

C.S.

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SUBJECT.

1935.

192

14th November.

THE BRITISH BROADCASTING CORPORATION -

Introductory Memorandum on Broadcasting
and the Colonial Empire.

Previous Paper.

MINUTES.

1-17 S. of S. Confidential Circular of 14/11/35.

Ct. To see and for your observations
please.

The most satisfactory form of
broadcasting in this Colony would
probably be on the "air". The benefits
of broadcasting at present is confined
to Stanley and could not be extended
to outlying districts except at heavy
expense.

2. If broadcasting were carried
on from the W.F. Station the
whole Colony would get local news,
music by gramophone records and
over-seas news. In the majority of

Subsequent Paper.

Cases crystal sets which cost under
£1 would do to receive on.

1. It would probably not be
advisable to improve the present system
whereby the house connections to the
studies are carried on wires. Any
extension of this system necessarily
entails increased cost of upkeep.

I consider that if it is found
possible financially to improve broadcasting
then the system should be altered
in order that the whole colony
could have the benefit of the
service.

MCH
25.1.56

Hon Col Sec.

Sir,

I have read very carefully the Confidential
circular regarding Broadcasting Generally.

I respectfully consider Sir that any observations
that I made on such a far reaching and most
important matter would be of little help to the Government.
Would I be allowed to suggest that I think that
the only possible way to get to the root of Empire
and Local Broadcasting would be, to call a Council
meeting (similar to that called to discuss the Electrical
"Point & meter" question) and at which meeting Mr. A.
Meyer Senior operator & myself might be present
to be questioned regarding technical & other details
dealing with this very important subject

G. B. Butcher
C. E. E. D.

29/1-56

Senior Operator

Can you give an estimate of the cost of the instruments required for broadcasting from the W.T. Station.

W.C.H.
C.S.

24. 1. 36

Hon. C.S.

From the information contained in Red 1-16. it would be necessary to employ apparatus consuming from 10 KW to 20 KW in order to broadcast to the outlying Islands. The estimated cost of which would be not less than £3,000. This figure is arrived at from the quotation which was received from The Marconi Co in 1934, in connection with the proposed installation of a Short-wave transmitter for Stanley Station costing about £1,600 for 3.5 KW.

A member

So operator.

1/2/36.

W.H.

Submitted. I fear it will not be possible to extend broadcasting in this Colony at present at the estimated cost of £3,000.

It would also seem inadvisable to incur any further expenditure on extending the present system and

add to cost of maintenance. Probably
broadcasting from the W.T. Station
would be the best scheme.

McH
3. 2. 36

I agree

~~McH~~ 2/2/36

C.R. - noted please - G.W.B. - C.R. 3-2-36

See operator

To note.

McH
C.R.
3. 2. 36

A. Mercer.
4. 2. 36.

P. A. McH

CONFIDENTIAL

THE BRITISH BROADCASTING CORPORATION

INTRODUCTORY MEMORANDUM

ON

BROADCASTING AND THE
COLONIAL EMPIRE

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1. The planning, organisation and development of broadcasting to and within the Colonial Empire present problems and difficulties some of which are similar to those encountered in providing the now established administrative and other services. Others, mostly technical in character, are new and are inherent in the science and practice of broadcasting. But broadcasting itself is new; it is so potent an influence that its development should not be hindered by precedents and susceptibilities nor by considerations of financial stringencies. Already other countries have followed our lead and are securing to themselves that which their short wave services were designed to secure, the interest and gratitude of Empire communities. From this more serious consequences—commercial and political—may follow. There is no time to be lost.
2. As far back as 1926 the B.B.C. endeavoured to interest the authorities in the possibilities of short wave broadcasting. Eventually permission was secured for experiments to be conducted from Chelmsford. These shewed what might be done with proper apparatus; and various efforts were, in due course, made with a view to the B.B.C. being authorised and financed to proceed with the establishment of a Service. England would then have been ahead of other countries instead of—despite all that has been accomplished during the last three years—maintaining her position with difficulty, and in danger of falling behind. And some of those other countries, it should be remarked, have no ostensible justification for their activities such as the possession of a great and wide-scattered Empire provides, if not demands.
3. The Colonial Office Conference of 1930 endorsed with remarkable unanimity and even enthusiasm the idea of an Empire Service put before them by the B.B.C. Notwithstanding this, no funds were procurable for the purpose, and little if any encouragement was forthcoming at home. It was not till the end of 1931 that the B.B.C. decided that, so great were the issues involved, it must proceed with some kind of a service, financing it as best might be from the share of home licence revenue which it was permitted to retain. In December, 1932, accordingly, two transmitters, specially designed and of reasonable (but not high) power, were put into operation with modest and not very efficient aerial arrays. Programme and staff costs were approved more or less as demanded; but though these, with capital and maintenance charges, were considerable, they were slight compared with what some other countries were meeting, with propaganda as their incentive and vision to implement it.
4. A good deal has been accomplished since 1932 and there are now far fewer unknown quantities. There is a satisfactory amount of reception statistics from overseas; the requirements of listeners are tolerably clear; their interest is proved. There has been a steady increase in the quality and quantity of material broadcast. The aerial arrays have been improved. Two new higher-powered transmitters have been ordered; two more are projected. But still further expansion in all these fields is anticipated if England is at least to maintain her position.
5. The B.B.C. (still deficient of authorisation and finance, but hopeful of something from Lord Ullswater's Committee) is doing all it can. A certain amount has been done at the other end, that is in some of the Colonies. The time has come for consideration to be given to definite, comprehensive action throughout the Colonial Empire to the end that the Daventry service should cover the Empire satisfactorily in both the technical and programme sense; that Colonies should be equipped to receive the Daventry service (a proposition quite distinct from the encouragement of direct listening by

individuals) providing themselves with central receiving apparatus, with a view, in the very small Colonies, to central community listening, and, in the larger ones, to the Daventry service being relayed (in whole or part according to local resources); that the necessary arrangements for relay throughout the Colonies should be made, either by the wireless exchange system or by local transmitters, or a combination of both, programme material being provided locally to such extent as resources, programme and finance permit; and that broadcasting be "institutionalised" and treated as an organic interest in the Colonial Office and in all Colonies.

