

(No. 162.)



1884.

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PARLIAMENT OF TASMANIA.

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**TORPEDO CORPS MATERIAL, &c.**

**PROGRESS REPORT FROM THE SELECT COMMITTEE, WITH  
MINUTES OF THE PROCEEDINGS, AND EVIDENCE.**

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Brought up by Mr. Archer, October 23, 1884, and ordered by the House to be printed.



*SELECT COMMITTEE appointed, on the 17th July, to enquire into and report upon all Materials, Stores, and Appliances purchased for and on behalf of the Torpedo Corps: with power to call for persons and papers.*

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MEMBERS OF THE COMMITTEE.

MR. CROWTHER.  
MR. ROOKE.  
MR. ARCHER.  
MR. GRAY.

MR. PILLINGER.  
MR. COOTE.  
MR. BURGESS. (*Mover.*)

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DAYS OF MEETING.

22nd July. 23rd July. 29th July. 30th July. 1st August. 16th September. 18th September. 19th September.  
24th September. 26th September. 2nd October. 23rd October.

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WITNESSES EXAMINED.

W. H. Windsor, Assistant Treasurer. H. E. Smith, Chief Clerk Secretary's office. Colonel Legge, Commandant Local Forces. Captain Boddam, Staff Officer. Sergeant-Major Falconer, Torpedo Instructor. Donald Stalker, Foreman Locomotive Department, Main Line Railway.

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EXPENSES.

John Lucas, Launching Torpedo Boat, £5 17s. 6d.

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MINUTES OF PROCEEDINGS.

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TUESDAY, JULY 22, 1884.

*Present*—Mr. Coote, Mr. Crowther, Mr. Archer, Mr. Gray, Mr. Burgess.

1. Mr. Burgess was voted to the Chair.

2. Resolved, That the following gentlemen be summoned to attend and give evidence to-morrow at 11 A.M. :—

Mr. B. T. Solly, Under Secretary, with contracts, papers, and correspondence connected with the purchase of the Torpedo-boat, and all stores, materials, and appliances supplied to the Torpedo Corps.

Mr. W. H. Windsor, Assistant Treasurer, with details of all amounts paid for the Torpedo-boat, and all stores and materials supplied to the Torpedo Corps, showing the various heads of charges and provision for the said payments.

3. Resolved, That the following witnesses be summoned, on dates to be hereafter decided on :—Colonel Legge Captain Boddam, Mr. R. Henry, Jun.

The Committee adjourned at 11.50 A.M. till Wednesday, 23rd instant, at 11 A.M.

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WEDNESDAY, JULY 23, 1884.

*Present*—Mr. Archer, Mr. Coote, Mr. Pillinger, Mr. Burgess.

Mr. Burgess took the Chair.

Mr. W. H. Windsor was called in and examined, and laid a statement before the Committee showing a detailed statement of moneys expended in connection with the Torpedo Corps.

Mr. Windsor withdrew.

Mr. Henry Edwin Smith appeared for Mr. B. T. Solly, Assistant Secretary, who had been summoned, but was unable to attend through illness.

Mr. Smith, having laid before the Committee all contracts, correspondence, and papers connected with the purchase of all materials, stores, and appliances for and on behalf of the Torpedo Corps, withdrew.

Ordered, That the statement handed in by Mr. Windsor be printed with the Evidence.

The Committee adjourned to Tuesday next at 11 A.M.

TUESDAY, JULY 29, 1884.

The Committee met at 11 A.M.

*Present*—Mr. Archer, Mr. Pillinger, Mr. Burgess.

The Minutes of last meeting were read and confirmed.

Mr. J. W. Israel, Chief Clerk of the Audit Office, was called in and examined, producing the vouchers for the payment of certain goods, materials, &c. supplied to the Torpedo Corps.

Mr. Israel withdrew.

The Committee perused and considered the documents laid before them on the 23rd instant, and reports from Colonel Legge and Captain Boddam—Appendix B.

The Committee adjourned till Wednesday next at 3 o'clock.

WEDNESDAY, JULY 30, 1884.

The Committee met at 3 P.M.

*Present*—Mr. Gray, Mr. Archer, Mr. Pillinger, Mr. Burgess, Mr. Rooke.

The Minutes of last meeting were read and confirmed.

The Committee deliberated.

Ordered, That Colonel Legge be summoned for Friday at 11 A.M., to produce the Manual for Submarine Mining, <sup>7396</sup>/<sub>4876</sub> Horse Guards, War Office, 12th June, 1880.

The Committee adjourned till Friday, the 1st August, at 11 A.M.

FRIDAY, AUGUST 1, 1884.

The Committee met at 11 A.M.

*Present*—Mr. Gray, Mr. Pillinger, Mr. Rooke, Mr. Crowther, Mr. Burgess (Chairman).

The Minutes of last meeting were read and confirmed.

Colonel Legge, Commandant Local Forces, was called in and examined.

Colonel Legge withdrew.

Captain Boddam, Staff Officer Local Forces, was called in and examined.

Captain Boddam withdrew.

The Committee adjourned at 12.10 P.M. till Tuesday, 16th September.

TUESDAY, SEPTEMBER 16, 1884.

The Committee met at 11 A.M.

*Present*—Mr. Gray, Mr. Davies, Mr. Crowther.

Mr. Gray was voted to the Chair, *pro tem*.

The Clerk intimated to the Committee that since the last meeting, Mr. Burgess (the Chairman) had been discharged at his own request from attendance on the Committee, and that Mr. Davies had been appointed to serve in his stead.

Mr. Archer was voted to the Chair.

The Chairman informed the Committee that by an Order of the House on August the 7th, all matters connected with the description of guns and ammunition recently imported into Launceston for the use of the Volunteer Artillery there had been referred to this Committee.

The Clerk was instructed to write to the Chief Secretary and ask for any further correspondence between the Government and the Contractors for the Torpedo appliances.

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The Clerk was instructed to wire to Captain Collins, Launceston, requesting him to supply the Committee with all information respecting the guns and ammunition recently supplied the Launceston Artillery.

Resolved, That the following witnesses be summoned :—

Sergeant-Major Falconer, of the Torpedo Corps, for Thursday next, at 11 A.M.

Mr. Stalker, Foreman Main Line Railway, for Thursday next, at 11.45.

The Committee adjourned at 11.55 till Thursday, the 18th instant, at 11 o'clock.

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### THURSDAY, SEPTEMBER 18, 1884.

*Present*—Mr. Pillinger, Mr. Gray, Mr. Crowther, Mr. Archer (Chairman).

The Minutes of the last meeting were read and confirmed.

The Clerk laid upon the Table four letters *re* Torpedo stores, received from the Chief Secretary since the last meeting.

Sergeant-Major Falconer, Torpedo Instructor, was called in and examined.

Sergeant-Major Falconer withdrew.

Mr. Donald Stalker, Foreman Locomotive Department, Main Line Railway, was called in and examined.

Mr. Stalker withdrew.

The Committee adjourned at 12.50 A.M. till Friday next at 12 o'clock.

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### FRIDAY, SEPTEMBER 19, 1884.

The Committee met at 12 o'clock.

*Present*—Mr. Rooke, Mr. Crowther, Mr. Davies, Mr. Gray, Mr. Pillinger, Mr. Coote, Mr. Archer (Chairman).

The Minutes of last meeting were read and confirmed.

The Chairman laid upon the Table a letter from Captain Collins, of the Launceston Volunteer Artillery, furnishing particulars of the guns lately supplied to Launceston.—See Appendix.

The Clerk was instructed to wire the thanks of the Committee to Captain Collins for his Report.

Ordered, That a letter be written to Colonel Legge requesting him to supply the Committee with the prices of all stores and appliances supplied for the Torpedo Corps by the Contractors, as shown in the Manual of Submarine Mining, and that a Return of the amounts paid for the two mountain guns supplied to the Launceston Volunteers, and for all the appurtenances thereto, be laid on the Table.

Sergeant-Major Falconer was called in and further examined.

Sergeant-Major Falconer withdrew.

The Committee adjourned at 1 P.M. till Wednesday, the 24th inst. at 12 o'clock.

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### WEDNESDAY, SEPTEMBER 24, 1884.

*Present*—Mr. Pillinger, Mr. Crowther, Mr. Archer (Chairman).

1. The Minutes of last Meeting were read and confirmed.

The following documents were laid upon the Table :—

1. Letter from Captain Boddam, forwarding (a) Memorandum of charges, or amount of Defence Department included in accounts of Crown Agents, for the half-year ended 30th June, 1884. (b) Price list of New Type Armstrong guns, carriages, ammunition, &c. (c) 7-pounder jointed guns. Particulars connected with the guns and carriages, and stating that he could furnish all necessary information with reference to the cost of torpedo stores from priced vocabulary of stores.—See Appendix E.

2. Letter from Mr. Donald Stalker forwarding Memo. from Capt. Boddam, stating that an order from the Committee, given through the Commandant, would be necessary to enable Mr. Stalker to examine the electric light engine.

3. Correspondence relative to the purchase of the 7-pounder mountain gun in Melbourne, and voucher for payment of same, £261.

4. Accounts of Agent-General in England for purchase of one 7-pounder mounted gun and fittings, £383 15s.

3. The Clerk was instructed to write the following letters :—

(a.) To Colonel Legge, asking him to give Mr. Stalker every facility for inspecting the electric light engine for the information asked for on the 20th inst., and forwarding Captain Collins' report on the Launceston guns for his perusal and comments.

(b.) To Mr. Donald Stalker, requesting him to forward his certificate for the inspection of the Committee.

4. Resolved, That certain supplementary questions be sent to Sergeant-Major Falconer.

The Committee adjourned at 12 o'clock until Friday next at 11 o'clock.

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### FRIDAY, SEPTEMBER 26, 1884.

The Committee met at 2.45 P.M.

*Present*—Mr. Davies, Mr. Pillinger, Mr. Crowther, Mr. Archer (Chairman).

The Minutes of last Meeting were read and confirmed.

The Committee considered the documentary evidence before them.

The Committee adjourned at 4 P.M. till Thursday next at 11 A.M.

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THURSDAY, OCTOBER 2, 1884.

The Committee met at 11 A.M.

*Present*—Mr. Gray, Mr. Pillinger, Mr. Archer (Chairman).

The Minutes of last Meeting were read and confirmed.

The Committee deliberated.

The Committee adjourned at 12:20 P.M. till Friday next at 3 P.M.

THURSDAY, OCTOBER 23, 1884.

The Committee met at 3 P.M.

*Present*—Mr. Crowther, Mr. Gray, Mr. Davies, Mr. Rooke, Mr. Archer (Chairman).

The Minutes of last meeting were read and confirmed.

A draft Progress Report was drawn up, and agreed to.

The Committee adjourned *sine die*.

## PROGRESS REPORT.

In anticipation of the Estimates for the Defences of the Colony being shortly proceeded with, we beg to lay before you a Progress Report of the inquiry entrusted to us.

Much difficulty has attended the prosecution of this inquiry for the want of professional opinion of a thoroughly independent character; and we are prevented from giving full and conclusive evidence as to the quality and character of material supplied by the Australian Electric Light Company, in consequence of the opinion of experts kindly supplied by Commodore Erskine not having reached us.

It is greatly to be regretted that the suggestion of Colonel Scratchley with reference to the appointment of a local Board to receive and examine goods under contract from the Australian Electric Light Company was not carried out, and this clearly was not done (*vide* Captain Boddam's evidence).

The position of Captain Boddam in this respect is an anomalous one. We would urge upon the Government the necessity of at once providing a remedy for this state of affairs.

A close examination of correspondence and the evidence at present at our disposal leads us to the expression of the following opinion:—That the material as supplied by the Australian Electric Light Company was, for the most part, of an imperfect and inferior description, and that the Government erred in not cancelling contract and enforcing penalties after reasonable time had been allowed for the fulfilment of such contract; and your Committee would respectfully urge that, if legally possible, such proceedings may at once be taken as will put an end to this most unsatisfactory contract.

With regard to the guns supplied to the Launceston Artillery Corps, we append herewith a Report from the Captain commanding that Corps, together with the Commandant's reply, which, in the opinion of your Committee, fully explains the matter.

W. H. D. ARCHER, *Chairman*.

*Committee Room, Thursday, 23rd October, 1884.*

## EVIDENCE.

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WEDNESDAY, JULY 23, 1884.

MR. WILLIAM HENRY WINDSOR, *Under Treasurer of the Colony, called in and examined.*

1. *By the Chairman.*—Your name? William Henry Windsor.
2. You are the Under Treasurer of Tasmania? I am.
3. Can you produce accounts showing the cost of the Torpedo Boat, and all stores, materials, and appliances, which have been paid for by the Treasury? I can, and now place before you a return showing details of the Torpedo expenditure. This return shows the different heads of service to which the different expenditures are charged, with details attached; these details are a copy of the entries in the Treasury Books. The vouchers in support of these entries are in the custody of the Colonial Auditor, who can produce them if necessary.

Mr. Windsor withdrew.

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MR. HENRY EDWIN SMITH, *Chief Clerk, Chief Secretary's Department, called in and examined.*

4. *By the Chairman.*—Your name? Henry Edwin Smith.
5. You are Chief Clerk in the Chief Secretary's Department? I am.
6. You appear in place of Mr. Solly, Under Secretary, who is unwell? I do.
7. Can you produce all contracts, papers, and correspondence connected with the purchase of the Torpedo Boat, and all stores, materials, and appliances on behalf of the Torpedo Corps? I lay them before the Committee.

Mr. Smith withdrew.

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TUESDAY, JULY 29, 1884.

