1899.

NEW ZEALAND.

TELEGRAPH CABLES

(FURTHER PAPERS RELATING TO).

[In continuation of Paper F.–8A, presented on the 18th October, 1898.]

Presented to both Houses of the General Assembly by Command of His Excellency.

PROPOSED PACIFIC CABLE.

[Extract from British parliamentary paper entitled "Pacific Cable Committee: Report, Minutes of Proceedings," &c., presented to both Houses of Parliament by Command of Her Majesty, April, 1899.]

INSTRUMENT OF APPOINTMENT OF THE COMMITTEE.

I APPOINT the Right Hon. William Waldegrave, Earl of Selborne, Under-Secretary of State for the Colonies; George Herbert Murray, Esq., C.B., a principal clerk in the Department of the Treasury; Sir Donald Alexander Smith, G.C.M.G., High Commissioner for Canada; the Hon. Sir Mackenzie Bowell, K.C.M.G., member of the Privy Council of Canada; the Hon. Sir Saul Samuel, K.C.M.G., C.B., Agent-General for New South Wales; and the Hon. Duncan Gillies, Agent-General for Victoria, to be a Committee to consider in all its aspects the proposal for laying a telegraph cable between British North America and the Colonies of Australasia, and to report to me, for the consideration of Her Majesty's Government, their views upon the following questions:—

1. Is the laying of such a cable practicable from a technical point of view?
2. If so, what route should be selected for the cable?
3. What will be the cost—(*a*) of laying, (*b*) of maintaining the cable, and (*c*) of the annual working expenses?
4. What revenue will arise from the traffic which may be expected to pass over the cable?
5. Should the cable be owned and worked by Government or by a subsidised private company?
6. If the cable were to be national property, what would be the proper method of management and administration?
7. What should be the form of contract offered to a contractor for its construction?

It is desired that the report should embody the views of the Committee upon any subsidiary questions of a practical nature which may arise during the investigation.

Should the report of the Committee, after it has been submitted to Her Majesty's Government, render such a course advisable, the Chancellor of the Exchequer and myself will be prepared to discuss with the representatives of the Dominion of Canada and of the Australasian Colonies the financial side of the question in its bearing upon the interests of the Governments concerned.

2nd June, 1896. J. CHAMBERLAIN.

FURTHER INSTRUMENT OF APPOINTMENT.

I APPOINT the Hon. A. G. Jones to be a member of the Pacific Cable Committee, in the place of the Hon. Sir Mackenzie Bowell, K.C.M.G., resigned.

10th November, 1896. J. CHAMBERLAIN.

REPORT OF THE COMMITTEE APPOINTED TO CONSIDER THE PROPOSAL FOR LAYING A TELEGRAPH CABLE BETWEEN BRITISH NORTH AMERICA AND THE COLONIES OF AUSTRALASIA.

1. The Committee have the honour to report that, having been appointed by the Secretary of State for the Colonies on the 2nd June last, they held their first meeting on the 5th of that month, but that owing to unavoidable delays they were unable to begin the examination of witnesses till the 12th November.

2. The Committee desire to express their obligations to Mr. Sandford Fleming, whose long labours on the subject of a Pacific cable have thrown much light upon the project, and materially

facilitated the task of the Committee, and to all the gentlemen who have been so good as to give evidence, and whose answers range over the whole ground comprised in the reference to the Committee.

3 The Committee have carefully considered these answers, and other materials bearing on the subject which have been laid before them, and have the honour to report as follows upon the questions submitted to them.

4. The Committee consider that the most convenient course will be for them to deal with the points submitted to them in the same order as is laid down in the instrument of appointment.