6. The B.B.C. was encouraged by the interest shewn by the Right Hon. Sir Philip Cunliffe-Lister when Secretary of State for the Colonies. The present Secretary of State, however, has intimated his concern in cogent terms, and it is a matter of great satisfaction to the B.B.C. to prepare and submit, with his encouragement, this Introductory Memorandum.

7. Incidentally a strong broadcasting service to and within the Empire (Dominions and Colonies) is not the end of the matter. The 'projection of England' in foreign languages and to other countries is outside the scope of this Memorandum. But sooner or later it must be undertaken; and the sooner the better.

A. THE DAVENTRY SERVICE.

Time
Differences

8. The time factor (dependent upon longitude) is obviously an essential consideration in designing the out-going service. Time differences within the Colonial Empire range from 6 hours slow on G.M.T. in British Honduras to 12 hours fast in Fiji. This range is covered by the existing service which (within limits) provides a daily programme for reception at a convenient listening time in all parts of the Empire—that is in Dominions as well as Colonies—when technical conditions of reception are favourable. This involves a programme schedule occupying 17 hours out of the 24.

Transmission
Periods

9. The times in G.M.T. of daily transmissions from Daventry are as follows:—

Transmission 1—early morning hours in England for late afternoon or evening reception in Australia, New Zealand and the Pacific Islands (Oceania). The actual period of transmission moves from 8.30 to 10.30 a.m. in midwinter to 4.30 to 6.30 a.m. in midsummer. This variation is determined by technical conditions of propagation. The time difference ranges from 8 hours fast on G.M.T. in Western Australia to 12 hours (or more) fast in New Zealand and some of the Pacific Islands.

Transmission 2—11.0 a.m. to 1.45 p.m. for evening reception in Malaya and the Far East (and Western Australia) where local time is 7 or 8 hours fast on G.M.T.

Transmission 3—2.0 p.m. to 5.0 p.m., providing an evening programme for India, Burma and Ceylon, where local time is 5 to 6 hours fast on G.M.T.

Transmission 4—5.15 p.m. to 10.45 p.m.—the longest single period of transmission—which is divided into two parts providing evening reception in (a) South and East Africa, Mediterranean countries and outlying islands (2 to 3 hours fast on G.M.T.) and (b) West Africa, islands in the South Atlantic, the West Indies and British communities in South America (from 1 hour fast to 4 hours slow on G.M.T.).

Transmission 5—11.0 p.m. to 1.0 a.m., serving Canada, Newfoundland, the West Indies and British listeners generally in North and South America where local time is from 4 to 7 hours slow on G.M.T.

Transmission 6—3.0 a.m. to 4.0 a.m., providing a programme on the previous evening in Western Canada where local time is 7 or more hours slow on G.M.T.

The actual times of transmission are liable to slight seasonal changes, and there is considerable overlapping of transmissions from the reception point of view. The regions aimed at in terms of evening listening hours are indicated above, but each transmission may be received in other parts of the Empire to which it is not specially directed. For example, Transmissions 1, 2 and 3 can be heard in comparatively early hours in other countries between England and the East, and Transmission 6 has been received at good strength in the morning in India.

Reception
Notes

10. Reception conditions are as follows :—

Ascension	.....	.....	.....	.....	Transmissions 4a and 4b good.
Bahamas	.....	.....	}	.....	Transmissions 2 and 3 fairly good. Transmissions 4b and 5 good but reception of this last transmission may deteriorate during the winter. Barbados wireless exchange uses the Empire Station regularly.
Barbados	.....	.....	
Basutoland	.....	.....	}	.....	Transmission 4a satisfactory to good.
Bechuanaland Protectorate	.....	.....	
Swaziland	.....	.....	
Bermuda	.....	.....	.....	.....	Similar to Bahamas and Barbados.
Borneo	.....	.....	.....	.....	No reliable information : probable that Transmissions 2 and 5 are fairly good.
British Guiana	.....	.....	.....	.....	Similar to Bahamas and Barbados.
British Honduras	.....	.....	.....	.....	” ” ” ”
Cameroons	.....	.....	.....	.....	Transmissions 4a and 4b satisfactory.
Ceylon	.....	.....	.....	.....	Transmission 2 good except for Morse interference. Transmissions 3 and 5 good. Average of 15 hours per month of Transmission 3 relayed by local station.
Cyprus	.....	.....	.....	.....	Moderately good throughout the day, especially in summer.
Falkland Islands	.....	.....	.....	.....	No detailed information, but reported that Transmissions 4b and 5 very fair to good.
Fiji	.....	.....	.....	.....	No reliable information : probable that Transmission 1 is fairly satisfactory ; Transmission 6, however, may be giving better results.