MR. J. W. ISRAEL, *called in and examined.*

8. *By the Chairman.*—Your name? John William Israel.
9. You are Chief Clerk in the Audit Office? I am.
10. Will you produce those vouchers for payment of stores, materials, &c. supplied to the Torpedo Corps, which I have initialled on the list before us? I now produce them; there are nine of them, as follows:—October 16, Joseph Bros., £87 18s. 5d. December 31, ditto, £60. February 20, R. Joseph, £64. August 18, ditto, £636 8s. 10d. September 5, R. E. Joseph, £776 12s. July 11, G. W. Silby, Jun., £130 6s. 8d. November 5, Australian Electric Company, £447 2s. 8d. 1884.—March 6, R. E. Joseph, £17 2s. March 7, Australian Electric Company, £1251 1s. 2d.
11. Have you seen the contract under which the materials, stores, &c. were supplied? I have not seen it personally, but it has been inspected in the Audit Office by the officer whose duty it was to do so.
12. Do you consider that the goods for which those payments have been made were received in accordance with the terms of the contract? I am only in a position to certify as to the Schedule prices.
13. From whom would you receive the final certificate as to the quality of the stores to enable you to pay the final 20 per cent. that has been withheld? We should consider the approval of the Minister our safeguard and pay on that, and a final inspection of the contract.

Mr. Israel withdrew.

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FRIDAY, AUGUST 1, 1884.

COLONEL WILLIAM VINCENT LEGGE, *Commandant of the Forces, called in and examined.*

14. *By the Chairman.*—Your name? William Vincent Legge.
15. What office do you hold? That of Commandant of the Forces.
16. What is the date of your appointment? My commission is dated 6th December, 1883.
17. Have you had any experience, either practical or from actual service, with torpedo stores and appliances? I have been through the course on H.M.S. *Vernon*, Portsmouth, in April and May, 1883.
18. Will you produce your certificate of competency? I have not any, as I went through the course of instruction as a special member with half-pay naval officer, who do not pass examinations.
19. Are you aware that a large quantity of torpedo stores and material are being supplied to the Government under contract with the Australian Electric Company? I am.

20. Have you at any time since your appointment inspected the contract under which these stores have been supplied? I have; we have a copy in the office.

21. Do you produce the Manual of Submarine Mining, upon which that contract is based? I have not, as I am not at liberty to do so, having signed an undertaking to the English Government not to divulge its contents or to exhibit it to any one. I should be glad if the matter were referred to His Excellency the Governor. I should be glad to lay the Manual before the Committee, but it would be against my conscience to do that which would involve a breach of faith. Captain Boddam will be able to give all essential information as to materials, stores, &c. dealt with in the book without actually producing it.

22. *By Mr. Gray.*—You say in your letter to the Chief Secretary, in which you point out your inability to produce the Manual of Submarine Mining, that you are responsible to the English Government in all matters of a confidential nature connected with torpedo work. Do you receive any portion of your salary from the English Government, or are you paid entirely by this Colony? I am paid solely by this Colony.

23. *By the Chairman.*—Would not the contractors have a copy of the Manual in their possession? I should think not.

24. Then can you explain why this Manual is specially referred to, and made the basis of the conditions of the contract with respect both to pattern and detail? The contractor might have had access to it.

25. If the contractors can have access to it, can you assign or suggest any reason why that book so referred to in the contract should not be produced to this Committee, which is authorised by this House to inquire into the stores, &c. dealt with in it? I am not aware what the obligations of the contractors are, but as they are engaged in the manufacture of many warlike electric stores it is possible that they may be in the same position as myself, namely, that of having signed a certificate not to divulge the secrets of torpedo warfare.

26. Have you since your appointment had any control over the receipt of such stores? No stores of any importance have been supplied since my appointment. 34 mines were returned which were sent over to Melbourne to have their buoyancy increased.

27. Have you called upon your Staff Officer to make a report upon stores, &c. received prior to your appointment? I called upon him to make a report upon the Corps in general, in which report he has referred to these stores. The report is dated 28th February, 1884.

28. Will you produce such reports? I lay them before the Committee. (See Parliamentary Paper 103, Session 1884.)

29. Do you consider the electric light effective, and of such a pattern as to be in accordance with the conditions of contract? I do not consider it effective, nor do I consider its construction to be in accordance with the conditions of a good contract.

30. Were you present at the trial of the electric light when Captain Josephs was over in the early part of the year? No, I was not.

31. Have you made any report to the Government with reference to the electric light? I have.

32. Will you produce that report? I do; the machines referred to were tried by the Staff Officer, by my order.

33. When did you receive the torpedo boat? She came in the *Abington*.

34. What pattern or class of boat is she? A second-class torpedo boat, carrying a M'Evoy spar torpedo.

35. Where is she now lying? On the slip.

36. What steps, if any, have you taken for her examination and overhaul? I have had machinery and boilers overhauled, taken to pieces, put together again, and re-coated; her bottom has been painted and her deck works overhauled and cleaned.

37. Is she ready for active service? and have you sufficient quantity of stores? The stores are sufficient, and she is fit for service when I can get her crew appointed.

38. Have you tested her speed? No. I have been unable to do anything with her owing to my having as yet failed to get a caretaker appointed to her.

39. *By Mr. Gray.*—Is there any provision made by Parliament for a caretaker? There is £150 provided on the Estimates, which I am endeavouring to have appropriated for that purpose.

40. In your letter of the 23rd July, 1884, to the Chief Secretary, you speak of the commutators of the two dynamo machines which are exceedingly faulty in manufacture. Will you explain what you mean by the expression "such as it is," in speaking of the plant? I refer to the peculiar pattern of machine supplied by that Company, which is not suited for the purpose for which it was required. I do not consider the reflector to the lamp powerful enough for this estuary.

41. I see you recommend the use of the Mangin projector. Now, should it be necessary to obtain that projector, would not the dynamo machines now on hand be a total loss? No; if the commutators and portions of the machinery were rectified, I consider it would throw a good light if a Mangin projector were used. I have tried the machine six times myself, and Mr. Josephs has done so twice. I lay before the Committee a statement showing the results of these trials. (See Appendix C.)

Colonel Legge withdrew.

CAPTAIN BODDAM, *Staff Officer, called in and examined.*

42. *By the Chairman.*—Your name? Edmund Meyer Tudor Boddam.
43. What office do you hold? That of Staff Officer.
44. What is the date of your appointment? 4th May, 1878.
45. Have you had any experience, either practical or from actual service, with torpedo stores and appliances? I have had nearly two and a half years' experience in this Colony, but altogether 8 years of engineering work both at home and the colonies, and this, with my previous training at Woolwich, would enable me to take up the work at short notice.
46. Are you aware that a large quantity of torpedo stores and materials are being supplied to the Government under contract with the Australian Electric Company? I am.
47. Were you consulted by either the Government or Colonel Scratchley with reference to the draft of contract for same? I made out the draft conditions of agreement. There was no real contract between the Australian Electric Company and the Government when the order was given. It was two months later when I prepared a draft conditions of agreement and submitted it to the Government. The order for the preparation of this draft had been sent to the Law Officers, but as they did not know what was necessary, I was called in to prepare it.
48. Are you aware that Colonel Scratchley recommended the appointment of a Board to certify to the conditions of the stores being delivered? I am not. No such recommendation was ever notified to me, and no such Board was ever called together. I have never heard of a Board superintending any contract.
49. Have you inspected the contract under which the stores have been supplied? Yes, as well as all the stores supplied under it, and have reported on them at different times. It is, however, no part of my duties as Staff Officer to do this, and I receive no pay for doing it.
50. At what date ought the contract to have been completed? On the 1st December, 1882.
51. Has it yet been completed? No; some of the stores are not yet delivered.
52. What portion of the contract is at the present time incomplete? No relays, detonators, disconnecting fuzes, observing arc, or electric exploders have yet been received.
53. Are you aware of any application having been made for an extension of time? if so, for what period? No formal application has ever been made.
54. What would be the amount of the weekly penalty for non-completion of the contract within the specified time, and what would the total of the penalty now be? £37 4s. 4d.; in all £3275 1s. 4d.
55. Have the contractors had any notice that the penalties would be enforced? On several occasions I have recommended that the penalties should be enforced.
56. Calling your attention to the following accounts paid by the Treasury—£636 8s. 10d. 11th August, 1882, £776 12s. 5th September, 1882, £130 6s. 8d. 11th July, 1883, £44 2s. 8d. 14th November, 1883, £1251 1s. 2d. 7th March, 1884—and your certificates on same, what steps did you take in order to test the construction and efficiency of the articles supplied before giving the certificates? There are regular tests prescribed for the various apparatus, and they were all tested, as far as the appliances to hand in the Colony would admit of, in accordance with the Regulations. On the arrival of Sergeant-Major Falconer from England, the whole of the apparatus was overhauled by him and tested, and the certificate for the last supply was not given until after he had reported that the whole of the articles supplied were serviceable. A detailed list of the tests applied can be furnished if required.
57. Do you consider that the articles supplied are in conformity with the terms and conditions of contract, namely, that they shall be of a pattern approved by the consulting Engineer, and, where not specially provided for, to be of the latest improved pattern as detailed in the Manual of Submarine Mining, 1880? I do; the Submarine Mining Manual is dated 1880. There have been many different patterns of torpedo stores issued since then; but everything, except what Colonel Scratchley specially authorised the makers to alter, or which was not specified in detail in the Manual, has been made as far as possible in accordance therewith.
58. *By Mr. Gray.*—You have the accounts referred to before you? I have.
59. Was it necessary that these accounts should be certified to as being in accordance with agreement, before they were paid? It was.
60. How is it you certified to these accounts which have been passed and paid by the Treasury, when the articles supplied were not of a character in accordance with the terms and conditions of the contract? I have certified to nothing that is not according to agreement.
61. Then there have been no moneys paid to the contractors for material, &c. not in accordance with contract? There have not, as far as it was possible to judge from ordinary inspection and testing.
62. Then, how is it in your letter of the 16th July, 1884, to the Commandant Local Forces (see Appendix B.), you say that "one of the commutators flew to pieces, and on examining the connections it was found that the construction was most unsuitable and incomplete, and the workmanship a disgrace to an ordinary workshop," and that "commutators of larger circumference and proper manufacture must be supplied." I could not say that the articles were not according to contract at the time of testing, but they are not suited for the purposes of this Colony. In cases of defective workmanship, &c., we are protected both by the 80 per cent. we retain in hand, and the guarantee for twelve months contained in the contract, and there is also a special clause which provides for inspection during manufacture, which is the only way to provide against defective workmanship of this kind.



THURSDAY, SEPTEMBER 18, 1884.

SERGEANT-MAJOR JOHN FALCONER, *Torpedo Instructor, called in and examined.*

63. Your name? John Falconer.

64. What office do you hold? Torpedo Instructor.

65. What is the date of your appointment? 20th September, 1883.

66. Have you had any experience, either practical or from actual service, with Torpedo Stores and appliances? This last fourteen years, as Instructor in the Imperial Service.

67. Will you produce your certificate of competency? I can produce one from the School of Military Engineering at Chatham, and in addition I went through a special course of instruction in the Whitehead Torpedo at Portsmouth, for which I passed the examination.

68. Are you practically conversant with the Torpedo Stores and Material in stock here? I am.

69. Have you the Manual of Submarine Mining? No, it was taken from me by order of the Commandant, by Capt. Boddam, the day before the Commandant was examined by this Committee, no reason being assigned.

70. Is it considered strictly secret? It is from the public, but not from members of the Corps.

71. Is the apparatus and material here for the most part of the pattern 1880 in England? Some is, and some is nothing like it; the larger portion is not; some of it was actually obsolete in 1880. The E. C. jackets of the mines were obsolete prior to that date; this sort of jacket seriously affects the buoyancy of the mines, and so greatly impairs their buoyancy as in time to render them useless; the mines would have to be laid some three months before the enemy comes, and as the wood loses its buoyancy by submersion, the mine sinks and becomes ineffective and useless.

72. How long would the buoyancy of these mines last? That would be according to the foulness of this river, which can only be ascertained by experiments; these experiments should have been tried some time back, and should be continued even now. I should not like to trust to the buoyancy of these mines beyond three months. I could rely on an iron or steel mine for eighteen months. I am of this opinion from experiments tried at the S. M. E., Chatham.

73. Will you give the Committee information as to the value of the material in use, especially as to—

(a) Shutter apparatus? The shutter apparatus purchased has an adjustment which is not to be relied upon. It consists of thread instead of wire, thread being much more liable to be affected by atmospheric changes than wire.

(b) Circuit Closers? The circuit closing apparatus is obsolete; a different pattern is now in use in England. Experiments should be carried on with this signalling apparatus also.

(c) Multiple Disconnecter? I never saw a pattern like the one in use here when in England; it appears to me to be a badly constructed copy of the English apparatus.

(d) Mines? These mines, being constructed of galvanised iron, lose 25 per cent. of their strength; they should have been made of iron and kept painted when stored.

(e) Condensor? The condensor is quite right in construction, but is not in use in England. Not being required, it is a useless expense to the Colony.

(f) Cells, Daniell's? These are a very poor imitation of the English pattern. I have altered twelve of them, but cannot make them like the English pattern on account of the porous pot used for the inner cell. These cells will have to be experimented with.

(g) Gun-cotton cutter? This cutter is much too small for the purpose for which she is used, her efficiency being much lessened thereby. She leaks to such an extent that she has to be baled out every week, two men being sent down for that purpose.

(h) Local tools? There are enough of them to last for some years, though some of them are very bad.

(i) Engine, strength of same? The engine is only 8 horse-power. The ones in use in the Service are from 10 to 20 horse-power.

(j) Dynamos: are they good machines? They are weak in construction. The insulator of the commutator is of wood, gets charred, and consequently as the commutator plates are screwed to it the screws fly out of the charred wood and the apparatus falls to pieces. The longest period I have seen the electric light burn continuously for is three hours, and then not perfectly. The brushes will not last longer than that.

(k) Galvanometers, field? Are not used in the Home Service. The astatic galvanometers were sent back to Melbourne to be altered; they are now in fair order. The 3-coil galvanometers and commutators are bad.