1. Practicability.

5. No one disputes the practicability of the project from a technical point of view, although the depth—probably in places over 3,000 fathoms—is as great as that in which any cable has hitherto been laid. The Committee consider that a preliminary survey is indispensable, principally for the purpose of ascertaining before the cable is laid, and of avoiding while it is being laid, any serious inequalities in the bed of the ocean which might cause "suspension," and, in course of time, fractures, of the cable. Such a survey could, however, be made while the cable is being manufactured; it could be made by the contractors under the supervision of an officer appointed for the purpose by the owners of the cable; and the necessary provision for it, with all proper conditions, could be obtained in the contract. The present information with regard to the route is sufficient for the purpose of estimating the expense of the cable, and it may be assumed that the further survey recommended would not lead to any material variation in the tenders.

6. Further, it will be necessary that a careful examination be made of the various islands to be presently mentioned, with a view to ascertaining the best spots available for landing-stations.

2. Route.

7. The Committee recommend that the route should be from Vancouver *viâ* Fanning or Palmyra Island, Fiji, and Norfolk Island, with branches from the last-named station to Queensland and New Zealand. No doubt there would be a decided advantage in taking the cable *viâ* the Hawaiian Islands instead of *viâ* Fanning or Palmyra Island, as the section would in that case be shorter and therefore less costly for the same speed, or faster for the same cost, and some traffic would, if no line is laid from California, be obtained from Honolulu. But this route would involve a departure from the principle of using only British territory for landing-stations, and, as this principle has been formally indorsed by the Canadian and Australasian Governments at the conferences at Ottawa and Sydney, the Committee consider that it should be adhered to, and that a departure from it would be a material change in the character of the scheme which was approved at those conferences.

8. The length of the cable over the route recommended would be, allowing 10 per cent. for "slack" actually used, about 7,986 nautical miles—viz.: Vancouver to Fanning Island, 3,561, or a little less from Vancouver to Palmyra Island; Fanning Island to Fiji, 2,093, or a little less from Palmyra Island to Fiji; Fiji to Norfolk Island, 961; Norfork Island to New Zealand, 537; Norfolk Island to Queensland, 834.

9. The Pacific cable as a means of communication between Australasia and Europe would be, of course, dependent on the land-lines across America and on the trans-Atlantic cables; and it would be necessary for it to have some working arrangement with them. Such arrangements are universal in the case of submarine-cable companies, which must obviously make terms with the land-lines by which their traffic is received or forwarded. The only telegraph-line which at present runs from the eastern seaboard to Vancouver is that of the Canadian-Pacific Railway Company. This company is in connection at Canso, in Nova Scotia, with the Commercial Cable Company, which possesses three cables from Great Britain to Canso; and the nature of the arrangement between them is shown in the telegraphic correspondence contained in the appendix [not printed] to this report. The Commercial Cable Company is an American company, but all the landing-stations are on British territory. It is stated that the other trans-Atlantic cable companies, whether British or foreign, are in connection and alliance with the Western Union Telegraph Company, which is also an American company.

10. The Western Union at present effects its junction with the Canadian-Pacific Railway Company's telegraph-lines at Montreal, but it is highly probable that were a Pacific cable laid from Vancouver to Australia it would (if it does not already possess such a connection) make its own connection with Vancouver through the United States territory as far as British Columbia.

11. The effect of this position of affairs is that the choice of routes would lie between an American cable company having its stations exclusively on British soil, and in connection with a land system passing over British territory and controlled by a British company, and cable companies which, whether British or American, and which, whether possessing stations on British or American soil, are in connection with a land system controlled by an American company, and possibly passing through the greater part of its length over American territory.

3. Cost.

12. The cost of laying the cable depends mainly on the materials used in it; and, as the quality of these can be tested, the question is practically one of quantity. The outer coverings are much the same in all specifications, according to the conditions of the case, but the conductor, of copper, and the insulator, of guttapercha, vary in quantity in proportion to the speed of transmission required, and therefore the question of cost practically depends upon them, the heavier the cable in these respects the greater being the speed and the cost. With regard to all the sections, except the long one from Vancouver to Fanning Island, opinions as to the composition of the cable do not much

vary, and, as the speed of the whole line is limited for through traffic to that of the longest section, it will only be necessary to go into particulars with regard to that section.