(11)

Gambia	.....	.....	.....	Similar to Cameroons.
Gibraltar	.....	.....	.....	Quite satisfactory throughout the day in summer, but less satisfactory on winter evenings. Droitwich long wave also receivable.
Gold Coast	.....	.....	}	Transmission 2 fairly good. Transmissions 4a and 4b very good. Accra wireless exchange uses Empire Station regularly.
Ashanti	.....	.....
Hong Kong	.....	.....	.....	Transmissions 2 and 3 fairly good and have improved during past six months. About 4 hours per week of Transmissions 2 and 3 relayed by local station.
Jamaica and West Indian Islands	.....	.....	}	Similar to Barbados.
Kenya	.....	.....	.....	Transmission 3 fair. Transmission 4a good.
Malaya	.....	.....	.....	Transmission 2 satisfactory to good except first hour. Transmissions 3 and 5 good. Morse interference has been severe on the 17 metre wavelength.
Malta	.....	.....	.....	Fairly good. Transmission 4a best.
Mauritius	.....	.....	.....	Transmission 4a good.
Nigeria	.....	.....	.....	Transmissions 4a and 4b good.
Nyasaland	.....	.....	.....	Transmission 4a fair to good.
Pacific Islands	.....	.....	.....	Similar to Fiji.
Palestine and Transjordan	.....	.....	.....	Transmissions 2 and 3 and 4a very good in summer, but Transmission 4a poorer in winter.
Rhodesia, South and North	.....	.....	.....	Transmission 4a fairly good.
St. Helena	.....	.....	.....	Transmissions 4a and 4b fairly good.
Sarawak	.....	.....	.....	As for Borneo.
Seychelles	.....	.....	.....	Transmission 4a good. Transmission 3 fair.
Sierra Leone	.....	.....	.....	Transmission 2 fairly good. Transmissions 4a and 4b very good. Freetown wireless exchange uses the Empire Station regularly.
Somaliland	.....	.....	.....	No information, but most probable that Transmissions 3 and 4a satisfactory.
Tanganyika	.....	.....	.....	As for Nyasaland.
Tristan da Cunha	.....	.....	.....	The wireless operator of ss. 'Empress of Australia' reported that Transmissions 4a, 4b and 5 had been received at good strength when the ship was lying off the island ; there was, however, no short wave receiver on Tristan da Cunha.
Uganda	.....	.....	.....	As for Nyasaland.
Zanzibar	.....	.....	.....	” ”

Anglo/Egyptian Sudan Transmission 4a good.
New Hebrides As for Borneo.

Reports of good to very good reception of Transmissions 4 and 5 have been received from whaling expeditions in South Atlantic waters and from the British Grahamsland Expedition in the Antarctic.

Programme
Policy

11. Essential factors in British social and cultural interests provide a basis for the programme policy of the Daventry Service, and the programmes have been planned to meet the overseas demand for broadcasts from the home country representative of British tradition and sentiment. The use of the Service for the exchange of programmes and information between the Dominions and Colonies and the United Kingdom has already been realised, and this exchange, with a consequent fuller conception of Imperial ideals in the component parts of the Empire, has proved its value. There is a large measure of flexibility in the Service, but it is unlikely that the fullest possible use by the Colonies of transmissions from Daventry would disclose a need for any change in policy, although some minor adjustments would probably be required in the detailed content of programmes.

News

12. News bulletins, for which a special Empire editorial staff exists, have an established place in each transmission and are designed to cover events of importance taking place throughout the Empire and the world during the twenty-four hours preceding radiation. A foreseen consequence of this is that the News is of greater value to isolated listeners than to those situated in populous centres where there are normal newspaper services. In compiling the bulletins emphasis is placed on the need for accurate and authoritative reporting of events. As a supplement to the bulletins, periodical notes on agricultural and commodity markets are provided according to a regular schedule. This commercial information is so distributed as to cover in general terms the interests of groups of Colonies where geographical juxtaposition makes a common service practicable.

Public Events
and Talks

13. Broadcasts of outstanding public ceremonies and sporting events occupy an important place in the programmes and have evoked widespread interest in the Empire, especially on occasions such as the Royal Jubilee, the Royal Wedding in 1934, the launch of the 'Queen Mary' and (in a lesser degree) national sporting events. Distribution in Colonies where there is already some measure of broadcasting organisation has led the way to the promotion of unity of interests. Similarly, talks of a general character or dealing with various aspects of everyday life in England or the Empire are provided. Their Majesties the King and Queen, the Princes of the Royal House and a great many distinguished statesmen and other speakers have broadcast from Daventry.

General
Programmes

14. The Service also includes entertainment programmes of all kinds and they are, of course, essentially British in character, likely to appeal in the first place to 'white' populations in the Colonies. While it will never be practicable to cater from Daventry for purely native interests in language and music, broadcasting provides a far-reaching means of promoting unity of speech and culture, and the development of native resources will lead to a wider audience for programmes Western in type. This is borne out in the case of operation of wireless exchanges in West African territories where it is understood that a large proportion of subscribers are native.

Programme and
Programme
Staff Costs

15. It is difficult to give an exact cost of the present operation of the Empire Service. To a large degree it functions as an integral part of the general activities of the B.B.C. Administrative and production facilities (including accommodation) are provided within the Corporation's organisation, and all programmes broadcast in the United Kingdom are available for simultaneous radiation from Daventry. The value of this cannot be computed but, apart from it, allocation for

expenditure exclusively on Empire programmes is at present £51,000 per annum. This will rise to £90,000 per annum by the end of 1936. The correlation of the Daventry service with a comprehensive service within Colonial territories will occasion further additional expenditure on programmes which it is impossible to estimate. Expansion of the Empire staff will also be required. At present, the staff engaged exclusively in programme and administrative work for the Empire Service costs approximately £14,000 per annum, and the expansion referred to would probably increase this to £20,000 per annum.