(l) Instrument sounders? These sounders have thread adjustment instead of wire, and are not according to English pattern.

(m) Electric lamp? The lamp is good in principle, but the construction is bad.

(n) Oil stoves? These stoves are quite useless. I cannot understand what their use is.

(o) Table tests? Are also useless. We fit all our own test-tables up.

(p) Parabolic reflector? Has been obsolete in the service for years.

MR. DONALD STALKER, *Foreman Locomotive Department, Main Line Railway, called in and examined.*

74. *By the Chairman.*—Your name? Donald Stalker.

75. What office do you hold in the Railway, and what are your qualifications? I am Foreman of the Locomotive Department, Main Line Railway, and a certificated engineer, and have passed a competitive examination in the Marine Department in New Zealand.

76. What are you in the Torpedo Corps? I am a sworn-in member.

77. What experience have you had in engineering? I have been employed at it since 1863, and have been certificated 5 years.

78. Do you know a man named Boyle? I do.

79. Do you consider him competent to act as fireman, and take charge of the Torpedo Boat? At the present time he is not competent; he is employed as a coppersmith and tinsmith in the Main Line Railway.

80. *By Mr. Gray.*—Would you employ him as a competent man to overhaul her boilers and machinery, take it to pieces and put it together again, and recoat it? Most certainly not.

81. Are you in direct contact with the workmen in the Railway works? I supervise them, and give them their working instructions.

82. Was this man employed under you? He was.

83. When you heard that this man was to be appointed, why did you not acquaint the Commanding Officer that he was not suitable? I did so, through the Sergeant-Major.

84. What in your opinion should have been done with the torpedo boat on her arrival here? Captain Boddam for his own protection should have tried the boat immediately on her arrival here. When I first saw her I noticed that the shippers had neglected to protect the propeller-shaft, which had become rusted. I do not know to what extent the rust went, or whether it has been remedied. The propeller-shaft is an important part of the machinery.

85. Do you think that there has been enough work on this boat to keep two men (on an average) employed since her arrival? No; for myself, I should be ashamed to spend a week in putting the boat into working order.

86. When did the boat arrive here? In the *Abington*, on the 1st May, 1884.

87. Were you ever asked to take charge of this boat? About six weeks ago Colonel Legge gave out on parade that I had been appointed to the charge of the torpedo boat. Last Tuesday morning he asked to see me up at his office; I saw him, and after discussing the matter, I point blank refused to take charge of the boat, because he had had incompetent men overhauling her previously, and especially as I had recommended the class of man suitable to take charge of her and he had not been appointed.

FRIDAY, SEPTEMBER 19, 1884.

SERGEANT-MAJOR FALCONER, *recalled, and further examined.*

88. *By the Chairman.*—How are your torpedo engines worked in the Service? In the first place volunteers are called for, blacksmiths and fitters having the preference. They then go through a six months' course of instruction at Woolwich Arsenal, and then return to Chatham to go through a further course of instruction in traction engines at the S.M.E.; after that they are trained in the use of marine engines on board H.M.S. *Hood*. They then pass an examination, and get parchment certificates according to their qualifications. It requires about two years to pass through the course. An engineer and engine-room artificer is lent from the Navy to take charge of the engines.

89. If this boat had been handed over to the Service from the contractor, what would have been done with it? The boat would have been handed over to the instructor in submarine mining. He would have sent for the engineer, and told him to get the engines ready for a series of trials. He would also have sent for the non-commissioned officer instructor, who would have to take charge of the torpedo. A series of trials would then have taken place, and, if successful, the boat would have been taken over from the contractors; if otherwise, she would have been handed back to them.

90. Would *any* man be sent to fire a boat in the Service? No one would be sent unless the holder of a certificate.

91. When a boat in the Service is laid up, what is done with her? If she is laid up for repairs she is repaired, but if laid up for want of work the engineer would draw the fires and clean up the furnaces, clean all machinery, and coat it with tallow and lime. The boat would then be inspected at intervals by the Naval Engineer, but no one would be permanently in charge of her.

92. Where are your quarters situated, and do you find them suitable for your work? With reference to the duties I have to perform, and for the better protection of the stores under my charge, it would be far better to have my residence nearer my work.

93. Can you offer any suggestions on the subject under our consideration? It is necessary to procure a hydraulic pump in order to carry on our mine testing. It has been applied for, but not supplied. This pump is an urgent necessity, as the mines cannot be well laid without it. A steam boat for laying mines is also necessary. We used the steamer *Kangaroo* last year and nearly had an accident. A small steam-launch

with apparatus is necessary, and a cutter to teach the men to row in should be procured. We also want a test-room and observing station fitted up at the back of the mine-field to test the mines; and the pier, stores, and engine-sheds should be together, so as the Instructor and Storekeeper would have everything under their own supervision.

Sergeant-Major Falconer withdrew.

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WEDNESDAY, SEPTEMBER 24, 1884.

SERGEANT-MAJOR FALCONER. (*Evidence furnished in writing.*)

94. Were all these torpedo stores and materials submitted for your inspection on your arrival in the Colony; did you inspect them; and were you consulted as to passing on the accounts for payment? They were inspected by me during the performance of my ordinary duties. I then found that a number of the appliances were imperfect and useless, and that others were not wanted at all. I made a list of the imperfect ones, putting down their various faults, and showed this both to Captain Boddam and the Contractor. When I stated that some of the articles were not wanted at all, the reply given was, "They were ordered and we must take them." I was never asked to inspect or report upon the stores, nor was I ever consulted about the passing of the accounts for payment.

J. FALCONER, *Torpedo Instructor.*

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## APPENDIX A.

## TORPEDO DEFENCES.

*RETURN of Expenditure in connection with Torpedo Defences under under-mentioned Heads of Service, as per details attached.*

|  | £    | s. | d. |
|--|------|----|----|
| Defence Works Execution Act, 42 Vict. No. 28:                                    |      |    |    |
| “Torpedo Stores and Defences, £5000.”—“Electric Light, £500” .....               | 4793 | 14 | 5  |
| Defence Works Execution Act, 46 Vict. No. 25:                                    |      |    |    |
| Proportion of Vote for “Armament for Batteries and Torpedo Boat, £10,700,”—      |      |    |    |
| Torpedo boat .....   | 4011 | 1  | 4  |
| Consolidated Revenue Fund, 1882:   |      |    |    |
| Repairs, alterations, &c. to Buildings in connection with Torpedo Defences ..... | 692  | 8  | 6  |
| Consolidated Revenue Fund, 1883:   |      |    |    |
| Volunteer Force—Torpedo Stores and Electric Light .....                          | 118  | 10 | 3  |
| Consolidated Revenue Fund, 1884:   |      |    |    |
| Volunteer Force—Torpedo Stores and Electric Light .....                          | 28   | 1  | 6  |

WM. H. WINDSOR, *Under Treasurer.*

Treasury, 23rd July, 1884.

## RETURN of Expenditure in connection with Torpedo Defences.

|  |     |   |     |       |
|--|-----|---|-----|-------|
| Expenditure under Act 42 Vict. No. 28—Torpedo Stores and Defences, Vote. |     | £5000   |     |       |
| Electric Light, Vote.....  |     | 500   |     |       |
|  |     | £5500   |     |       |
|  |     |   | £   | s. d. |
| 1878.  |     |   |     |       |
| July   | 31. | R. Henry, junior, expenses to Melbourne and back in connection with torpedo work .....  | 38  | 5 0   |
|  |     | Ditto, allowance to telegraph operators for extra work during Mr. Henry's absence ..... | 20  | 0 0   |
| Oct.   | 7.  | T. S. N. Company, freight of castings for torpedo works .....                           | 1   | 2 6   |
|  | 16. | Joseph Bros., torpedo stores .....  | 87  | 18 5  |
| 1879.  |     |   |     |       |
| Jan.   | 13. | T. S. N. Company, freight .....   | 0   | 2 6   |
| Dec.   | 2.  | J. Browne & Co., freight and charges on 2 cases torpedo apparatus .....                 | 0   | 15 0  |
|  | 31. | Joseph Bros., torpedo test table and shutter apparatus .....                            | 60  | 0 0   |
| 1880.  |     |   |     |       |
| Jan.   | 7.  | Wm. Winch, cartage .....  | 0   | 0 11  |
| Feb.   | 24. | J. Browne & Co., freight and charges on torpedo stores .....                            | 0   | 14 6  |
| April  | 23. | W. J. Dossetor, cartage .....   | 0   | 0 10  |
| June   | 12. | R. H. Stabb, repairing buildings for torpedo stores .....                               | 48  | 2 0   |
| August   | 12. | J. Harbottle, galvanised piping .....   | 1   | 7 6   |
| 1882.  |     |   |     |       |
| Feb.   | 20. | R. Joseph, torpedo appliances and chart .....   | 64  | 0 0   |
| Aug.   | 11. | Ditto, 80 per cent. on invoice of torpedo stores .....                                  | 636 | 8 10  |
|  |     | B. T. Solly, exchange on draft for Melbourne .....                                      | 1   | 11 10 |
|  | 18. | J. Browne & Co., freight, insurance, &c. of torpedo stores .....                        | 11  | 15 0  |
| Sept.  | 5.  | R. E. Joseph, 80 per cent. on torpedo stores .....                                      | 776 | 12 0  |
|  |     | B. T. Solly, exchange on draft for Melbourne .....                                      | 1   | 18 11 |
|  | 8.  | J. Browne & Co., freight and charges on torpedo stores .....                            | 13  | 0 10  |
| Oct.   | 4.  | Ditto, ditto .....  | 4   | 10 0  |
| Dec.   | 1.  | W. C. Grubb Bros., cartage of torpedo plant .....                                       | 5   | 0 0   |
| 1883.  |     |   |     |       |
| March  | 30. | J. Browne & Co., freight and charges on stores <i>ex Corinna</i> .....                  | 2   | 16 3  |
| May  | 19. | R. R. Rex, purchase of yacht <i>Enchantress</i> for storage of gun cotton .....         | 202 | 1 0   |
| June   | 23. | Jno. Lucas, fitting up, &c. yacht <i>Enchantress</i> .....                              | 45  | 4 4   |
| July   | 11. | J. Browne & Co., freight, &c. on rubber bands, <i>ex Southern Cross</i> .....           | 0   | 4 0   |
|  |     | G. W. Selby, jun., 80 per cent. instalment on contract for Torpedo Corps ....           | 130 | 6 8   |
|  |     | B. T. Solly, exchange on bank draft for £130 6s. 8d. ....                               | 0   | 13 1  |

| 1883.  |   | £     | s. | d. |
|--|---|-------|----|----|
| Oct.   | 19. J. Browne & Co., freight and charges on torpedo apparatus, ex <i>Esk</i> .....      | 1     | 18 | 0  |
|  | Ditto, electric light.....  | 2     | 3  | 6  |
|  | 23. Jas. Webster, belting supplied .....  | 19    | 17 | 6  |
|  | 31. J. Browne & Co., freight and charges on torpedo stores, &c., ex <i>Waihora</i> .... | 2     | 11 | 5  |
| Nov.   | 5. Australian Electric Company, instalment on contract for torpedo stores.....          | 447   | 2  | 8  |
|  | 14. J. Browne & Co., freight and charges on stores, ex <i>Southern Cross</i> .....      | 1     | 7  | 6  |
| Dec.   | 11. E. M. Boddam, wages of men assisting to take soundings on torpedo line.....         | 13    | 0  | 0  |
|  | Payments in London by Crown Agents during 1883—   |       |    |    |
|  | Paymaster-General—Gun cotton.....   | 647   | 19 | 10 |
|  | Freight and insurance .....   | 81    | 16 | 2  |
|  |   | 729   | 16 | 0  |
| 1884.  |   |       |    |    |
| March  | 3. J. Browne & Co., freight and charges on stores, ex <i>Te Anau</i> .....              | 21    | 8  | 9  |
|  | 6. R. E. Joseph, expenses visiting Hobart, re torpedo stores.....                       | 17    | 2  | 0  |
|  | 7. Australian Electric Company, 80 per cent. on contract for torpedo stores.....        | 1251  | 1  | 2  |
|  | 11. H. Judd, making cast-iron sinkers .....   | 54    | 12 | 0  |
| April  | 4. Jno. Fox, making chests for tools, and cupboard.....                                 | 9     | 18 | 0  |
| May  | 21. W. C. Grubb Bros., cartage of engine, boiler, and plant .....                       | 7     | 6  | 0  |
|  | 30. H. J. Marsh & Co., tools, &c. ....  | 59    | 18 | 0  |
| <i>Total Expenditure under Act 42 Vict. No. 28</i> ..... |   | £4793 | 14 | 5  |

EXPENDITURE under Act 46 Vict. No. 25.—Proportion of Vote of £10,700, Armament for Batteries and Torpedo Boat.