13. On this branch of their inquiry the Committee have taken a large amount of technical evidence from electrical experts. This evidence has been in some important respects conflicting, and the Committee have been obliged to form their own conclusions, weighing one authority against another.

14. The principal points which the Committee have had to consider are: (1) The weight per nautical mile of the core best suited for the purposes of the long section; (2) the theoretical speed of transmission obtainable from a given core over a given distance; (3) the deductions which have to be made from the theoretical speed of transmission to arrive at the actual practical speed in "paying" letters; (4) the number of hours per diem during which a cable can be worked for commercial purposes.

The Core.

15. The cores recommended to the Committee varied from 500 lb. copper and 320 lb. guttapercha (Mr. Siemens) to 800 lb. copper and 550 lb. guttapercha (Mr. Preece, of the General Post Office), but the Committee have decided to select for detailed consideration from between those limits two types, which have been recommended from different points of view.

16. The first would contain 552 lb. copper and 368 lb. guttapercha, and was that recommended to the Indiarubber, Guttapercha, and Telegraph Works Company by Lord Kelvin in November, 1895.

17. The Committee do not consider that it would be wise economy to lay down a cable of any lighter type than this. The speed of transmission would be reduced to too low a figure.

18. The second would contain 650 lb. copper and 400 lb. guttapercha, and is that which was adopted for the cable laid by the Anglo-American Telegraph Company in 1894. There is a serious mechanical difficulty in handling cable of very heavy weight at great depths, and the Committee are of opinion that it would not be prudent in any case to lay a cable of a heavier core than this over the long section.

Speed: Theoretical and Practical.

19. It is, however, in connection with the speed obtainable from a given cable over a given distance that the opinions of the experts have differed most materially.

20. For instance, Dr. A. Muirhead gave it as his opinion that a cable of 552 lb. copper and 368 lb. guttapercha over the long section would, with experienced operators and by the use of the automatic curb method of transmission, give a speed of eighty letters per minute; and, similarly, for a cable of 650 lb. copper and 400 lb. guttapercha, ninety-five letters per minute.

21. Mr. Preece, on the other hand, stated that the same core as that last named, over the same distance and by the same process, would give a speed of not quite sixty-three letters per minute.

22. For the same cable Mr. M. H. Gray, Mr. Lucas, speaking for himself and for the late Admiral Sir George Richards, and the representatives of the Eastern Extension Telegraph Company estimated a speed of seventy letters per minute.

23. On the other hand, Mr. Siemens estimated the same speed of seventy letters per minute for a cable of 500 lb. copper and 320 lb. guttapercha, while, for a cable of 800 lb. copper and 550 lb. guttapercha, Mr. Preece estimated a speed of eighty-five letters per minute.

24. Lord Kelvin wrote to the Committee that, in his opinion, they might reckon on getting sixty letters per minute, and that possibly they might get eighty letters per minute, out of a cable composed of a core of 552 lb. copper and 368 lb. guttapercha over the long section.

In all cases the speed given was the theoretical speed for simplex working.

25. On the question of deductions which have to be made to reduce the theoretical to the practical speed the divergence of opinion was not less remarkable.

26. The explanation of this is to be found in the fact that much depends upon the system on which a line is worked. Thus, in the case of the trans-Atlantic lines, where the competition is very keen and the hours of business comparatively limited, and where the regulations of the International Telegraphic Convention do not apply, it has been found possible to reduce the non-paying traffic to about 16 per cent.