Engineering
and Engineering
Staff Costs

16. Nor can total engineering costs be estimated accurately. The whole of the B.B.C.'s technical organisation for supervision, research, installation, etc., is at the disposal of the Empire Service. The cost of the engineering staff and the running expenses of the Empire transmitters total at present approximately £23,000 per annum, and will increase to approximately £54,000 per annum when the new higher power transmitters become available. This will certainly be further increased by additions to the service provided.

Total Costs

17. The total annual cost at present, on the above figures, is, therefore, £88,000, rising in 1937 probably to £164,000. This, as explained above, is very definitely a net figure including nothing for overheads of any kind, not even for material used from home programmes. Further, no provision is here included for the necessarily heavy depreciation on the capital expenditure on transmitters, buildings and land already in use at Daventry or on order for the contemplated extension of the existing service. The capital expenditure already incurred at Daventry amounts to £62,000, and an immediate further outlay of £220,000 has been authorised. Beyond this the additional expenditure of £100,000 is contemplated.

Technical
Extension

18. The capital expenditure already authorised for additions to the Daventry station covers the provision of two more transmitters, each of considerably higher power than the existing transmitters, and an extensive new aerial system. The object of these additions is clearly to provide a better and more reliable service to the Empire than that already achieved, within the limits of the present reception areas and programme timings. The further expenditure contemplated is designed to secure the extension of the areas over which transmissions can be well received and/or the period of good reception. The radiation of more than one programme, to provide for the reception of different programmes simultaneously in different areas, will also be possible.

Overseas
Appreciation

19. There has been generous and significant appreciation of the Service by listeners overseas. This reaction can be gauged to some extent by the following summary of incoming letters and other reports on the Service from all parts of the world :—

1933 (including testing period at end of 1932)	.....	11,250
1934	.....	13,500
1935 (up to October 19th only)	.....	23,500

These figures indicate maintenance of interest and a growing audience. Approximately 40% of the letters have come from the Empire. This fact should be considered in relation to population statistics. The population of the United States (where the Service has evoked great interest) is 125 millions, and the 'white' population of the whole Empire is approximately 21 millions. The newspaper press of the Empire has devoted considerable space to the printing of programmes and favourable comments on the Service. There is also evidence from many Colonies (in West Africa, for example) to shew that the daily contact with the home country has exercised an important influence on the editorial policy of local newspapers and has, in other ways, created a greater sense of Imperial unity in isolated territories. The terms in which individual and collective appreciation of the Service has been expressed leave no doubt as to the immense contribution it can make to the solidarity of the Empire.

8

B. RECEPTION ARRANGEMENTS.

Direct
Listening

20. Individual or direct listening requires, of course, the possession by individuals of short wave receiving apparatus giving them direct contact with the Daventry service. It is impossible to say how many receiving sets are at present in use in the Colonial Empire, but a study of individual Colonies' licence figures and other statistics would enable an approximate estimate to be made.

Apparatus

21. There is no fundamental difference in the apparatus required for direct listening and that required for a central receiver (see Paragraph 22 below). Each type of apparatus requires an aerial, installed so that it will pick up the maximum of wanted signals from Daventry and the minimum of unwanted signals from other stations and unwanted interfering noises, and a short wave receiver. The ordinary all-wave receiver, such as is used for direct listening, may cost anything between £20 and £50, the price depending partly on the type of receiver and partly on the costs of freight to and Customs duties in different parts of the Empire. The performance of standard commercial all-wave receivers is limited partly by the cost at which they must be produced and partly by the necessity for providing easy manipulation by the individual listener. Where a higher and more reliable standard of reception is required, the best possible aerials and receiving apparatus should be provided, since more people will be dependent on the output of the one receiver. The cost of one such receiver with a suitable aerial system would probably be of the order of £250, but this cost would probably be reduced if receivers were produced in greater numbers. It should also be possible to produce a compromise between the two above types of receiver which would be suitable for community listening (see below) at an intermediate price.

Reception for
Distribution

22. A central receiver may be used for three purposes :—

- (a) *Central Community Listening.* A public address system is installed in one or more assembly halls, schoolrooms, etc. This type of listening would be very suitable in a small Colony such as Tristan da Cunha. In addition, the provision of suitable receiving sets in villages and native settlements would seem to be the only medium of direct contact with the native element in many Colonies. Recent experience of such facilities in India has proved encouraging, and the operation of the Village Listening Scheme by the Palestine Government will undoubtedly provide valuable information in this sphere.
- (b) *Distribution by Wireless Exchanges.* Instead of being connected to one or several public address loudspeakers, the central receiver may be connected to a large number of loudspeakers through a number of suitable amplifiers, the individual loudspeakers being situated in the homes of listeners and fed over a line network analogous to that of a telephone system.
- (c) *Rebroadcasting by Local Transmitters.* The output of the central receiver is connected to the input of a broadcast transmitter and the programme received by radio on individual receivers in the homes of listeners.

In a suitable area, one central receiver could function simultaneously on the above three systems of distribution.