Payments in London by Crown Agents—

| 1883.   |   | £     | s. | d. |
|---|---|-------|----|----|
| April   | 13. Thorneycroft & Co., first instalment on contract for second class torpedo boat..        | 800   | 0  | 0  |
| Oct.  | 22. Waterlow & Sons, copies of contract for torpedo boat.....                               | 2     | 5  | 0  |
| Nov.  | 8. Thorneycroft & Co., second instalment on contract for torpedo boat .....                 | 800   | 0  | 0  |
| 1884.   |   |       |    |    |
| Jan.  | 21. Ditto, third ditto .....  | 800   | 0  | 0  |
| Feb.  | 4. Paymaster-General, Admiralty, Superintendence construction of boilers, torpedo boat..... | 2     | 2  | 0  |
| March   | 20. Messrs. Freeland, freight of torpedo boat and fittings .....                            | 401   | 18 | 3  |
|   | 25. Paymaster-General, superintendence construction of boilers .....                        | 1     | 12 | 4  |
| April   | 1. Thorneycroft & Co., balance due for torpedo boat .....                                   | 800   | 0  | 0  |
|   | 26. Ditto, expenses of packing and shipping ditto.....                                      | 129   | 1  | 4  |
|   | 28. London assurance, premium on torpedo boat and gear.....                                 | 274   | 2  | 5  |
| <i>Total Expenditure for Torpedo Boat under Act 46 Vict. No. 25</i> ..... |   | £4011 | 1  | 4  |

EXPENDITURE from Consolidated Revenue Fund of 1882, for repairs, alterations, &c. to buildings, Lower Macquarie-street, in connection with Torpedo Defences .....

|   |  | £    | s. | d. |
|---|--|------|----|----|
| Provided by first Supplementary Estimate, 1882..... |  | 450  | 0  | 0  |
| Ditto by second ditto .....                         |  | 195  | 19 | 6  |
| Ditto by third ditto .....                          |  | 46   | 9  | 0  |
|   |  | £692 | 8  | 6  |

EXPENDITURE from Consolidated Revenue Fund of 1883, under Volunteer Force.—Vote Torpedo Stores and Electric Light—£100.

| 1883.  |  | £  | s. | d. |
|--------|--|----|----|----|
| March  | 14. J. Browne & Co., freight on electric goods .....                               | 1  | 7  | 6  |
| April  | 11. J. Chisholm, repayment on account labour.....                                  | 2  | 0  | 0  |
|        | 28. C. Cracknell, wages.....   | 3  | 0  | 0  |
| May    | 21. M. F. Daly & Co., stores .....   | 0  | 1  | 4  |
| June   | 6. J. Griffiths, cartage .....   | 2  | 11 | 0  |
|        | 21. H. J. Marsh & Co., torpedo stores .....  | 1  | 4  | 6  |
|        | 28. C. Davies, stores .....  | 2  | 17 | 8  |
| August | 8. J. Griffiths, cartage .....   | 0  | 9  | 0  |
|        | 13. J. Chisholm, repayment on account labour .....                                 | 2  | 8  | 0  |
| Oct.   | 10. C. H. Miller, building boat .....  | 17 | 10 | 0  |
|        | 22. Geo. Hooper, torpedo stores .....  | 0  | 16 | 8  |
|        | 30. D. Dingwall, iron bolts, segments, &c., supplied .....                         | 2  | 2  | 0  |
|        | 31. C. Davies, torpedo stores.....   | 3  | 3  | 4  |
| Nov.   | 14. C. Cracknell, making and painting notice boards for gun-cotton store-ship .... | 1  | 5  | 9  |
|        | 16. Jno. Fox, making stadimeters, test tables, &c.....                             | 7  | 10 | 0  |
|        | 17. D. Dingwall, iron bars for ketch <i>Enchantress</i> .....                      | 1  | 15 | 0  |

| 1883. |   | £           | s.        | d.       |
|-------|---|-------------|-----------|----------|
| Dec.  | 27. J. E. Risby, timber .....                         | 9           | 9         | 9        |
|       | R. G. Winter, bugles .....                            | 4           | 4         | 0        |
|       | 22. J. Griffiths, cartage .....                       | 0           | 5         | 0        |
|       | 31. Colonial Storekeeper, stores issued. ....         | 4           | 6         | 0        |
| 1884. |   |             |           |          |
| Jan.  | 11. Geo. Hooper, wood discs .....                     | 1           | 5         | 0        |
|       | 25. W. Burgoyne, kegs .....                           | 7           | 0         | 0        |
| Feb.  | 7. Hy. Collis, wages .....                            | 4           | 15        | 0        |
|       | 25. J. Griffiths, cartage .....                       | 2           | 1         | 6        |
|       | 28. R. R. Rex, stores .....                           | 9           | 11        | 3        |
| March | 15. Jas. Webster, cutting washers .....               | 2           | 5         | 0        |
|       | 17. Wm. Turner, slack coal .....                      | 0           | 12        | 6        |
|       | 31. W. C. Grubb Bros., cartage of torpedo plant ..... | 4           | 8         | 0        |
| April | 7. H. J. Marsh & Co., torpedo stores .....            | 8           | 17        | 0        |
|       | 26. J. E. Risby, timber .....                         | 3           | 7         | 0        |
| May   | 21. C. Davis, stores .....                            | 6           | 1         | 6        |
|       |   | <u>£118</u> | <u>10</u> | <u>3</u> |

EXPENDITURE from Consolidated Revenue of 1884, under Volunteer Force.  
Vote—"Torpedo Stores and Electric Light—£100."

| 1884. |   | £          | s.       | d.       |
|-------|---|------------|----------|----------|
| March | 14. Henry Collis, cleaning stores and replacing mines ..... | 3          | 10       | 0        |
|       | 12. W. C. Grubb Bros., cartage of torpedo plant .....       | 1          | 13       | 6        |
| April | 3. C. H. Miller, repairs to boat .....                      | 0          | 10       | 0        |
|       | 19. Jno. Fox, fittings for torpedo workshop .....           | 3          | 17       | 0        |
|       | 29. Ditto, fittings for instruction room .....              | 9          | 2        | 0        |
| June  | 13. Ditto, ditto .....                                      | 9          | 9        | 0        |
|       |   | <u>£28</u> | <u>1</u> | <u>6</u> |

## APPENDIX B.

Head Quarter Office, Hobart, 23rd July, 1884.

SIR,

I HAVE the honor to forward herewith a Report from the Officer Commanding the Tasmanian Engineers on a recent trial of the Electrical Machinery, and which I have called for in connection with my Defence Report now in course of preparation. In view, however, of the assembly of a Select Committee on the plant of the Engineer Corps, I think it advisable to transmit it to you as a separate document in conjunction with other papers on the same subject. My recommendations in connection with the plant now on charge are confined solely to the rectification of the relays (which have already been returned), and the Commutators of the two Dynamo Machines, which are exceedingly faulty in manufacture. By the terms of the contract the Company are bound to take back and replace articles of faulty construction, and there will therefore be no difficulty in obtaining perfect relays and Commutators when the plant, *such as it is*, will be in accordance with the conditions of supply. I use these words in reference to the description of machinery which was obtained in the first instance. A more powerful machine, such as the D Grannur, ought to have been obtained at the first outset, which, with the aid of a Mangin Projector and proper inclined lamp, would have provided a proper search light for so wide an estuary as the Derwent. The Mangin Projector, the acquisition of which I have already advocated in former correspondence, can still be obtained, but the Government will have to make the best of the Dynamo Machines now on charge, having elected to obtain them from the Melbourne Company, unless they are prepared to dispose of them for what they will realise.

I have, &c.

W. V. LEGGE, Colonel Commanding Tasmanian Forces.

To the Hon. the Chief Secretary.

Engineer Office, 16th July, 1884.

SIR,

In accordance with your request preferred in connection with the recent trial of the machines, I have the honor to forward the following detailed report on the Electric Search Light supplied for the Submarine Defences by the Australian Electric Company, which, so far, has proved defective and of very inferior workmanship in part.

The apparatus has been tried on a considerable number of occasions, but has never burnt steadily for longer than an hour and a quarter, and it is highly improbable that in its present state it ever would. I believe that the machines and lamps are well designed, but most defective in workmanship; the reflector is quite useless for the purposes of a search light; and that the engine and boiler are suitable and well constructed. I have stated in detail my reasons for arriving at the above conclusions. Under the clause of the contract by which all tested apparatus must be guaranteed for 12 months, and by which if any such apparatus shall become unserviceable or prove defective within that period it shall be repaired or fresh articles supplied, I would recommend that the Company be called upon to make good the deficiencies enumerated, or supply fresh machines and lamps.

### Dynamo Machines.

The Dynamo Machines on their arrival were objected, and on the arrival of the Company's Engineer were found to be defective and were completely rewound. In the presence of Mr. Joseph the machines were twice run; they were carefully tested by volt and ammeters, and gave a current of about 54 amperes when connected in parallel.

circuit, and 50 volts was the electro motive force of the machines when running at 910 revolutions; this, according to the ordinary calculations, would give a light of over 14,000 candle power, and as the lamps burnt well during the run I did not feel justified in withholding the certificate for the supply of the apparatus any longer. There are certain defects in the internal construction of the machine which render it utterly impossible to continue the light for any length of time, and which show that the details of internal workmanship have received no proper attention. In being run on a subsequent occasion, after an hour and a quarter one of the Commutators flew to pieces, and on examining the connections it was found that the construction was most unsuitable and incomplete, and the workmanship a disgrace to any ordinary workshop. The remaining machine was tested in a similar manner a few days ago with the same result; the Commutators split, and the same defective workmanship was brought to light. New Commutators of larger circumference and proper manufacture must be supplied. The core should be made of fibre or Italian asbestos instead of wood, which cannot possibly stand the heat of such a powerful current. The brushes require to be considerably heavier, and the contact should be made by a strong spring; the inherent spring in a thin brush is not sufficient, and when the brush wears away bad contact must ensue, which is not the case when the contact is made by means of springs. The spring clips are used in the Grannur and Siemen's machines, and are found to answer well.

#### *Lamps.*

As reported by me previously, the defects in the lamps arise almost entirely from defective workmanship. The guide-rods rattle in their bearings; the whole of the bearings are too short; the carbonholders have lateral movement, instead of being perfectly rigid and working the carbons vertically. The light has frequently to be stopped because the carbons work across one another, and also because the key-pins of the pinion wheels drop out. No amount of care will remedy either of these defects. The principal defect in the construction of the lamp is, however, that the axes of the carbons are made to work in the same vertical line. In the inclined hand-lamps generally used for search-lights the carbons are fixed so that their axes coincide in direction, but the upper or positive carbon is placed parallel to the lower carbon, and slightly nearer to the lamp. For this reason, and on account of the inclination of the lamp, the crater of the positive carbon is caused to face the reflector, and a much larger proportion of the light is thus thrown in the desired direction. The lamps will be, when properly altered, good for general work, but I would recommend, for the last reason stated, and also because the hand-lamps are cheap, that hand-lamps be bought for use with the Mangin Projector.

#### *Reflector.*

The principle of the parabolic reflector for purposes of a search light is altogether wrong; but, at the same time, the whole of the workmanship, mountings, and pedestal of the reflector supplied are really good. In every parabolic reflector there is much scattered light, and the intensity of the light varies considerably in the various portions of the illuminated area. These are great defects in a search light for war purposes, not only because the power of the light is so greatly diminished, but because it is of such immense importance to direct the light upon an enemy without disclosing your own position more than is necessary. These defects are overcome in the Mangin Projector, the beam of light from which is exceedingly well defined, and the intensity of the light in the various portions of the illuminated circle is practically equal, and diminished only according to the distance and state of the atmosphere. The reason for this is, that the relation which should exist between the radii of curvature of the two surfaces of the projector has been established by calculation and trial, and the centre of the inner one is made to be also the principal focus of the aplanatic reflector, consequently when the light is properly focussed the rays traverse the inner surface normally, and no light is dispersed by reflection from the concave surface of the lens,—the beam of projected light becomes for all practical purposes a truly parallel one, the only divergence being due to the size of the luminous point as compared with its distance from the silvered surface. For the above reasons I would recommend the purchase of a Mangin reflector; with it and the present machines a vessel distant from 3000 to 4000 yards ought easily to be seen. The range of a Grannur machine (D) and the projector would be considerably more than this.

The engine and boiler I consider well suited to the work. The engine with 75 lbs. of steam could work up to fully 16 horse power, and as at present it can drive the machines at over 1000 revolutions with 50 lbs. of steam there can be no question as to its power. Rope belting and change pulleys are generally used for driving dynamo machines now, or friction gearing, but nevertheless good belting effects the purpose well. The engine when running at 150 revolutions will drive the machines at 1050, and, as the maximum speed required is 920, the shafting and pulleys can be considered properly constructed. The engine has a very good and sensitive governor and regulator attached thereto, and is quite capable of driving a D Grannur machine if purchased.

I have, &c.

E. M. TUDOR BODDAM, *Captain Commanding Tasmanian Forces.*

*The Commandant Local Forces.*

### APPENDIX C.

| <i>Date.</i>      | <i>Machines tried.</i>                                   | <i>Remarks.</i>  |
|-------------------|--|--|
| 31 December, 1883 | One.   | The other machine was quite unserviceable; a very bad light was obtained, insufficient to lay down machines. |
| 9 February, 1884  | Both machines singly.                                    | Neither worked satisfactorily; were taken to pieces and re-wound.  |
| 18 February, 1884 | Both machines singly, and connected in parallel circuit. | Burnt well for about an hour.  |
| 19 February ..... | Ditto.   | Ditto.   |
| 28 May .....      | Both machines parallel, and both singly.                 | Burnt well; trial lasted about an hour altogether.   |
| 29 May .....      | Ditto.   | Burnt well for an hour and a quarter, when commutator split.   |
| 25 June .....     | One machine.   | Lamp defective; carbons crossed.   |
| 26 June .....     | Ditto.   | Burnt for half an hour; commutator split.  |

## APPENDIX D.

*Launceston Volunteer Artillery, Orderly Room, 18th September, 1884.*

SIR,

IN reply to your request to furnish the Committee with particulars of the guns lately supplied to the battery under my command, I have the honor to state as follows:—

The new guns consist of two 40-pounder rifled breech-loading Armstrong guns, mounted on field travelling carriages, and two 7-pounder jointed rifled muzzle-loading Armstrong guns, mounted on standing carriages.

With regard to the former, I do not think them suitable for Launceston, for the following reasons:—

- 1st. The difficulty of transport.
- 2nd. That two heavier guns, placed in battery on the banks of the river, would be more effectual in repelling an attack by water.
- 3rd. That owing to the guns being of special manufacture, the ammunition for similar guns in the British Service will not be available for their use, which might be a serious drawback in the event of the Colony requiring supplies in cases of emergency.
- 4th. The breech mechanism being of a delicate nature is liable to get out of order.