27. On the other hand, on the eastern lines the proportion is much higher, because the reserve power of the lines is very great, and therefore there is more margin for non-paying traffic, the working-hours are practically longer, and the regulations of the International Convention have to be followed. Mr. Preece estimated that a theoretical speed of nearly sixty-three letters per minute for the core of 650 lb. copper and 400 lb. guttapercha would be reduced in practical working to twenty-eight paying letters per minute. Mr. Lucas stated that a theoretical speed of seventy letters per minute for the same core was equivalent to four or five paying words a minute. Mr. Lamb, of the General Post Office, said that a deduction of 55 per cent. must be made from the theoretical to find the practical speed of a given cable. Mr. Ward, manager of the Commercial Cable Company, calculated that a total allowance of 16 per cent. should be made for "dead" traffic; Mr. Carson, of the Anglo-American Telegraph Company, 15 per cent.; and Mr. Gray, of the Indiarubber, Guttapercha, and Telegraph Works Company, about 17 per cent. Mr. T. B. Ffinch, Director-in-Chief of the Indo-European Telegraph Department of the Government of India, and having charge of the telegraphs from Karachi up the Persian Gulf and through Persia, stated that the average number of service indications which have to be forwarded with a message of twelve paying words of a length of eight letters each would, on the average, be equivalent to ten letters. Furthermore, he stated that the unavoidable use of the lines under his charge for administrative purposes would amount to less than 5 per cent. of the whole traffic. His estimate, therefore, of the total unavoidable "dead" traffic amounts to about 17 per cent.

By the theoretical speed of a cable the Committee understand the maximum number of words which can be transmitted in a minute so that an experienced operator can certainly and easily read them. The practical speed is the proportion of that maximum number which remains after certain deductions have been made for the transmission of words for which no revenue is received, and for loss of time.

28. The Committee ascertained that these deductions were made on account of—(1) Service indications and prefixes, such as station of origin, number of message, time, date, &c.; (2) repetitions, errors in transmission, corrections; (3) necessary intervals between the messages, time lost by clerks, &c.; (4) administrative messages connected with the traffic. There are, of course, other administrative messages which must necessarily be sent on the business of the line, but these could in most cases be left for periods when there was no traffic for transmission.

29. It must also be borne in mind, in considering this question, that, though the speed of a cable is usually stated as being a certain number of words per minute, these words are "reputed" words of five letters each. In actual practice a word averages eight letters, the increase being due to the use of code-words and to the omission of many conjunctions and prepositions when messages are sent "in clear."

30. The so-called "words," however, which have to be added to each message as service indications and prefixes do not consist generally of more than two or three letters each.

31. After weighing all the evidence carefully the Committee are of opinion that a deduction of 33 per cent. from the theoretical speed is amply sufficient to give the practical speed, or the paying traffic.

32. This estimate is a cautious one.

33. There is no apparent reason why, with good management, the "dead" traffic on a Pacific cable should not be kept much nearer to the level which obtains on the Atlantic than to that which obtains on the eastern lines. In addition, however, must be taken into consideration unavoidable losses of time in each working-hour, and the fact that the use of code-words (usually long ones) is increasing.

34. It has also been stated in evidence that possibly a Pacific cable would have to comply with the regulations of the International Telegraph Convention, but in the case of a line touching only British territory this necessity may perhaps be avoided.

35. The estimate of 33 per cent. has been arrived at with the desire to include an allowance for every possible deduction from the earning-power of the cable. If the experience of the Atlantic cable companies can be relied on the percentage would be considerably reduced.

Number of Working-hours per Diem.

36. In this matter, again, the expert evidence was somewhat conflicting, but the Committee consider that an estimate of eighteen hours per diem, during which the cable could be worked, would be a moderate one. A very small allowance for duplex working has been made in this calculation.

37. Duplex working is the system under which the same cable is made to transmit messages from both ends at the same time. It can be applied so as to add about 80 per cent. to the traffic sent by simplex working. But full advantage can only be taken of this system when the business hours are substantially the same at both ends of the cable. This, for instance, is the case between, say, London and Lisbon; as between London and New York, where the difference in point of time is about five hours, duplex is only regularly available for the few hours which may be considered part of the working-day in both places; while as between this country and the east of Australia, where the difference is about ten hours, so that night here is almost synchronous with day there, duplex working would only be resorted to to a small extent.

38. The conclusion the Committee have arrived at is that the core of 552 lb. copper and 368 lb. guttapercha might reasonably be expected to give forty paying letters a minute.