C. DISTRIBUTION ARRANGEMENTS.

Alternatives

23. Certain lines of possible action were laid down in the Secretary of State's circular despatch of the 8th May, 1935. The requirements and possibilities of each Colony would obviously have to be considered separately. As has been indicated, the Daventry service may be given by loudspeakers from the central receiving apparatus in small Colonies direct. But in very few Colonies will this be

considered adequate. Distribution arrangements must therefore be made either by use of a wireless exchange system or by a service from a local transmitter (or transmitters) and, according to circumstances, the programmes from those local transmitters will consist wholly or only in part of the Daventry material.

Village
Listening

24. The Colonial Empire as a whole, but excluding Malta and Cyprus, has a white population of approximately 200,000 out of a total population of approximately 60,000,000. It is obvious, therefore, that a Colonial service must be designed to appeal to the natives as well as to whites, but a native service might be limited to comparatively short periods in the evening. For native villages and settlements, community listening arrangements are required. Recent experience of such facilities is indicated under 22 (a) above. Village receiving sets can be used for the reception and rediffusion of the Daventry service direct, as well as for the local service; much more, however, for the latter, since the Daventry service can have but a limited appeal to natives. The effective operation of village sets therefore postulates the existence of a local transmitter (or transmitters) under local programme management.

Wireless
Exchanges

25. In populous areas the wireless exchange system, whereby individual subscribers are linked by telephone lines to the central receiver, is already in operation—under Government auspices in the Falkland Islands (Port Stanley), Sierra Leone (Freetown), the Gold Coast (Accra) and Nigeria (Lagos); and by private enterprise in Gibraltar, Barbados (Bridgetown) and Malta (Valetta). Operation by private enterprise is likely to be started soon in Jamaica (Kingston) and Trinidad (Port-of-Spain). These exchanges are restricted in operation to main centres of population, and their establishment in the chief towns of Colonial territories provides a valuable service for white residents and for educated natives. The existence of the line network facilitates the dissemination to subscribers of programmes originated within the Colony, say in a studio connected with the exchange, without any local wireless transmitter. So far as is known, the Gold Coast is the only Colony contemplating the operation of an exchange system in more than one town. Plans for the extension of the Gold Coast service to Cape Coast, Takoradi (with Sekondi) and Kumasi are under consideration. In response, however, to the Secretary of State's circular of the 8th May, 1935, it appears that further exchange activity is possible in Zanzibar and other territories where investigations are now being carried out.

Local
Transmitters

26. For Colonies of any size the provision of local transmitters is essential to the development of a Colonial branch service. There is no other means of reaching the public as a whole, and certainly for locally produced programmes this is essential. In the light of experience in Colonies where broadcasting is at present organised, it seems that the establishment of stations to be used for broadcast transmissions should be linked with the development of internal communications within the Colonies. Broadcasting is now carried on by the Governments of Ceylon, Hong Kong and Palestine (as from the end of 1935). There is a service in Kenya operated by Cable and Wireless Limited, and one is shortly to be inaugurated in Malaya (at Singapore) by the recently-formed British Malaya Broadcasting Corporation. There is also some broadcasting activity in the Pacific Islands (Fiji and Papua), British Guiana, Bermuda and Malaya (small stations at Singapore, Kuala Lumpur and Penang). In none of these Colonies does there appear to be any real organisation at present, and in several of them it is understood that the stations used for broadcasting are also employed for general communication purposes.

D. PLANNING A COLONIAL SERVICE.

Service
Areas

27. The service area of a broadcasting station depends principally on three factors: the wavelength to be used, the type of country to be covered, and the power of the transmitter. Since a measure of the quality of the service is the ratio of wanted signal to unwanted noise at the aerial terminal of the receiver, the question

of the level of unwanted electrical noise, which may be caused either by atmospheric disturbances or by man-made 'static' (interference caused by domestic and industrial electrical apparatus), must be taken into account as well as the actual signal level.

Wavelengths

28. The wavelengths generally available by international agreement for broadcasting in the Colonies are those known as the medium waves, between 200 and 545 metres, although broadcasting can be and is also carried on in Europe on the so-called long waves, between 1,000 and 2,000 metres approximately. The attenuation offered by the earth to the passage of radio waves increases rapidly with decrease in wavelength, so that, from the point of view of covering a given area with the highest signal strength, the use of the longer waves is desirable. Other factors enter into the question, however, such as the efficiency of the transmitting and receiving aerials (which, for a given size, increases with decreasing wavelength) and freedom from atmospherics and man-made static (which also increases with decreasing wavelength). In practice, therefore, a compromise has to be sought. Generally speaking, atmospheric disturbances are worse in tropical than in temperate countries and in summer than in winter. In certain Colonies, therefore, the use of long waves, and even of the longer of the medium waves, may prove impossible for a considerable part of the year.

Attenuation

29. The attenuation offered to a given wavelength is dependent on the sub-soil, being generally greater as the geological age of the soil increases (e.g., granite sub-soil offers extremely high attenuation to radio waves). The attenuation also depends on whether the ground is broken or flat, dry or moist, and whether it is covered with trees, high buildings, etc. It is lowest for transmission over sea. In addition to the attenuation offered by the ground after the waves have been radiated, the sub-soil at the transmitting station itself also has a definite bearing on the radiation characteristics of the station and its efficiency.