In support of the first objection, I may state that eight horses are required for the transport of each gun, which renders moving them about very costly, and, owing to the weight of the gun and carriage, with limber loaded (about four tons), it will be a very serious undertaking leaving the metal roads in approaching the banks of the river to take up a position, and no means are provided for landing the guns should water carriage be decided upon.

These guns, although powerful, are not, in my opinion, sufficiently heavy to cope with the fire from a war vessel such as might be expected to visit this port in the event of hostilities.

No ammunition has been supplied with the guns; and I have been given to understand that experiments are now being carried out in England to determine the efficacy of a certain description of gunpowder before obtaining a supply of cartridges. I consider it a great drawback to any Colony to possess guns requiring a description of ammunition that cannot be obtained from the Imperial authorities, or, in case of extreme need, from the other colonies having service guns of the same calibre in their possession.

The breech mechanism of these guns is, I think, similar, with the slight exception of the method of locking the breech-piece, to that given in Lieut.-Colonel Owen's "Modern Artillery," page 549, where that officer, in describing some guns constructed at the French Imperial Foundry at Ruelle, says:—"The breech-loading arrangement is similar in principle to that proposed by Eastman, several of whose guns were purchased by the British Government during the Crimean war, but have never been used."

I enclose a sketch and description of the above taken from Colonel Owen's work, and can see no difference between it and the breech arrangement of the 40-pounders sent to Launceston, with the trifling exception above referred to.

The guns are not alike, and some of the fittings (loading tubes, &c.) do not fit as they should. Gun No. 3253 is rifled on the increasing twist system, having 27 grooves, whilst gun No. 3561 is uniform, with 37 grooves. I do not notice any difference in the depth of the grooves, but the bands of the latter are, of course, narrower.

The 7-pounder rifle muzzle-loading guns are intended for mountain warfare, and to move them it is necessary to dismount the gun and carriage, disjoint the gun, and pack the whole on pack saddles, the ammunition being carried in ammunition boxes in a similar manner. No harness or saddlery has been supplied, and upon application for a few rounds of ammunition for these guns for practice purposes, I was informed that there was none available. The guns are from Sir William Armstrong & Co.'s manufactory, and, like the 40-pounders, are a speciality; the same remarks made in reference to the ammunition of the 40-pounders apply equally in this case. The transport, it will be seen, must be very expensive, each gun requiring at least four ponies or mules,—a mode of conveyance not adapted to the Colony. I have no hesitation in saying that for the defence of Launceston any position required to be taken up by field guns could be accomplished by guns mounted on field carriages. The guns are constructed in two parts, unscrewing and taking to pieces at the trunnions; the joint must necessarily be a weak place, and in time get out of order. As these guns are equipped at present, they cannot be moved except by placing them upon other conveyances. I expressed my disapproval to the extent that I objected to take these pieces over from the Ordnance Department until obliged to do so.

I have, &c.

GEO. COLLINS, *Captain Commanding L.V.A.*

*The Chairman, Torpedo Committee, Hobart.*

EXTRACT FROM OWEN'S MODERN ARTILLERY, PAGE 549.

The bore is closed by a steel plug with a thread on its exterior surface, fitting into a screw in the breech of the gun. A brass tray, hung on hinges, supports the plug when withdrawn from the gun previous to loading (Fig. 1). The thread does not extend round the plug, but it consists of three separate equal portions, which, together, cover one-half of the surface of the plug. The thread is removed from the three intervening spaces, and this is also the case in the breech. The plug can therefore be easily entered, its screwed portions passing up the plane surfaces in the breech; but when pressed home and turned by a lever handle through one-eighth of a circle, the threads of the plug lock into those in the breech, and the plug is secured in its place. Attached to the face of the plug is a circular steel plate with a steel cup screwed on to it to prevent the escape of gas.



## APPENDIX E.

Staff Office, 23rd September, 1884.

SIR,

I HAVE the honor to forward at your request all available information with reference to the cost of guns received per s.s. *Gulf of Papua*. No detailed list of charges has been supplied to this office.

A copy of Sir Wm. Armstrong & Co's tender for the supply of new type guns is forwarded, the order for the guns lately received having been made out on the data furnished therein.

I forward also list of 7-pounder gun equipment, showing stores and equipment received with the two 7-pounder Guns, which will enable comparison to be made as to their relative values. The 7-pounder received from Melbourne was, I believe, supplied at a reduction of about 30 per cent.

I can furnish all necessary information with reference to the cost of Torpedo Stores from priced vocabulary of stores, also as to patterns of stores which were available for issue on prepayment.

I have, &amp;c.

E. M. TUDOR BODDAM, Capt. &amp; Staff Officer.

To the Secretary, Committee on Torpedo Stores, House of Assembly.

## A.

MEMORANDUM of Charges on account of Defence Department included in Accounts of Crown Agents, for Half-year ended 30th June, 1884.

| To whom paid.                                    | Particulars.   | Amount.    | Head of Service.             |
|--|--|------------|------------------------------|
| Sir W. G. Armstrong & Co.<br>J. & A. B. Freeland | Guns, carriages, and limbers, &c. ....   | £ 2657 4 0 | 46 Vict. No. 25.<br>Armament |
| London Assurance                                 | Freight of guns, carriages, wheels, &c.,<br>per s.s. <i>Gulf of Papua</i> .....  | 105 13 1   | Ditto                        |
| Major-General Steward                            | Premium .....  | 36 4 11    | Ditto                        |
|  | Supervising execution of contract with Sir<br>W. G. Armstrong for guns, &c. .... | 57 0 8     | Ditto                        |
|  | TOTAL .....  | 2856 2 8   |                              |

23rd September, 1884.

E. M. TUDOR BODDAM, Capt. and Staff Officer.

## B.

PRICE List of "New Type" Armstrong Guns, Carriages, Ammunition, &amp;c.

| DESCRIPTION OF GUN—  | 7-pounder.   | 9-pounder.    | 12½-pounder     | 18-pounder.     | 40-pounder.     | 80-pounder.      |
|--|--------------|---------------|-----------------|-----------------|-----------------|------------------|
| Weight of projectile.....  | 2½ inches.   | 2-6 inches.   | 3 inches.       | 3-3 inches.     | 4-724 inches.   | 6 inches.        |
| Calibre .....  | 400 lbs.     | 5 cwt. 9 lbs. | 7½ cwt. 12½ lb. | 12 cwt. 18 lbs. | 26 cwt. 40 lbs. | 4 tons.          |
| Weight .....   | 1 lb. 8 ozs. | 2-5 lbs.      | 4-25 lbs.       | 8 lbs.          | 12 lbs.         | 80 lbs., 34 lbs. |
| Weight of powder charge .....  |              |               |                 |                 |                 |                  |
| <b>Prices—</b>   |              |               |                 |                 |                 |                  |
| Muzzle-loading guns, complete<br>with sights .....                               | £ 110 0 0    | £ 130 0 0     | £ 140 0 0       | £ 270 0 0       | £ 330 0 0       | £ 615 0 0        |
| Breach-loading ditto, ditto.....   | ...          | 143 0 0       | 154 0 0         | 300 0 0         | 363 0 0         | 676 0 0          |
| Field carriages and limbers.....   | 85 0 0       | 210 0 0       | 225 0 0         | 300 0 0         |                 |                  |
| Camp equipment & entrench-<br>ment tools.....                                    | ...          | 25 0 0        | 25 0 0          | 25 0 6          |                 |                  |
| Naval carriages and slides of<br>wrought iron ambulance<br>carriages .....       | ...          | 150 0 0       | 180 0 0         | 250 0 0         | 350 0 0         | 500 0 0          |
| Saddlery and harness.....  | 120 0 0      |               |                 | 40 0 0          | 50 0 0          | 76 0 0           |
| Gun-metal racers, approximate  | ...          | ...           | ...             |                 |                 |                  |
| Accessories and spare parts,<br>per set, for M.-L. guns .....                    | 10 13 6      | 30 13 0       | 34 13 0         | 44 6 11         | 53 15 11        | 65 3 0           |
| Ditto, B.-L. ditto .....   | ...          | 47 13 0       | 52 13 0         | 67 6 11         | 79 15 11        | 90 3 0           |
| Assorted ammunition, per 100<br>rounds .....                                     | 68 18 9      | 55 1 5        | 56 16 5         | 78 14 2         | 107 14 5        | 216 12 5         |
| Powder for charges & bursters<br>Packing not included. Delivery<br>at our works. | 5 19 0       | 9 18 9        | 14 0 1          | 34 14 3         | 57 18 1         | 140 0 8          |

(Signed) W. G. ARMSTRONG &amp; CO.

Elswick Works, Newcastle-upon-Tyne, October 5, 1882.

## 7-POUNDER JOINTED GUNS.

*Particulars connected with the above Carriages and Guns.*

| <i>Articles.</i>  | <i>From Melbourne,<br/>September, 1882.</i> | <i>From London,<br/>June, 1884.</i> |
|---|---|-------------------------------------|
| 7-pr. M.L. Jointed R. Field Gun .....                             | 1   | 1                                   |
| Carriages 10 J. for ditto, with drag washers and linch pins ..... | 1   | 1                                   |
| Cartridges, empty, 1 lb. 8 oz. ....                               | 22  | 100                                 |
| Shell, common, with gas check .....                               | 4   | —                                   |
| Shell, shrapnel, with gas check .....                             | 10  | —                                   |
| Shot, case .....  | 6   | —                                   |
| Fuze, fine E., Armstrong, special .....                           | 12  | —                                   |
| Fuze, Percussion P.S., Armstrong, special .....                   | 6   | —                                   |
| Primers, fuze (Limbers) time, E. ....                             | 12  | —                                   |
| Tubes, friction, copper .....                                     | 50  | —                                   |
| Boxes, ammunition, leather pack saddle .....                      | 4   | —                                   |
| Block, dismounting .....  | 1   | 1                                   |
| Bars for dismounting block .....                                  | 2   | —                                   |
| Caps, sponge .....  | 1   | 2                                   |
| Cradles .....   | 6   | —                                   |
| Cartouches, canvas, for cartridges .....                          | 2   | —                                   |
| Girths, webb (horse fittings) .....                               | 13  | —                                   |
| Hammers, sledge, for trunnion ring .....                          | 1   | 1                                   |
| Hammers, claw .....   | 1   | —                                   |
| Handspikes, traversing (trail) .....                              | 1   | 1                                   |
| Harness, single sets .....  | 1   | —                                   |
| Irons, priming, field (sets) .....                                | 1   | 1                                   |
| Keys, fuze, R.O. ....   | 1   | 2                                   |
| Keys, gas check .....   | 1   | 1                                   |
| Lanyards, friction tube .....                                     | 3   | 3                                   |
| Needles, laboratory .....   | 4   | —                                   |
| Pockets, tube, leather .....                                      | 1   | 1                                   |
| Pockets, fuze, leather .....                                      | 1   | 1                                   |
| Panels, saddles, prs. ....  | 6   | —                                   |
| Plugs, shell, R. O. (special) .....                               | 14  | —                                   |
| Quoins, sliding .....   | 1   | 1                                   |
| Rope toggle .....   | 1   | —                                   |
| Rope, drag, light .....   | 2   | —                                   |
| Sponge, rammer, and worm, each .....                              | 1   | 2                                   |
| Scissors, prs. ....   | 1   | —                                   |
| Screw driver .....  | 2   | —                                   |
| Spikes, common .....  | 2   | —                                   |
| Spikes, spring .....  | 1   | —                                   |
| Spanners, M' Mahon .....  | 1   | —                                   |
| Sight, trunnion, Armstrong .....                                  | 1   | 1                                   |
| Sights, hind or breech tangent .....                              | 1   | 1                                   |
| Screw, preserving, sight hole, trunnion .....                     | 1   | 1                                   |
| Stands, wood, for panels and cradles .....                        | 3   | —                                   |
| Straps, side, arm .....   | 18  | —                                   |
| Straps, tube and fuze pocket .....                                | 2   | 2                                   |
| Trunnion ring .....   | 1   | 1                                   |
| Tompson .....   | 1   | 1                                   |
| Tin for grease .....  | 1   | —                                   |
| Leather case for breech and trunnion sights .....                 | 1   | —                                   |
| Spare windows for trunnion sights .....                           | ...   | 2                                   |
| Spare steel gas check for joint .....                             | ...   | 1                                   |
| Spare sponge cloths .....   | ...   | 2                                   |
| Leather straps, protect vent .....                                | 1   | —                                   |
| Leather covers and straps, cover joints, &c. ....                 | 2   | —                                   |

No particulars as to price of any of the articles mentioned in the above return has been furnished to this office.

E. M. TUDOR BODDAM, *Capt. and Staff Officer.*

23rd September, 1884.

## APPENDIX F.

Launceston, 26th January, 1882.

## TORPEDO DEFENCES.

SIR,

THE sum of £5000 was voted by the Legislature for torpedo defences, and it is an item of the loan for the Defences of Tasmania. There is also an item of £500 for an electric light, besides £500 for telegraphic communication between batteries.

The last-named item need not be dealt with at present, but I now submit recommendations respecting the torpedo defences and electric light. As these two items are part and parcel of the torpedo defences they should be considered together.

I propose to provide torpedo stores for Hobart and Launceston, and an electric light for Hobart.

The Australian Electric Company, of Melbourne, have forwarded to me, per Captain Joseph (of the Victorian Torpedo Corps, their Electrical Engineer), tenders for the supply of these stores, together with a letter addressed to you, marked A, and enclosed.

Enclosure B is a detail of the stores for Hobart, and the prices tendered amount to £2417 2s.

These stores will provide for barring the mouth of the Derwent, and for a group of mines at the entrance to Sullivan's Cove. These torpedo defences will prevent an enemy steaming past the batteries, or attempting to enter Sullivan's Cove, provided they are adequately protected by artillery fire.