39. The core of 650 lb. copper and 400 lb. guttapercha similarly would give forty-eight paying letters per minute.

40. To get the carrying-capacity of these cables in a year the above numbers of letters should be multiplied by sixty (minutes to the hour); then by eighteen (working-hours per day); then by three hundred (working-days in a year). The totals on this basis would be: At forty paying letters, or five paying words, 1,620,000 words; at forty-eight paying letters, or six paying words, 1,944,000 words.

41. Thus the lowest of these totals considerably exceeds the whole of the Australasian traffic in any year except 1895.

Cost of Laying.

42. The Indiarubber, Guttapercha, and Telegraph Works Company has offered to lay the whole cable over the route recommended, with the first of the above-mentioned types for the long section, for the sum of £1,517,000, this sum including the erection at each station of a suitable dwellinghouse and operating-room, with duplicate sets of all proper instruments; also the use of two cable-repairing ships, with the cost of maintaining them as well as the cables themselves for three years.

43. This estimate included an allowance for 10 per cent. slack.

44. This allowance of slack is, in the opinion of the Committee, a reasonable one for actual laying, but they are of opinion that another 10 per cent. should be manufactured, which would be properly chargeable to the repair and maintenance fund to be hereinafter mentioned.

45. The condition as to maintenance for three years was laid down by the Canadian Government in inviting tenders, but, though there is some convenience in thus having maintenance guaranteed for the first three years, the Committee consider that such a period is unnecessarily

long as a test of the original condition of the cable when laid, without being long enough to prove its durability while under water, and they would recommend that the contractors should be required to maintain the cable for six months. With this modification the price would presumably be varied in approximately the following manner:—

	£
	1,517,000
Deduct cost of maintenance for three years (this was put at £40,000 a year for the two ships and £30,000 a year for the cable used)	210,000
	1,307,000
Add for maintenance for six months at the same rate	35,000
Add for purchase of two repairing-ships	80,000
	£1,422,000

Or in round numbers, and leaving a margin of £78,000 for miscellaneous expenses payable out of capital, £1,500,000.

46. It seems probable that another firm would offer similar terms.

47. As regards the probable cost of a cable of the second of the above types, the information laid before the Committee is to the following effect:—

48. The Telegraph Construction and Maintenance Company estimated that the price for such a cable from Vancouver to New Zealand *vid* Honolulu would be £1,870,000, this sum including the cost of five stations, estimated at £37,000. This distance (without slack) would be 6,352 nautical miles, and the longest span (Vancouver to Honolulu) 2,325. The route recommended is (without slack) 7,186, and the long section is about 3,200. The price of this type therefore, on the basis of the above estimate, would considerably exceed £2,000,000.

49. The Indiarubber, Guttapercha, and Telegraph Works Company stated, in reply to a question from the Canadian Government, that their price for a fifteen-word-per-minute cable would be £1,672,000, and for eighteen words £1,880,000, but specifications for these cables have not been given.

50. The representatives of the Eastern Extension Telegraph Company estimated the cost of the cable, with a core of 650 lb. of copper and 400 lb. of guttapercha between Vancouver and Fanning Island, allowing 15 per cent. or more for slack, and including the cost of erecting stations and supplying apparatus, at about £1,650,000. The Henley Telegraph Works Company tendered for a cable of this type, with completely equipped and furnished stations and cable-huts, for £1,492,000.

51. Mr. Preece also estimated that a cable, of a heavier core over the section to Fanning Island (800 lb. copper and 550 lb. guttapercha), would cost a little over £2,000,000. It seems therefore possible that a cable of the dimensions under consideration might be had for £1,800,000. It would not be prudent to put the whole capital required for such a cable at less.

Working-expenses.

52. The annual working-expenses at the stations on the line may, the Committee consider, be put at £17,000, having due regard to their position and the cost of living.

53. For the central management £5,000 is allowed, making a total for annual working-expenses of £22,000.

Maintenance and Repairs.