Direct and
Indirect
Radiation

30. A further complication in the transmission of radio waves must now be considered, since it has a very important bearing on results. In addition to the waves which are radiated along the ground parallel to the earth's surface, a radio transmitter also radiates waves in an upward direction. These waves are not lost in space, at any rate after dark, but are reflected back again by a layer of ionized atmosphere some sixty miles above the earth's surface. They return to earth at a distance from the transmitter, either adding to or subtracting from the waves which have travelled over the earth's surface. These two sets of waves are known as indirect and direct radiation. The strength at which the former arrives is variable from practically zero in broad daylight to very strong at night, and, further, at night the strength may vary from moment to moment over wide limits. The strength of the direct ray will be determined by the attenuation offered by the factors already mentioned, but at least it will remain sensibly constant. The combined effect on the receiver of the two radiations at night, however, will be variable and is responsible for the well-known phenomenon of fading. An increase of power will not, of itself, alter fading, since both direct and indirect radiation will be equally increased. Two typical conditions will be found as a receiver is taken away further and further from a radio transmitter. By day the signal will be steady but will become gradually weaker, until it is finally below the prevailing spurious noise level. By night the signal will be steady near the transmitter, but will become gradually weaker as the distance is increased, until a point is reached where the signal will fluctuate—the fluctuations becoming greatest at a point where the indirect and direct radiations are equal. On further increasing the distance, so that the direct ray attenuated by the earth becomes negligible in comparison with the indirect ray which has not suffered this attenuation, fading will be less marked and, in fact, a secondary service area will be found in which relatively good reception will be possible. In very mountainous districts, where attenuation of the direct ray is extremely high, it may be necessary to rely entirely on this night indirect ray service which, although not ideal, is in certain circumstances acceptable.

Transmitting
Aerials

31. The aerials of transmitting stations can be designed to project the radiation at desired angles in the vertical plane, and account should obviously be taken in their design of whether a direct or indirect ray service is desired.

Power and
Signal Strength

32. A consideration of the above factors will shew that it is impossible to specify the exact coverage of a given wavelength working at a given power for general use in the Colonies. There is, however, one definite statement that can be made: it is that the strength of signal at a given point depends on the square root of the power of the transmitter. This means that, in order to double the strength of the signal, the power of the transmitter must be quadrupled, or, to treble the strength, the power must be multiplied by nine, etc.

Power of
Typical
Stations

33. While, as has been stated above, it is impossible to give precise details of wavelength and power of transmitters suitable for the Colonies, it is possible to give one or two examples of the power employed by typical broadcasting stations. A station designed to serve a small area (say, up to a five-mile radius) in a fairly flat country, such as pastoral England, could conveniently use a power of 300 to 500 watts. Such a station would also be suitable for serving one medium-sized town (say, 100,000 inhabitants). Transmitters of a power of 1 or even 5 kilowatts could similarly be used if conditions were particularly difficult. Transmitters of a type designed to serve a region with a radius up to 50 or 60 miles would require a power of 10 to 20 kilowatts, and even up to 50 kilowatts if conditions were particularly difficult. Transmitters of a higher power (50 to 100 kilowatts) are used only in conditions where it is necessary to obtain the utmost service possible from a given wavelength (e.g., in congested areas from the radio point of view, such as Europe or the U.S.A.), or where it is desired to serve a very large area with an indirect ray signal at night. In areas where there is no shortage of wavelength channels, more even coverage can be obtained by a larger number of medium or low power transmitters than by a small number of higher or very high power transmitters. Nevertheless, the maintenance cost of a larger number of low power transmitters is proportionately greater.

Use of Short
Wavelengths

34. There are two other types of wavelength which are available for use by broadcasting stations. These are known technically as 'short' or 'ultra-short' waves. Normally, wavelengths in the first category are used only for very long distance broadcasting. This applies to the Empire Service and to the world-wide service carried out by such stations as Zeesen in Germany and Pontoise in France. In the ordinary way, such wavelengths are not used for local services in countries comparable in size with many of the Colonies, although attempts have been made to use them in tropical countries as they are less susceptible to atmospheric disturbances. On the other hand, reception is, in general, obtainable over considerable areas only by indirect radiation (see above) and is, therefore, variable and subject to fading. Such reception, however, is not confined on these wavelengths to the hours of darkness. Another objection to the use of these waves for a local service is that there are as yet few commercial broadcast receivers which cater for their reception efficiently. This does not apply to apparatus manufactured in the U.S.A. A further objection to their use for local services is that there are insufficient channels within the short wavebands allocated by international agreement to the long distance services mentioned above. If some of these few channels are taken up by local services, serious interference will result with the reception of, for example, Daventry, since a station with as little power as 1 kilowatt is capable of producing almost world-wide interference on these waves.

Use of
Ultra-short
Wavelengths

35. Wavelengths in the second category ('ultra-short'—below 10 metres) are suitable for serving only small areas, roughly speaking up to a radius of between 20 and 30 miles. Their practical use for broadcasting has not yet been proved, but it is likely that in the future their use may be considerable in certain suitable areas. They are peculiarly free from natural atmospheric disturbances, but interference

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may be caused by the ignition systems of motor cars and by certain types of electro-medical apparatus. Practically no receivers are at present available for service on ultra-short wavelengths; but it is anticipated that such receivers will shortly be developed commercially in connection with television which, for reasons that need not be elaborated here, must be carried out on these ultra-short wavelengths. The B.B.C. will obtain experience of the suitability of ultra-short wavelengths for sound broadcasting in the course of the next year.