Enclosure C is a detail of stores for Launceston (Tamar River), and the amount of tender is £477 18s. 10d.

The stores will be sufficient to bar the river, and, with the guns of position, which I hope to see ordered (20 pr. B.L. guns), the defence against ships will be very effective.

Enclosure D is for an electric light for Hobart, and amounts to £827 18s. 4d.

Enclosure E is for the necessary supply of gun-cotton, and the tender amounts to £460 16s. 8d.

The order for gun-cotton should be withheld, as I wish to check the prices charged by reference to England. Moreover, the cost of freight will be heavy, and requires consideration. As in the event of the gun-cotton not being forthcoming, dynamite could be used, although it is not to be preferred to gun-cotton, the delay will not be of any importance.

I have checked the prices in Captain Joseph's tenders (B, C, D), comparing them with prices furnished to me by the War Office. The English and Australian prices agree very nearly.

There is a great advantage in procuring the stores from the Australian Electric Company, because they will not be paid for until they have been tested and passed by inspectors appointed by the Government of Tasmania. All risks being taken by the Company, there is a guarantee that the best articles and the latest patterns will be supplied.

As to the inspection and testing, I think the best plan will be to appoint Captain Boddam and Mr. Henry, of the Telegraph Department, to certify to the condition of the stores when delivered. As regards the cables, Mr. Warren, from Low Heads, might be associated with Mr. Henry. At Melbourne, I will keep an eye on the proceedings of the Company.

To sum up, I recommend that tenders marked B, C, D be accepted in the usual way, a proper agreement being entered into by the Government with this Company, and that I should be informed when this has been done.

In the enclosed Memorandum you will perceive in what manner I propose expending the balance available on the two items, amounting to £5500.

An early decision is necessary, because I understand that a representative of the Australian Company is proceeding to London during the first part of February, and it would be advantageous for me to discuss the matter with him verbally.

I shall remain in Melbourne until the 7th February. After that date I proceed to Sydney on my way to Brisbane.

I should mention that Captain Joseph has kindly offered to come to Tasmania when the stores have been supplied, in order to assist in getting them stored, &c., and he would only charge his travelling expenses. This is an offer which it would be well to accept when the contract has been entered into.

I have, &amp;c.

The Hon. the Colonial Secretary, Hobart.

P. H. SCRATCHLEY, Colonel, R.E.

*Torpedo Defences.*

|                                  | £     | s. | d. |
|----------------------------------|-------|----|----|
| Amount voted .....               | 5000  |    |    |
| Ditto for electric light .....   | 500   |    |    |
|                                  | 5500  |    |    |
| Deduct already expended .....    | 258   |    |    |
| Balance available .....          | £5242 |    |    |
| <hr/>                            |       |    |    |
| Tender B. Plant for Hobart ..... | 2417  | 2  | 0  |
| " C. Plant for Launceston .....  | 477   | 18 | 10 |
| " D. Electric light .....        | 827   | 18 | 4  |
|                                  | 3722  | 19 | 2  |
| Balance.....                     | 1519  | 0  | 10 |
|                                  | £5242 | 0  | 0  |

| <i>Mode of expending Balance.</i>  |  | £            | s.       | d.        |
|--|--|--------------|----------|-----------|
| Gun-cotton.....  |  | 690          | 0        | 0         |
| Sinkers, buoys and sundries, mechanical mines, boat and appliances, cable ponds, contingencies, repairs to buildings for reception of stores, &c., sundries and unforeseen [to be settled hereafter] ..... |  | 821          | 0        | 10        |
|  |  | <u>£1510</u> | <u>0</u> | <u>10</u> |

## A.

*The Australian Electric Company, Limited,  
Offices, "The Exchange," Melbourne,  
Hobart, 25th January, 1882.*

SIR,

I HAVE the honor, by direction of Colonel Scratchley, R.E., to submit for your consideration the enclosed tenders for the supply of torpedo and electric light apparatus for Hobart defences.

I desire to point out that should you favour us with an order, your Government will be protected to the extent of obtaining perfectly modern and serviceable apparatus, whilst the prices quoted are not in excess of any English manufacturers.

With the exception of the cable, gun-cotton, and steam engine, the whole of the apparatus will be made and tested in accordance with the rules laid down in the "Torpedo Manual;" at the Company's factory duplicates of every part can thus be readily obtained.

The stores to be gradually delivered within six months f.o.b. steamer in Melbourne, properly packed, and in good condition.

I have, &amp;c.

*The Hon. the Colonial Secretary.*ROBERT E. JOSEPH, *Electrical Engineer, A.E.C.*

## B.

## HOBART DEFENCES.—SUBMARINE MINES AND APPARATUS.

|  | £            | s.       | d.       |
|--|--------------|----------|----------|
| 45 100 lbs. electric-contact mines, with works, at £20 10s.....      | 922          | 10       | 0        |
| 700 fathoms 2-inch rope (steel wire) for mooring, at £6 .....        | 42           | 0        | 0        |
| 1000 fathoms $\frac{3}{4}$ -inch tripping chain, at £20 6s. 8d. .... | 128          | 6        | 8        |
| 100 iron thimbles .....  | 0            | 12       | 6        |
| 150 iron shackles .....  | 12           | 10       | 0        |
| 51 iron connecting boxes, at 7s.....                                 | 17           | 17       | 0        |
| 12 multiple junction disconnecter boxes (pattern 1882), at £8.....   | 96           | 0        | 0        |
| 4 junction boxes for 14-core and 4 single cables, at 50s.....        | 10           | 0        | 0        |
| 1 mile of 4-cored armoured cable .....                               | 330          | 0        | 0        |
| 2½ miles of single armoured cable, at £85 .....                      | 212          | 10       | 0        |
| 1 cable drum for $\frac{1}{4}$ knot 4-cored cable .....              | 45           | 0        | 0        |
| 1 cable drum for $\frac{1}{4}$ -knot single cable .....              | 30           | 0        | 0        |
| 100 platinum wire detonating fuses .....                             | 7            | 10       | 0        |
| 100 platinum wire disconnecting fuses .....                          | 5            | 0        | 0        |
| 3 sets shutter signalling apparatus, at £20 10s.....                 | 61           | 10       | 0        |
| 1 set of test table fittings (Imperial pattern) .....                | 14           | 10       | 0        |
| 1 astatic galvanometer in leather case .....                         | 5            | 0        | 0        |
| 3 boat galvanometers and batteries, at £4 .....                      | 12           | 0        | 0        |
| 2 common galvanometers and batteries, at £2 5s.....                  | 4            | 10       | 0        |
| 2 3-coil detector galvanometers, at £3 5s.....                       | 6            | 10       | 0        |
| 1 reflecting galvanometer .....                                      | 15           | 0        | 0        |
| 2 sets firing resistance coils, at £8.....                           | 16           | 0        | 0        |
| 6 firing keys, at 30s.....   | 9            | 0        | 0        |
| 4 retarding firing keys, at £2 5s.....                               | 10           | 0        | 0        |
| 2 reversing keys, at £3 10s.....                                     | 7            | 0        | 0        |
| 45 insulating plugs, at 7s. 6d.....                                  | 14           | 12       | 6        |
| 45 relays for mines, at 40s.....                                     | 90           | 0        | 0        |
| 1 field and boat test-table, with sounder and key.....               | 22           | 10       | 0        |
| 3 battery switches, at £2 5s.....                                    | 6            | 15       | 0        |
| 100 single binding screws, at 1s.....                                | 5            | 0        | 0        |
| 100 double binding screws, at 1s. 4d.....                            | 6            | 13       | 4        |
| 1 firing observing arc .....   | 45           | 0        | 0        |
| 2 Morse sounders, at 55s.....  | 5            | 10       | 0        |
| 4 telephones, at 20s.....  | 4            | 0        | 0        |
| 2 Morse keys, at 25s.....  | 2            | 10       | 0        |
| 2 field sounders in case.....  | 7            | 0        | 0        |
| 2 platinum wire clips on stand, at 25s .....                         | 2            | 10       | 0        |
| 25 lbs. india rubber solution, at 2s.....                            | 2            | 10       | 0        |
| 25 lbs. india rubber tape, at 7s.....                                | 8            | 15       | 0        |
| 3 sets jointing tools, at £3 .....                                   | 9            | 0        | 0        |
| 2 cable jointing vices, at £12.....                                  | 24           | 0        | 0        |
| 23 insulated plates, with double binding screws.....                 | 3            | 15       | 0        |
| 3 sets soldering apparatus, at 20s.....                              | 3            | 0        | 0        |
| 1 cable condenser .....  | 6            | 10       | 0        |
| 1 dynamo quantity exploder (pattern 1881).....                       | 29           | 5        | 0        |
| 100 cells firing battery, at 15s.....                                | 75           | 0        | 0        |
| 5 cells test battery, at 4s.....                                     | 10           | 0        | 0        |
| 5 cells signal battery, at 4s.....                                   | 10           | 0        | 0        |
| 1 cells special fuse test, at 5s.....                                | 2            | 10       | 0        |
|  | <u>£2417</u> | <u>2</u> | <u>0</u> |

R. E. JOSEPH, *pro Manager.*

## C.

## LAUNCESTON DEFENCES.

|   | £           | s.        | d.        |
|---|-------------|-----------|-----------|
| 9 100 lbs. electro-contact mines, with works, at £20 10s..... | 184         | 10        | 0         |
| 120 fathoms mooring line.....                                 | 7           | 0         | 0         |
| 200 fathoms tripping chain.....                               | 40          | 13        | 4         |
| 20 iron thimbles.....   | 0           | 3         | 0         |
| 30 shackles.....  | 2           | 15        | 0         |
| 10 iron junction boxes, 7s.....                               | 3           | 10        | 0         |
| 2 multiple junction boxes, £8.....                            | 16          | 0         | 0         |
| 1 junction box.....   | 2           | 10        | 0         |
| 354 yards 4-cored armoured cable.....                         | 66          | 0         | 0         |
| 880 yards single armoured cable.....                          | 43          | 0         | 0         |
| 100 platinum wire detonating fuses.....                       | 7           | 10        | 0         |
| 9 relays for mines, at £2.....                                | 18          | 0         | 0         |
| 9 insulating plugs, at 7s. 6d.....                            | 3           | 7         | 6         |
| 1 field test-table.....                                       | 22          | 10        | 0         |
| 1 set firing resistance coils.....                            | 8           | 0         | 0         |
| 2 field sounders.....   | 7           | 0         | 0         |
| 50 cells firing battery, at 15s.....                          | 37          | 10        | 0         |
| 20 cells test battery, at 4s.....                             | 4           | 0         | 0         |
| 20 cells signal battery, at 4s.....                           | 4           | 0         | 0         |
|   | <u>£477</u> | <u>18</u> | <u>10</u> |

R. E. JOSEPH, *pro Manager*.

## D.

## HOBART DEFENCES.—ELECTRIC LIGHT.

|   | £           | s.        | d.       |
|---|-------------|-----------|----------|
| 2 dynamo-electric machines giving, when joined in one circuit, a light of 14,000 standard candles, at £112.....   | 224         | 0         | 0        |
| 2 electric lamps, self acting, at £30.....  | 60          | 0         | 0        |
| 1 silvered parabolic reflector, 22 in., mounted in lantern, and fitted in cast iron frame, with horizontal and vertical motions, tangent screws, and clamps complete..... | 90          | 0         | 0        |
| 1 focus observer, Siemen's pattern.....   | 5           | 0         | 0        |
| 1 electric dynamometer, Siemen's pattern.....   | 5           | 10        | 0        |
| 1 automatic shunt, large size, new pattern.....   | 3           | 0         | 0        |
| 1 velocometer.....  | 2           | 10        | 0        |
| 1 gun-metal switch.....   | 2           | 10        | 0        |
| 1000 yards insulated cable, at per 100 yards, £10.....  | 100         | 0         | 0        |
| 500 feet carbon rods, 300 at 1s. 1d., 200 at 11d.....   | 25          | 8         | 4        |
| 2 spare sets commutators, at 6s.....  | 0           | 12        | 0        |
| 8 spare sets brushes, at 6s. 3d.....  | 2           | 8         | 0        |
| 2 spare carbon holders, at 15s.....   | 1           | 10        | 0        |
| 1 special steam engine, boiler, tank, and feed-pump complete, for steadily driving dynamo-machines, 8 h.p. nominal.....   | 270         | 0         | 0        |
| Intermediate shafting with pulleys, &c., secured to cast iron bed plates, with driving belts, &c., complete.....  | 35          | 0         | 0        |
|   | <u>£827</u> | <u>18</u> | <u>4</u> |

R. E. JOSEPH, *pro Manager*.

## E.

## HOBART DEFENCES.—GUN COTTON.

|  | £           | s.        | d.       |
|--|-------------|-----------|----------|
| 4500 lbs. gun-cotton, in slabs, at 2s.....       | 450         | 0         | 0        |
| 100 lbs. gun-cotton, 8 oz. discs, at 2s. 2d..... | 10          | 16        | 8        |
|  | <u>£460</u> | <u>16</u> | <u>8</u> |

The above prices are for delivery at the manufactory. Freight and insurance from England varies considerably, for explosives will be charged extra.

R. E. JOSEPH, *pro Manager*.

Not to be accepted.

P. H. SCRATCHLEY, *Colonel, R.E.*

## APPENDIX G.

*Colonial Secretary's Office, Hobart, 6th February, 1882.*

SIR,

I HAVE the honor to acknowledge the receipt of your letter of the 26th ultimo, with reference to Torpedo Defences; and, in reply, I have to inform you that the Government concur in your proposal to procure the Stores enumerated in Captain Joseph's Tenders B, C, and D, which I herewith return, having kept copies of the same.

