metres. It has the appropriate call sign of 5SW and is linked up with the control room of 2LO at Savoy Hill, London, by land line in the usual way, so that it would be an

easy matter for the B.B.C. to retransmit from 5SW the programme of any of the English provincial stations. The transmissions have so far been confined to London. The equipment used at 5SW is a special standard and experimental apparatus connected to main panels of a Marconi transmitter. Usually the transmitter is of the oscillator type and each power stage consists of two 10 kilowatt valves. The total power rating of the station is in the neighbourhood of 25 kilowatts. The aerial system used is of the Franklin type and possesses a number of original features based on experience with beam transmitters. This takes the form of five half-wave aerials and is suspended, but insulated from a wire, attached to the tops of two 50 feet masts. It is claimed that this system is highly efficient and undoubtedly it is as thousands of listeners in Australia can testify. Short waves, however, have their vagaries, and there are times when reception is marred by static conditions or acute high-speed fading, but, taken generally, the relays from 2LO, London, via 5SW, have been an undisputed success. Engineers both in England and Australia are working hard to overcome the difficulties that arise, and the time is rapidly approaching when the exchange of international broadcast programmes will be such a regular feature that the then blasé listener will be able to consult his evening paper and take his choice of London, Paris, New York, Berlin, or Moscow, through which every local station is scheduled to relay."

### BRITAIN'S WONDER STATION.

Captain P. P. Eckersley, chief engineer of the British Broadcasting Corporation, is now generally regarded the world over as in the very front rank of broadcasting authorities. Prominent American radio men on visiting England a few months ago pronounced the quality of transmission by 2LO, London, in marked advance of anything in the United States where broadcast transmission has reached a remarkable degree of excellence. They paid unstinted praise to Captain Eckersley who was personally responsible for the creation of London's "wonder station." The following comments by Captain Eckersley on Empire broadcasting are, therefore, of special interest to us in the antipodes:—"The experimental transmissions of 5SW were initiated chiefly because experts in various parts of the world wished to investigate the best method of reception of short wave, high quality telephony transmissions. It has

incidentally furnished interest to Dominion, Colonial and foreign "fans" as well as occasionally affording listeners in distant parts of the world the opportunity of hearing, from their local station, relays of British programmes.

There are, in general, two problems. Firstly, to find the most suitable frequency of emission to give, in different parts of the world, an adequate signal at particular phases of the sun's shadow. Secondly, having got a signal, to find the best method of receiving it.

On the former point, 5SW has taught us nothing we did not know before. Particularly, Marconi engineers, as responsible for the tremendously successful beam telegraphy services, have previously made an exhaustive study of the best wavelengths to use at different times of the day and year. They are daily gaining more experience in the operation of their service, and 5SW is merely an additional check upon previous observations.

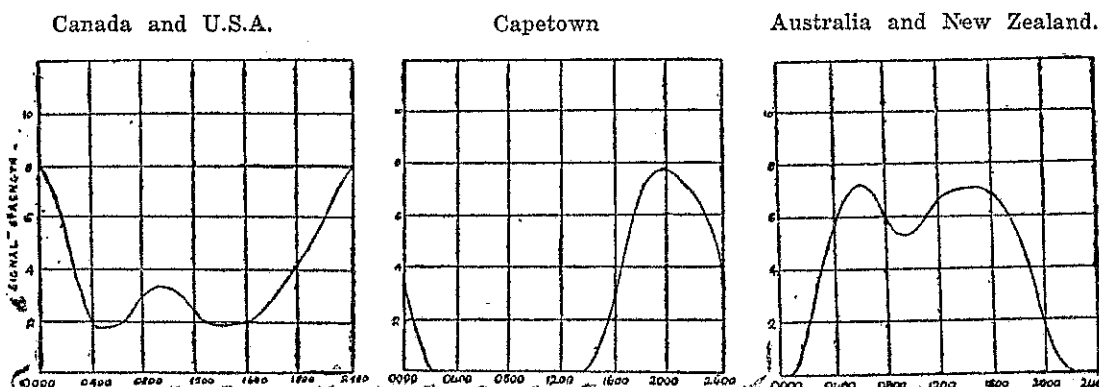
On the latter point, it is early days as yet to say that such-and-such a method is the best. The whole plan of attack involves producing a good ratio of signal strength to interference, and then trying to equalise what is, on single aerial reception, a most variable signal. Again, it is insisted that variability above a minimum, for telegraphy, does not matter; constancy, for telephone, is a sine qua non. In America some promising studies have been made, and elaborate systems are being installed to attempt to equalise signals. In England some fairly promising results have already been obtained; but it would be criminal foolishness to let these encourage one into saying that there is yet a guarantee of satisfactory service worthy of the object served.

Turning back, however, to the question of signal strength using a certain wave, the information—information, incidentally, which merely corroborates that previously obtained as to strength in different parts of the world at different times of the day—may be of interest to readers. For this reason three charts, concerning North America, South Africa, and Australia, are published herewith which give field strength against time of day for a thirty-six hours' test conducted just before Christmas, 1927.

The signal strengths are expressed in operators' nomenclature, and it may be taken that anything above R6—R7 is a robust signal, and, if it did not fade rapidly, sufficiently good for relaying.

Once more let it be insisted that it would not, by proper choice of frequency of emission, be at all impossible to guarantee a signal in any part of the world

about 80 per cent, of the time attempted. The problem now is to equalise that signal at the receiver. This problem is being tackled in many parts of the world (including Britain, where Marconi's and B.B.C. engineers are investigating a novel system of spaced aerials), and 5SW exists mainly to help others, and particularly American engineers, to take part in a world-wide and co-operative experiment. So far there are no guarantees of service.



The above graphs show the strength of reception on short wave test from 5SW in the various countries mentioned. The time indicated in the bottom line throughout is Greenwich Mean Time.