Studios

36. The number and size of studios required for any service will depend on the type and extent of the programmes to be produced. The simplest arrangement will be to provide one general purpose studio large enough to take a small orchestra with a maximum of, say, 30 performers. Such a studio, by suitable microphone-placing and the use of screens, could also be used for talks and other programmes. A studio of this type is capable of giving satisfactory results; but, as a programme service develops, it is likely to become desirable to add different types of studios, allotted specifically to various kinds of programmes. The actual dimensions of a general purpose studio may vary within fairly wide limits, but a studio 50 feet by 30 feet by 20 feet high (30,000 cubic feet) would accommodate an orchestra of 25 to 30 performers. The studio should be so situated that it is insulated from outside noise, and its walls, floor and ceiling should be as rigid as possible. Brick or stone construction is suitable for the walls. Details of acoustical treatment of studios based on B.B.C. experience are available.

E. COSTS.

General

37. An estimate of the number and cost of transmitters required for a service in the Colonies of the Empire is in process of preparation. It is strongly emphasised that this is prepared only from the map and not from personal knowledge or detailed study of the conditions to be met in practice. It is therefore a very rough estimate and is produced only to give an idea of the magnitude of the financial problem at the outset. For proper programme control technical units would need to be linked together, so that on occasions such as a message by His Majesty the King or an important statement of policy by the Colonial Government there could be comprehensive coverage of a whole Colony. The service in one Colony could also operate in sub-units to meet language and other sectional interests, particularly in relation to native matters and in connection with the operation of communal receivers.

**Transmitter
Costs**

38. There is considerable variation in material and labour charges in different parts of the Empire. Further, the cost of a transmitter will depend on the specification to which it is built, the precautions taken against breakdown, the building in which it is housed, the type of aerial system adopted and the cost of land. If such transmitting stations are built under Colonial Government auspices, costs will generally be reduced to a minimum, since they can often be erected in buildings and/or on land already available. The cost of each installation will call for individual consideration, and quotations to cover local requirements can, in due course, be obtained from one or other of the British companies specialising in this work: namely, Marconi's Wireless Telegraph Company, Limited, or Standard Telephones and Cables, Limited.

In order to give a rough idea of the costs and the headings under which they fall, the estimated costs for the Jerusalem station, which will be capable of putting a power of 20 kilowatts into the aerial, are given below :—

<u>CAPITAL EXPENDITURE</u>		£
Supply and erection of one 20 kilowatt transmitter		25,000
Purchase of land and erection of buildings		5,000
Contingencies (additional studio equipment or relaying apparatus)		2,000
		<u>32,000</u>
<u>ANNUAL EXPENDITURE</u>		
(5 hours broadcasting daily)		
Maintenance and working of station		2,900
Upkeep of buildings		100
		<u>3,000</u>

Maintenance
Costs

39. (a) *Technical Staff.* The staff will be determined by the number of hours of transmission and the power of the transmitter. Small transmitters could be operated by one man per shift, whereas a 20 kilowatt station would probably require at least one junior engineer and one senior engineer per shift, with one or two additional junior engineers for relief and/or holidays. In addition, at least one senior and one junior engineer would be required to run the studio premises if, as is probable, these were not on the same site as the transmitter: otherwise one senior engineer per shift could take charge of both. The above covers only the simplest type of equipment and will be greatly exceeded if (i) power is generated at the transmitting station, (ii) studios and equipment are elaborate, and (iii) a considerable number of outside broadcasts is undertaken.
- (b) *Power, Light and Heat.* In general terms, the total power required for a broadcasting station is from 6 to 7 times the power supplied to the aerial, i.e., a 10 kilowatt transmitter would take between 60 and 70 kilowatts from the mains.
- (c) *Rental of Lines.* Telephone lines capable of transmitting music are required to connect the studio premises to the transmitter, and to connect to the studio any places from which outside broadcasts are made.
- (d) *Rent, Rates, Taxes and Insurance.* These will depend entirely on local circumstances.
- (e) *Valve Replacement.* This is the most important item of normal maintenance. In the purchase of a transmitter, the supplier should be asked to quote on two bases: (i) the supply of the transmitter valves having a guaranteed life, and (ii) the valving of a transmitter at so much per hour of transmission.
- (f) *General Maintenance.* This includes upkeep of buildings, replacement of spares, and general administrative expenses. As a rough guide, it may be taken that in the case of a transmitter operating for 4,000 hours per annum the annual cost of power, light, and heat, valves and general maintenance is of the order of 10% of the capital cost of the plant only.

F. PROGRAMME MATERIAL.

Local
Programme
Material

40. Comment on some programme aspects of Colonial services may be of value. In certain Colonies where Western culture is firmly rooted (for example, in Malta, Cyprus and the West Indies generally), and possibly in others, some local programme material will be readily available. This is anticipated, for example, in Palestine and Malaya, where services are shortly to be inaugurated, and has been experienced in Ceylon. In the interests, however, of maintaining a reasonable programme standard, it will be essential for any Colonial service to be restricted to a relatively short period of daily transmission, apart from rebroadcasting. If conditions are favourable, an extension of hours will form part of the process of development. In other Colonies, where there is a small European population, the origination of local programmes will be difficult, and in territories with a high native population (the majority of African Colonies) the provision of local programmes will be exceedingly problematical.

Gramophone
Records

41. It seems that all the existing Colonial broadcasting services have experienced a lack of suitable local material. A high proportion of the programmes consists of gramophone records, but the attitude of the record manufacturers to broadcasting is not altogether favourable, and this is a matter which will call for full investigation. If a comprehensive Colonial service came into being, so that the cost could be spread over a large number of users, the B.B.C.'s output of records specially made for broadcasting could be extended. These recorded programmes would serve as a supplement to the rebroadcasting of Daventry transmissions and locally-produced material. Here again the programmes which could be recorded in England would appeal primarily to the minorities of 'white' population and educated natives. The recording of programmes within the Colonies would require investigation.