I will cause a Memorandum of Agreement to be prepared for signature by the Contractors and the Government, but I must leave the date within which the contract is to be completed until I hear from you, as that is a point which I should feel obliged by your arranging with Captain Joseph.

The Government gladly accept Captain Joseph's offer to visit Tasmania upon the Stores being supplied, and appreciate the terms in which the offer is made.

I would suggest that a detailed estimate should be prepared of the cost connected with the attendant expenses enumerated by you, such as sinkers, buoys, mechanical mines, boat and appliances, &c., as the available balance is only £821, and it is desirable the Government should have full information of the amount required to complete the equipment before the Estimates are prepared for Parliament.

I have, &c.

Colonel SCRATCHLEY, R.E., C.M.G.  
Public Works Office, Melbourne, Victoria.

W. R. GIBLIN, for the Colonial Secretary, absent.

Public Works Office, Melbourne, 10th February, 1882.

SIR,

I BEG to acknowledge receipt of your letter of the 6th instant, and to state that the estimate asked for will be forwarded next week.

I have informed the Australian Electric Company that a Memo. of Agreement will be entered into by you with the Company.

I am going through the three tenders again carefully with Captain Joseph, in order to see that they are correct in every respect, and will report further.

I have, &c.

The Hon. the Colonial Secretary, Hobart.

P. H. SCRATCHLEY, Colonel, R.E.

Colonial Secretary's Office, Hobart, 15th February, 1882.

MEMO.

THE accompanying letter from Colonel Scratchley, R.E., and enclosures, are forwarded for the perusal of the Solicitor-General, and with a request that he will prepare a Draft Agreement between the Colonial Secretary and "The Australian Electric Company, Limited," of Melbourne, for the supply of the Torpedo and Electric Light Apparatus, as tendered for by the Company, in accordance with the terms and conditions contained in the Tender.

The time within which the Stores, &c. are to be delivered in Hobart to be left blank, also the penalty for delay.

The Solicitor-General.

WM. MOORE.

Public Works Office, Melbourne, 11th February, 1882.

Expenditure of balance of £821 on Vote for Torpedo Defences of £5500.

SIR,

HEREWITH I forward a Memorandum, as requested in your letter of the 6th instant. I cannot go more into detail as I have not the data to work upon, and until the torpedo stores have been delivered, and the whole matter of Torpedo Defence considered on the spot, no one can say exactly how this £821 will be laid out.

Judging from my experience in such matters I think you will find that the £821 will cover all the extra or attendant expenses, excepting freight, landing, storage of the torpedo plant, &c., and exclusive of the works expenditure for fitting up buildings at the Artillery drill-yard for instruction and storage purposes, as well as a cable tank. The freight, &c. should be charged to the item for contingencies in the Loan vote; the works to the same item, or to a special grant to be asked for at the same time as the supplementary estimate for the completion of the batteries and armaments. I suggest the latter course.

As regards the small annual expenditure required in connection with the Torpedo Defences, the practice of some of the other Colonies should be followed,—i.e., a small sum should be voted annually in the Military Estimates for the necessary experiments and practice for the Torpedo Corps, any balance remaining at the end of each year to be expended in the purchase of additional torpedo plant to be added to the stock. The annual expenditure should be controlled by the Commandant.

I may add that I think you will find it advantageous to let the Commandant assist in keeping a check upon the balances remaining on the several items of the loan for defences, and I would strongly urge the necessity of not sanctioning any expenditure whatever which is chargeable to this vote except upon approved requisitions. Provided matters connected with this defence expenditure are dealt with in a systematic manner, the exercise of the check proposed would not involve any delay or inconvenience.

There is another reason why the Commandant should be concerned in the matter, especially in the expenditure in connection with the armaments, torpedo defences, &c. The Staff Officer will necessarily have much to do with the technical details, and all reports and matters referred to the Staff Officer should go through the Commandant. This is the custom in the other Colonies, and the arrangement works very well indeed.

I have, &c.

The Hon. the Colonial Secretary, Hobart.

P. H. SCRATCHLEY, Colonel, R.E.

Proposed Mode of expending the balance of £821 estimated to be available on Items for Torpedo Defences.

|   | £    | s. | d. |
|---|------|----|----|
| (1.) 54 cast iron sinkers, 5 cwt. each (cost £10 per ton in Melbourne, but could be obtained for less in Hobart, as c.i. scrap can be supplied by breaking up old c.i. carriages), say.....   | 100  | 0  | 0  |
| (2.) 12 marking-out buoys (if of cork cost about £4 a piece, could be extemporized on the spot say for £2.) say .....   | 24   | 0  | 0  |
| (3.) Sundry stores (details for which will have to be written out) and contingencies, say.....  | 100  | 0  | 0  |
| (4.) Trolly, 4-wheel, with flat wheels (see Manual), say .....  | 12   | 0  | 0  |
| (5.) Lighter (fitted with all appliances, as per pages 136 and 137 Manual), say .....   | 150  | 0  | 0  |
|   | 386  | 0  | 0  |
| (6.) Keep balance as a margin for unforeseen contingencies (as to mechanical mines they would have to be extemporised in time of war, and would cost about £5 a piece, but this is a pure assumption, as nothing has yet been settled in regard to this class of mine)..... | 435  | 0  | 0  |
|   | £821 | 0  | 0  |

P. H. SCRATCHLEY, Colonel, R.E.

11. 2. 82.

## APPENDIX H.

Public Works Office, Melbourne, 1st February, 1882.

## TENDERS FOR TORPEDO STORES.

SIR,

REFERRING to your letter of the 6th instant, and mine of the 10th, I beg to state that I had gone very carefully through the tenders B, C, D, and have no alterations to propose.

As to the time for the completion of the orders, the Australian Electric Company say that six months will suffice, but as I think this time too short, I recommend that nine months be allowed for the entire completion, and that payments be made to the Company from time to time to the extent of 80 per cent. of the value of the stores as they are delivered. If the Company complete the contract in six, seven, eight, or nine months, the payment to be in full.

In order to ensure proper arrangements as to testing, &c. of the articles, I recommend that you should let me see the draft of the proposed memorandum of agreement.

I have told the Company that they can now proceed with the preliminary arrangements for the contract.

The date from which this time is to count shall be the date of the Company signing the agreement. If I can be of any service to the Government in regard to the signing of the document, I am at its service.

I go to Brisbane, *via* Sydney, on the 17th instant. All letters posted after the 15th instant should be addressed to Union Club, Sydney, and if I have left that city they will be forwarded on to me to the Brigade Office, Brisbane. Telegrams should be addressed to these two places until the 5th of March, when I return to Sydney.

I have, &amp;c.

The Hon. the Chief Secretary, Hobart.

P. H. SCRATCHLEY, Colonel, R.E.

SCHEDULE B.—SCHEDULE OF PRICES.  
Hobart Defences.—Submarine Mines and Apparatus.

Contract No.

| No.  | Description.  | Rate.   | Cost.     |
|------|---|---------|-----------|
|      |   | £ s. d. | £ s. d.   |
| 45   | 100 lbs. E. C. mines, with works complete .....                 | 20 10 0 | 922 10 0  |
| 700  | Fathoms 2-inch steel wire rope for mooring .....                | 6 0 0   | 42 0 0    |
| 1000 | Fathoms 3-inch tripping chain .....                             | 20 6 8  | 128 6 8   |
| 100  | Iron thimbles .....   | ...     | 0 12 6    |
| 150  | Iron shackles .....   | ...     | 12 10 0   |
| 51   | Iron connecting boxes, complete .....                           | 0 7 0   | 17 17 0   |
| 12   | Multiple junction boxes, with disconnectors, pat. '82 .....     | 8 0 0   | 96 0 0    |
| 4    | Multiple junction boxes for (1)4 core and 4 single cables ..... | 2 10 0  | 10 0 0    |
| 1    | 1 Mile 4-core armoured cable .....                              | ...     | 330 0 0   |
| 2½   | 2½ Miles single armoured cable .....                            | 85 0 0  | 212 10 0  |
| 1    | 1 Cable drum ½-knot 4-core cable .....                          | ...     | 45 0 0    |
| 1    | 1 Cable drum ½-knot single cable .....                          | ...     | 30 0 0    |
| 100  | 100 Platinum wire detonating fuzes .....                        | ...     | 7 10 0    |
| 100  | 100 Platinum wire disconnecting fuzes .....                     | ...     | 5 0 0     |
| 3    | 3 Shutter signalling apparatus .....                            | 20 10 0 | 61 10 0   |
| 1    | 1 Test table fitted complete (Imp. patt.) .....                 | ...     | 14 10 0   |
| 2    | 2 Astatic galvanometer, in case complete .....                  | ...     | 5 0 0     |
| 3    | 3 Galvanometers and batteries, for B.S., ditto .....            | 4 0 0   | 12 0 0    |
| 2    | 2 Common ditto, ditto .....                                     | 2 5 0   | 4 10 0    |
| 2    | 2 3 coil detector galvanometer complete .....                   | 3 5 0   | 6 10 0    |
| 1    | 1 Reflecting ditto, with shunts complete .....                  | ...     | 15 0 0    |
| 2    | 2 Sets firing resistance coils, complete F.S. and S.M. ....     | 8 0 0   | 16 0 0    |
| 6    | 6 Firing keys .....   | 1 10 0  | 9 0 0     |
| 4    | 4 Retardation firing keys .....                                 | 2 5 0   | 10 0 0    |
| 2    | 2 Reversing keys .....  | 3 10 0  | 7 0 0     |
| 45   | 45 Insulation plugs, with wires .....                           | 0 7 6   | 14 12 0   |
| 1    | 1 Field and boat service test table complete .....              | ...     | 22 10 0   |
| 3    | 3 Battery switches, P.O. pattern and tumbler .....              | 2 5 0   | 6 15 0    |
| 100  | 100 Single binding screws .....                                 | 0 1 0   | 5 0 0     |
| 100  | 100 Double ditto ditto .....                                    | 0 1 4   | 6 13 4    |
| 1    | 1 Firing observing arc .....                                    | ...     | 45 0 0    |
| 2    | 2 Morse sounders .....  | 2 15 0  | 5 10 0    |
| 4    | 4 Telephones .....  | 1 0 0   | 4 0 0     |
| 2    | 2 Morse keys .....  | 1 5 0   | 2 10 0    |
| 2    | 2 Field sounders, in case, complete .....                       | 3 10 0  | 7 0 0     |
| 2    | 2 Platinum wire-clips, on stand .....                           | 1 5 0   | 2 10 0    |
| 25   | 25 lbs. India rubber solution .....                             | 0 2 0   | 2 10 0    |
| 25   | 25 lbs. India rubber tape .....                                 | 0 7 0   | 8 15 0    |
| 3    | 3 Sets jointing tools, complete .....                           | 3 0 0   | 9 0 0     |
| 2    | 2 Cable jointing vices .....                                    | 12 0 0  | 24 0 0    |
| 25   | 25 Insulated plates with double binding screws .....            | 0 3 0   | 3 15 0    |
| 3    | 3 Sets soldering apparatus .....                                | 1 0 0   | 3 0 0     |
| 1    | 1 Cable condenser .....   | ...     | 6 10 0    |
| 1    | 1 Dynamo quantity exploder (patt. '81) .....                    | ...     | 29 5 0    |
| 100  | 100 Cells firing battery, at .....                              | 0 15 0  | 75 0 0    |
| 50   | 50 Cells test ditto .....                                       | 0 4 0   | 10 0 0    |
| 50   | 50 Cells signal ditto .....                                     | 0 4 0   | 10 0 0    |
| 10   | 10 Cells special fuze test .....                                | 0 5 0   | 2 10 0    |
|      | TOTAL .....   | ...     | £2417 2 0 |

Such prices to include packing and delivery free on board steamships proceeding by direct route to Hobart.

SCHEDULE C.—SCHEDULE OF PRICES.  
*Launceston Defences.—Submarine Mines and Apparatus.*

| No.         | Description.   | Rate. |     |     | Cost. |    |    |
|-------------|--|-------|-----|-----|-------|----|----|
|             |  | £     | s.  | d.  | £     | s. | d. |
| 9           | 100 lb. e.c. mines complete.....                                 | 20    | 10  | 0   | 184   | 10 | 0  |
| 120         | fathoms mooring line, 2-in steel wire rope for mooring .....     | 6     | 0   | 0   | 7     | 0  | 0  |
| 200         | fathoms tripping chain .....                                     | 20    | 6   | 8   | 40    | 13 | 0  |
| 20          | iron thimbles.....   | ...   | ... | ... | 0     | 3  | 4  |
| 30          | shackles .....   | ...   | ... | ... | 2     | 15 | 0  |
| 10          | iron junction boxes .....  | 0     | 7   | 0   | 3     | 10 | 0  |
| 2           | multiple junction boxes, with disconnectors, patt. '82 .....     | 8     | 0   | 0   | 16    | 0  | 0  |
| 1           | multiple junction box for one 4-core and four single cables..... | 2     | 10  | 0   | 2     | 10 | 0  |
| 354         | yards 4-core armoured cable .....                                | ...   | ... | ... | 66    | 0  | 0  |
| 880         | yards single armoured cable .....                                | ...   | ... | ... | 43    | 0  | 0  |
| 100         | platinum wire detonating fuze .....                              | ...   | ... | ... | 7     | 10 | 0  |
| 9           | relays for mines .....   | 2     | 0   | 0   | 18    | 0  | 0  |
| 9           | insulation plugs, with wires .....                               | 0     | 7   | 6   | 3     | 7  | 6  |
| 1           | field test table, for field and boat service, complete .....     | ...   | ... | ... | 22    | 10 | 0  |
| 1           | set firing resistance, coils complete, F.S. and S.M.....         | ...   | ... | ... | 8     | 0  | 0  |
| 2           | field sounders, in cases complete .....                          | ...   | ... | ... | 7     | 0  | 0  |
| 50          | cells of firing battery, at .....                                | 0     | 15  | 0   | 37    | 10 | 0  |
| 20          | cells of test battery .....                                      | 0     | 4   | 0   | 4     | 0  | 0  |
| 20          | cells of signal battery .....                                    | 0     | 4   | 0   | 4     | 0  | 0  |
| TOTAL ..... |  | ...   | ... | ... | £477  | 18 | 10 |

Such prices to include packing and delivery free on board steamship proceeding by direct route to Launceston.