54. With regard to maintenance and repairs, it is, of course, impossible to forecast what interruptions would occur in any year and what expenditure would be incurred in restoring communication. It may, however, be remarked that repairs of a cable are the substitution of new material for old, so that in course of time the whole of the cable might be replaced; and this circumstance affords some guide as to the annual sum which should be set apart, on the principle of providing not merely for the cost of annual repairs in case of interruption, but for the entire replacement of the cable, so far as might be found necessary within some definite period. Thus the replacement of the cable would be completed in forty years by laying two hundred miles of cable a year; and, taking the cost of cable, in round figures, at £200 a mile, this process would, on that basis, be effected by devoting £40,000 a year to this purpose. It is not suggested that it would be necessary to replace every part of the cable in such a period, or that such a sum would be expended each year on repairs, but the fact that the sum named would not only meet current repairs, but would in forty years be equivalent to the replacement of the whole cable, indicates, in the opinion of the Committee, that it is as great a provision as need be made under this head. To it, however, should be added the fixed expenses of two repairing-vessels, which may be put at £30,000, making £70,000 in all.

55. It should be added that the evidence clearly shows that the great depth of the Pacific will be a favourable factor in determining the life of the cable, while it will be an unfavourable influence on the facility and cost of the necessary repairs.

56. The provision suggested would therefore, it is estimated, in the shape partly of new cable and partly of unexpended balances, perpetually maintain the value of the cable as an asset.

Total Annual Charge.

57. To the expenses of working and maintaining the cable must be added the annual charge for interest, and provision for replacing the capital at the end of a certain period.

58. Having regard to the character of the work, the Committee think that a period of fifty years might reasonably be allowed for the latter purpose.

59. The rate of interest to be assumed must depend to a great extent on the conditions under which the capital is raised, and the Committee have therefore thought it better to append four estimates of the total annual charge which must be provided for, varying according to the type of cable selected and the rate of interest.

60. In each case the sinking fund is calculated to replace the capital in fifty years.

	With a Capital of £1,500,000.		With a Capital of £1,800,000.	
	Interest at 2¾ per Cent.	Interest at 2½ per Cent.	Interest at 2¾ per Cent.	Interest at 2½ per Cent.
	£	£	£	£
Interest	41,250	37,500	49,500	45,000
Sinking fund	14,311	15,387	17,173	18,464
Working-expenses	22,000	22,000	22,000	22,000
Maintenance	70,000	70,000	70,000	70,000
Total	147,561	144,887	158,673	155,464

61. The Agent-General for South Australia, under instructions from his Government, placed before the Committee the claim of that Government to be compensated for the loss which they will sustain by the diversion of traffic from the line of telegraph which they erected across the Continent of Australia, and over which a considerable proportion of the traffic now passes.

62. A somewhat similar claim may be put forward by the Eastern Extension Telegraph Company in the event of a cable being laid across the Pacific with Government assistance. No question of compensation has been referred to the Committee, and they therefore abstain from expressing any opinion upon the equity of any such claim.

63. The Government of India, whose position is in many respects similar to that of South Australia, have intimated that they do not propose to make any such claim.

4. Revenue.

64. The revenue depends on the amount of traffic obtained, and there are no certain data by which this can be calculated. The representatives of the Eastern Extension Telegraph Company and Mr. Lamb, of the General Post Office, estimated that on the total traffic of 1895 the amount which would be diverted to the new cable would be 672,297 and 620,000 words respectively. Mr. Sandford Fleming, for the reasons given in his evidence, put it at one-half the existing traffic. The Committee, having considered all the evidence bearing on the subject, and feeling that they must in such a matter be actuated by extreme caution, select 750,000 words (which are between a third and a half) as a basis of calculation for the year 1896. They further consider that the estimate may assume an annual increase of this traffic at a rate of 10 per cent. In 1875 the amount of the Australasian telegraphic traffic was 235,160 words; in 1885 this had risen to 537,355 words; and in 1895 to 1,860,423 words. Thus the estimated rate of increase is considerably below the ascertained average increase of recent years; but special caution is advisable in drawing an inference from this, as the increase has lately been out of proportion to the increase of business so far as shown by imports and exports, thus probably indicating a change of habit in transacting commercial business which must have some limit; and, further, the rather special circumstances of the Western Australia gold discoveries must be taken into account. There are no materials for estimating the probable increase in the American-Australasian traffic, which is at present very small, but it is likely that with a Pacific cable it would substantially develop. A little local traffic in the Pacific may also be counted upon.