News and
Copyright

42. The Daventry news bulletins are available for distribution overseas through wireless exchanges, but are not, under existing contracts, available for rebroadcasting. It is obviously desirable that there should be no restriction on the use of these bulletins within the Colonial Empire, although considerable cost may be involved. With the exception of these bulletins, all programmes broadcast from Daventry are available for distribution overseas through wireless exchanges and also for rebroadcasting provided arrangements have been made with the appropriate copyright-holders. It is not considered, however, that these arrangements should present undue difficulties of settlement between the British Government or Colonial Governments and the copyright-holders for whom, in most cases, responsible Associations exist. It might be possible, in arrangements reached, to cover also the public performance of programmes by loudspeaker.

G. " INSTITUTIONALISATION."

Importance of
the Service

43. There is no need to emphasize here the importance of broadcasting as touching every aspect of life. Other countries, as already indicated, have realised its overseas potentialities. Germany and Italy, in particular, have organised efficient short wave services, carrying programmes of a strong propagandist character. The French short wave service is being notably extended. These developments make more important than ever the achievement of the widest possible dissemination of programmes of British origin. In certain Colonies there is need to counteract the subversive propaganda of foreign stations. In all Colonial territories it is vitally necessary to employ the instrument of broadcasting to the utmost extent. The planning of Colonial services must be comprehensive, and adequate finance is essential to success. No expenditure could be better worth while. The potentialities of broadcasting are comparable with the demands of the major social services and of defence. This consideration gives rise to other problems besides those—primarily

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of broadcasting technique—which are dealt with above. They are problems in which considerations of technique and experience dovetail into those of administration. As such they come more into the province of the Colonial Office than of the B.B.C., and will more fitly be dealt with at a later stage. A few points only of outstanding importance are here noted, to which the preliminary experience of the B.B.C. in this field leads it to draw attention.

Status of
Broadcasting

44. It is of prime importance that the status of broadcasting be recognised, both at the Colonial Office and in individual Colonies, as a vital interest of national organisation, organically related and not subordinate to other such activities. The general supervision and control of the service, as well as its initiation, should, it would seem, remain with the Colonial Office. Its local control in individual Colonies should be 'institutionalised' in such a way as will in each case best secure to it a distinct and well-founded status in relation to major Government undertakings. In some Colonies broadcasting is at present controlled by the Posts and Telegraphs Departments. While exceedingly valuable pioneer work has been done in all Colonies where such services exist, it is considered that for proper development broadcasting should be in the hands of specially appointed persons of standing, responsible direct to the Governor or his immediate deputy. Technical matters could be handled by officers, who would naturally have to work in close touch with those in charge of general communications.

Central
Organisation
and Staff
Recruitment

45. These considerations suggest that a Department may need to be established in the Colonial Office, the functions of which would be the maintenance of close contact, on the one hand, with Colonial Governments and individual broadcasting officers, and, on the other, with the B.B.C. Such a Department would, it is presumed, also be closely concerned with the recruitment and training of broadcasting staff, at least for many of the Colonies. Actual appointments would perhaps be made on the advice of a board jointly representative of the Colonial Office and the B.B.C. The training of staff would be undertaken by the B.B.C., within whose organisation facilities exist for the study of all aspects of broadcasting practice.

Local Control

46. The success of broadcasting in the Colonies will depend upon the early allotment of an adequately trained and experienced staff. Each Colony will have to provide statistics to show what is required to give good coverage. Each Colony will have to explore and determine what programme material its local resources can provide. While at the outset officers would presumably have to be responsible to local Governments (and through them to the Colonial Office), it is desirable that there should be some measure of local freedom in general programme and service development. This might lead in time to some measure of autonomy being granted in an individual Colony to a public service analogous to the B.B.C.

Concessions

47. In some territories it might be considered convenient at the outset to have broadcasting operated by a commercial undertaking under terms of a concession. The Secretary of State's despatch dated the 16th March, 1934, enclosed a draft agreement which might be applied to a wireless exchange operated in this way. Experience has, however, shown that the association of commercial interests with the operation of a service of any type is undesirable. It is urged, therefore, that, if such a basis of operation is unavoidable, there should be adequate safeguards in the agreement to cover the taking-over of the service, within a reasonably short period of years, by the Government or by a public utility organisation nominated or appointed by the Government.

BROADCASTING HOUSE,

October 25th, 1935.

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CIRCULAR

CONFIDENTIAL

Downing Street,

14th November, 1935.

Sir,

*Bds. 18.25-
w.p.
312/32*

I have the honour to refer to my predecessor's Circular despatch of the 8th of May, 1935. In that despatch he expressed clearly the great importance which he attached to the development of broadcasting services throughout the Colonial Empire and suggested certain lines along which that development might take place. Since assuming Office, I myself have been increasingly impressed with the potentialities of Colonial broadcasting and am anxious that these potentialities should receive the fullest investigation of Colonial Governments.

2. The British Broadcasting Corporation, who were seized of my interest in this matter, have accordingly prepared a preliminary memorandum on the subject, a copy of which I enclose. I do not wish at this stage to express any opinion on the various suggestions which are put forward in this memorandum, but meanwhile I command it to your careful study, and I shall take a further opportunity to address you on the subject of the steps which should be taken to promote the development of a broadcasting system upon the right lines.

I have the honour to be,

Sir,

Your most obedient, humble servant,

Wolcott Macdonald

The Officer Administering
the Government of