65. These circumstances appear to the Committee to show the moderation of their estimate, but they have not failed to bear in mind the fact that the eastern telegraph companies possess an old-established business, with wide connections, and that if any prolonged breakdown occurred on a Pacific cable great injury might (in the absence of a duplicate cable) be inflicted on its business. On the other hand, the Atlantic cable companies in England would be interested in collecting traffic for a Pacific cable.

66. The amount of the through rate would depend on the terms made with the trans-Atlantic companies and the American land-lines, but the Committee have been informed that a shilling rate could be obtained from Great Britain to Vancouver.

67. Taking, however, the existing rate to Australia of 4s. 9d. aword as a basis, and assuming that the existing rate of 1s. 6d. from London to Vancouver is maintained, a Pacific cable would be able to secure 3s. 3d. a word. On an estimated traffic of 750,000 words in 1896 this would amount to £121,875. If the tariff were reduced so as to admit of a Pacific cable retaining 2s. a word, the revenue would be £75,000; and, at 1s. 6d. a word, £56,250. This calculation is based on the assumption that each word pays the full rate. No reduction is made for Government or Press telegrams, because allowance for this consideration has been made by the Committee in arriving at the above estimate of the total traffic and after reckoning that similar proportions of Press and Government telegrams would be carried by a Pacific cable, and at similarly reduced rates to those now transmitted by the eastern route. According to the returns of the Eastern Extension Telegraph Company for 1895 the Press words were about 10 per cent. of the whole, and the Government words about 2 per cent.

68. The Committee have only to add, with reference to the financial question, that the cable would be a competitive line, and would have to be managed accordingly. While they have felt themselves bound, as they have remarked, to show extreme caution in their estimates, they consider that the question of expenditure, and still more the question whether a business approximating more to the capacity of the cable could be obtained, would largely depend, as would similar questions in all industrial enterprises, on the energy and care shown by the management.

69. The evidence has clearly shown that the best management and the adoption of the most improved methods can get much more paying work out of a cable than inferior management and the use of older methods.

Recommendation and Summary.

70. In consideration of the traffic estimated for the cable, and of the opinion expressed below, that a duplicate cable should be laid at the earliest possible moment, the Committee have arrived at the conclusion that a core over the long section from Vancouver to Fanning Island of 552 lb. copper and 368 lb. guttapercha will be sufficient. On the assumption that this recommendation is adopted, and taking the total annual expenditure at £144,887, and the increase of business at 10 per cent. per annum on 750,000 words in 1896, a Pacific cable would, if it came into actual work on the 1st January, 1900, earn £178,437 in its first year of working if the rate obtained by it per word were 3s. 3d., thus leaving a credit balance on the first year's working of £33,550. If the rate per word were reduced to 2s., in the year 1900 it would earn £109,807; in 1901, £120,788; in 1902, £132,867; and in 1903, £146,153; it would thus become a paying concern during the fourth year of working.

5. Ownership.

71. The Committee are of opinion that the cable should be owned and worked by the Governments interested.

72. In arriving at this conclusion they do not underrate the importance of allowing all commercial undertakings to be carried out, whenever possible, by private enterprise unassisted by Government. But in the present case there seems to be no probability that private capital will be forthcoming for the purpose of laying a Pacific cable without a larger subsidy than the Governments interested in the project would be prepared to grant.

73. If Government assistance, in some form or other, is necessary, the Committee think that a scheme under which the cable would be constructed and owned by the Governments interested is much to be preferred to a private company working under a Government subsidy.

6. Management.

74. The Committee are of opinion that the general direction should be in the hands of a manager in London, under the control of a small Board, on which the associated Governments would be represented. The manager would be in communication with the telegraph authorities of the respective Governments with regard to matters of local administration. The details could be arranged without difficulty by the Governments interested.

7. Contract.

75. The contract would in the main follow the ordinary forms, specimens of which are shown in the appendix [not printed]. Provision should be made for a preliminary survey under the supervision of an officer appointed by the Governments, and for the maintenance of the cable by the contractor for six months, as recommended above. The cable in shallow waters should be protected by brass-taping against marine insects. The details of the specification would present no difficulty when the type for the long section has been fixed upon, as there is not much difference between the present modes of constructing submarine cables.

Duplication.

76. The Committee have only to add that it would, in their opinion, be necessary to lay a duplicate cable, and that, if a deviation from an all-British route were permissible in the case of a duplicate cable, and if the circumstances of the time permitted of it, such a cable might advantageously follow a somewhat different route, *viâ* Honolulu. Most cables on important routes have been duplicated, but generally in the first instance they have been laid singly, and the duplication has followed when the success of the undertaking warranted a fresh outlay of capital.

77. There can be no doubt, however, that the duplication should be effected at the earliest convenient opportunity. Cables have usually been duplicated to protect and preserve their business in cases of interruptions, even when there have been no competing lines ready to profit by their breakdowns. Duplication would be, therefore, the more necessary in the case of a new line, which would be laid in competition with an existing undertaking.

78. If a second cable were laid along the same route as the first, the annual expenditure entailed by it might be reckoned at £37,000 less than that of the first, as the additional working-expenses would certainly not exceed £15,000, and there would be no additional standing charges for repairing-ships. If a second cable were laid *viâ* Honolulu, not only would there be the above-mentioned reduction in annual expenditure of £37,000, but also a very material reduction in the charges for interest and sinking fund, as the capital required would be less.

79. In the event, therefore, of a second cable being laid along the route recommended for the first, and on the assumption that the tariff were reduced to 2s. a word, and that such a reduction brought no increase of business beyond the 10 per cent. per annum already estimated, the total annual receipts from the two cables would exceed the total annual expenditure upon them in the tenth year from the commencement of the work of the first cable in 1900. If a second cable were

laid along the cheaper route, or if the tariff were not reduced to 2s. a word, or if the annual increase of business exceeded 10 per cent., the period during which the total annual expenditure exceeded the total annual receipts would be proportionately shortened.

80. Moreover, the financial position of the cables would be a very strong one.

81. The custom of the owners of cables is to put by such a sum of money every year as will enable their cables to be kept in continual repair, and the old cable entirely replaced by a new cable within a certain number of years. This they consider to be a sufficient provision for the replacement of their capital. The Committee have, however, suggested that in the case of a Pacific cable there should be what practically amounts to a double replacement of capital. They have recommended that a sufficient sum should be set aside for annual maintenance to insure the complete renewal of the cable within forty years, so that at the end of that time the associated Governments should either be in possession of a new cable, or, if the old cable had not been wholly renewed, of a reserve fund sufficient to replace such part of the original cable as still existed. And, further, they have provided for the complete extinction of the original loan at the end of fifty years. These facts must be borne in mind in considering the financial prospects of the cable.

82. The Committee cannot conclude this report without expressing their strong sense of the value of the services rendered to them by their secretary, Mr. W. H. Mercer. It has been mainly owing to his exertions that they have been enabled to carry through their work evenly and promptly since their regular sittings first commenced.

SELBORNE, Chairman.
DONALD A. SMITH.
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SAUL SAMUEL.
D. GILLIES.
GEO. H. MURRAY.

Colonial Office, 5th January, 1897.

W. H. Mercer, Secretary.

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