SCHEDULE D.—SCHEDULE OF PRICES.  
*Hobart Defences.—Electric Light.*

| No.         | Description.   | Rate. |     |     | Cost. |    |    |
|-------------|--|-------|-----|-----|-------|----|----|
|             |  | £     | s.  | d.  | £     | s. | d. |
| 2           | Dynamo-electric machines, giving, when joined in one circuit, a light of 14,000 standard candles .....   | 112   | 0   | 0   | 224   | 0  | 0  |
| 2           | Electric lamps, self acting.....   | 30    | 0   | 0   | 60    | 0  | 0  |
| 1           | Silvered parabolic reflector, 22in., mounted in lantern, and fitted with cast iron frame with horizontal and vertical motions, tangent screws, and clamps, &c., complete ..... | ...   | ... | ... | 90    | 0  | 0  |
| 1           | Focus observer, Siemen's pattern .....   | ...   | ... | ... | 5     | 0  | 0  |
| 1           | Electric dynamometer.....  | ...   | ... | ... | 5     | 10 | 0  |
| 1           | Automatic shunt, large size (new patt.) .....  | ...   | ... | ... | 3     | 0  | 0  |
| 1           | Velocimeter .....  | ...   | ... | ... | 2     | 10 | 0  |
| 1           | Gun-metal switch .....   | ...   | ... | ... | 3     | 0  | 0  |
| 1000        | Yards insulated cable .....  | 10    | 0   | 0   | 100   | 0  | 0  |
| 50          | Feet carbon rods.....  | ...   | ... | ... | 25    | 8  | 4  |
| 2           | Spare sets of commutators.....   | 0     | 6   | 0   | 0     | 12 | 0  |
| 8           | Spare sets of brushes .....  | 0     | 6   | 3   | 2     | 8  | 0  |
| 2           | Spare carbon-holders .....   | 0     | 15  | 0   | 1     | 10 | 0  |
| 1           | Special steam engine, boiler, tank, and feed-pump complete, for steadily driving D.E. machines, 8 h.p. nominal .....   | ..    | ..  | ..  | 270   | 0  | 0  |
|             | Intermediate shafting, pulleys, fastenings, &c., secured to cast iron bed-plate, with belting complete .....   | ...   | ... | ... | 35    | 0  | 0  |
| TOTAL ..... |  | ...   | ... | ... | £827  | 18 | 4  |

Prices to include packing and delivery free on board steamship proceeding by direct route to Hobart.

*Colonial Secretary's Office, Hobart, 13th April, 1882.*

SIR,

I HAVE the honor to forward herewith draft conditions of Contract and Schedules of Prices, together with Draft Agreement between the Australian Electric Company and the Government for the supply of the requisite torpedo apparatus and stores.

I shall be glad if you will confer with Mr. Joseph on the subject, and if you jointly concur in the terms of the contract and the conditions, I shall feel obliged by your returning the documents at your early convenience in order that they may be duly copied, and the Contract sealed and signed.

I have, &c.

*Colonel SCRATCHLEY, R.E., C.M.G.,  
Public Works Office, Melbourne.*

WM. MOORE.



Melbourne, 22nd June, 1882.

*Contract for Torpedo Stores.*

SIR,

THE Company wish to close this matter, as they have most of the stores and articles approaching completion, and will shortly be able to commence delivery, and the whole of this order will be supplied by the end of September.

I shall be glad to know when the contract papers can be sent for signature.

I have, &amp;c.

The Hon. the Colonial Secretary, Hobart.

P. H. SCRATCHLEY, Colonel, R.E.

This Contract made the thirteenth day of July in the year of our Lord one thousand eight hundred and eighty-two BETWEEN the Australian Electric Company Limited carrying on business in Melbourne in Victoria (hereinafter and in the documents hereto annexed called the Contractors) of the one part and the Colonial Secretary of Tasmania (hereinafter called the Colonial Secretary which term shall include any Colonial Secretary for the time being) of the second part WITNESSETH that the Contractors hereby covenant with the Colonial Secretary to execute and perform the several works and supply all materials and everything of every kind respectively named described and referred to in the Conditions of Contract and Schedules of Prices hereto respectively annexed to be supplied by and on the part of the Contractors for the sums stated in the Schedules of Prices subject to the Conditions of Contract complete AND the Contractors hereby covenant with the Colonial Secretary and the Colonial Secretary hereby covenants with the Contractors to perform fulfil and observe comply with and submit to the conditions stipulations and requisitions and all matters and things contained and expressed or reasonably to be inferred from the said Conditions of Contract and the said Schedule of Prices and by and on the part of the Contractors and the Colonial Secretary respectively to be performed fulfilled and observed AND it is hereby mutually covenanted and agreed between the Colonial Secretary and the Contractors that the said Conditions of Contract and Schedules of Prices shall form part of this Contract and that the same shall be read and construed in the same manner and in all respects as if the said Conditions of Contract and Schedules of Prices were herein set forth IN WITNESS whereof the said Colonial Secretary has hereunto set his hand and seal and the Common Seal of the Australian Electric Company Limited has been affixed the day and year first hereinbefore mentioned.

Signed sealed and delivered by the within named  
 William Moore as Colonial Secretary as } WM. MOORE.  
 within mentioned in the presence of

B. TRAVERS SOLLY.

The Common Seal of the Australian Electric  
 Company was affixed hereto in the presence  
 and by direction of

THOS. BYRON MOORE,  
*The Officer appointed to affix the Seal.*

*Documents annexed to which the above Contract refers.*

- (1.) Conditions of Contract, A.
- (2.) Schedules of Prices, B, C, D.

Stamped in my presence. }  
 A. C. DOUGLAS. } (Stamp, 5s.)  
 14 Aug., 1882. }

## A.—CONDITIONS OF CONTRACT.

## INTERPRETATION CLAUSE.

*Contract* shall mean and include the whole of the documents subscribed or signed by the Contractor herein comprised or hereunto attached.

*Government* shall mean the Responsible Ministers of the Government for the time being.

*Consulting Military Engineer* shall mean the Consulting Military Engineer of the Tasmanian Government, or any person who may from time to time be appointed to perform the duties of that office.

*Superintending Officer* shall mean any officer or officers appointed to perform the duty by the Government of Tasmania.

*Contractor* shall mean and include the Australian Electric Company, Limited, carrying on business in Melbourne, in Victoria.

*Words* importing the singular number only shall include the plural number, and words importing the plural number shall include the singular number.

## SECURITY.

For the due fulfilment of this Contract in all its parts the Contractor will be required to give security to the amount of (£350) three hundred and fifty pounds sterling, by the joint and several bond of two of the Directors of the Company, and sign the formal Indenture of Contract, together with the Conditions of Contract and Schedule of Prices, as guarantee of his agreement thereto.

## MATERIALS AND WORKMANSHIP.

The whole of the materials used in the execution of this Contract to be the best of their respective kinds. All apparatus and equipment to be so constructed that the several parts of similar articles will agree and exactly fit those of any other, so as to require no numbering or arranging for putting together. The work to be executed in every detail with perfect finish, in the most workmanlike manner, and to the entire satisfaction of the Superintending Officer.

## PATTERN.

The whole of the apparatus to be of a pattern approved by the Consulting Military Engineer, and, where not specially provided for, to be of the latest Imperial pattern, as detailed in the Manual for Submarine Mining, <sup>7899</sup>/<sub>4816</sub>, Horse Guards, War Office, 12th June, 1880.

The Electric Light Apparatus to be of approved construction, furnished and fitted as detailed in Schedule D. attached, of the full candle power specified, and complete in every detail. The motor for actuating the dynamo-electric machines to be complete in every particular, thoroughly suitable for and capable of steadily driving the machines aforesaid, and for producing the full candle power specified continuously and without serious detriment to any of its parts. The engine to be of approved and simple construction, of the full power specified; all working parts to be easy of access and accurately fitted. The engine should be capable of being driven by any workman of ordinary intelligence. The boiler to be of approved construction, and completely furnished with all necessary mountings. The firebox to be entirely of the best Lowmoor or other iron equal thereto, and so constructed as to ensure economy in fuel, combined with compactness and durability.

## INSPECTION.

The Consulting Military Engineer shall be at liberty, when he so thinks fit, to examine all materials and apparatus during the process of manufacture, and to be present from time to time as aforesaid at the proving, testing, or otherwise examining of the said material and apparatus, and the Contractor shall afford him every facility and such tools and materials as he may need for the due performance of these duties.

## TESTING.

All apparatus which in the opinion of the Consulting Military Engineer shall require to be tested, shall be tested by proper machinery, and in accordance with the instructions laid down in the Manual for Submarine Mining aforesaid. All materials and apparatus shall sustain fairly the full required test both wholly and in part, be of the specified power and dimensions, and perfect in every particular.

## GUARANTEE.

The Contractor shall guarantee all tested apparatus; and if any of the guaranteed apparatus aforesaid should prove defective or become fractured or unserviceable through fair wear and tear within twelve months after the supply of the same, the Contractor shall supply other in the place thereof free of charge.

## EXTRA WORKS.

No claim for extra work shall be allowed unless such work shall have been expressly ordered in writing by the Consulting Military Engineer.

## EFFECT OF PRICES.

The sums and prices mentioned and set forth in the Schedules hereunto attached, subject to these conditions, shall be accepted by the Contractor in full satisfaction and discharged of and for all and every description of work referred to in these Conditions of Contract and Schedules attached, and for the ultimate completion of the work contracted for, perfect in every particular.

## DELIVERY.

The whole of the apparatus, machinery, and equipment, enumerated in the Schedules hereto attached shall be delivered by and at the expense of the Contractor free on board ship.

## CONTRACTOR TO BE ANSWERABLE FOR DELIVERY.

The Contractor shall be answerable for the safe custody and delivery of each and every article enumerated and included in this Contract, and for the careful package and stowage on board ship of the same; and he shall replace, free of charge, all material, apparatus, machinery, or equipment damaged through neglect in these respects. All articles to be insured at the cost of the Government.

## DISPUTES.

In case of any doubt, dispute, or difference of opinion arising with respect to the meaning of these conditions or Schedules of Prices, every such doubt, dispute, or difference of opinion shall be referred to and decided by the Consulting Military Engineer, whose decisions shall be made as required, and the decisions so made shall be binding, final, and conclusive upon all parties, notwithstanding any rule in court either in law or equity to the contrary.

## DISCHARGE OF CONTRACTOR.

The Government shall have full power to discharge the Contractor from the performance of this Contract, provided the workmanship or material is not satisfactory in the opinion of the Consulting Military Engineer.

## PAYMENT.

The Contractor shall be entitled to payment for his work in manner following (that is to say):—To instalments equal to 80 per cent. of the *primâ facie* value of the amount of work executed, and to the balance, whatsoever the same may be found to amount to, so soon as the responsibility of the Contractor shall cease and determine and shall have been entirely fulfilled, such instalment, or such balance only, to be considered due and owing on the receipt of a true and proper claim, the correctness of which shall have been certified to in writing by the Superintending Officer.

## COMPLETION.

The Contractor shall truly fulfil and satisfactorily complete his undertaking in all its parts on or before the First day of December, 1882, by which date he shall deliver, in a complete workmanlike and efficient condition, all apparatus, machinery, and equipment, and everything whatsoever enumerated, specified, or reasonably inferred to be included in this Contract, complete in every detail, and in accordance with the true spirit and intent of these Conditions.

## FAILURE TO COMPLETE.

If the Contractor shall fail in the due performance of this Contract by and at the time hereinbefore mentioned, he shall be liable to pay to the Government of Tasmania, as and for liquidated damages, the sum of (£1) one pound sterling per centum on the amount of the accepted tender for each and every week which may elapse between the appointed and actual time of completion and delivery provided for; or the Government may deduct the same from any money in their hands due or to become due to the Contractor.

## B.—SCHEDULE OF PRICES.

Contract No.

## Submarine Mines and Apparatus.

| No.             | Description.   | Rate.   | Cost.     |
|-----------------|--|---------|-----------|
|                 |  | £ s. d. | £ s. d.   |
| 45              | 100 lbs. E. C. mines, with works complete .....                    | 20 10 0 | 922 10 0  |
| 700             | Fathoms 2-inch steel wire rope for mooring .....                   | 6 0 0   | 42 0 0    |
| 1000            | Fathoms $\frac{3}{4}$ -inch tripping chain .....                   | 20 6 8  | 203 6 8   |
| 100             | Iron thimbles .....  | ...     | 0 12 6    |
| 150             | Iron shackles .....  | ...     | 12 10 0   |
| 51              | Iron connecting boxes, complete .....                              | 0 7 0   | 17 17 0   |
| 12              | Multiple junction boxes, with disconnectors, patt. '82 .....       | 8 0 0   | 96 0 0    |
| 4               | Multiple junction boxes for (one) 4-core and 4 single cables ..... | 2 10 0  | 10 0 0    |
| 1               | Mile 4-core armoured cable .....                                   | ...     | 330 0 0   |
| 2 $\frac{1}{2}$ | Miles single armoured cable .....                                  | 85 0 0  | 212 10 0  |
| 1               | Cable drum $\frac{1}{2}$ -knot 4-core cable .....                  | ...     | 45 0 0    |
| 1               | Cable drum $\frac{1}{2}$ -knot single cable .....                  | ...     | 30 0 0    |
| 100             | Platinum wire detonating fuzes .....                               | ...     | 7 10 0    |
| 100             | Platinum wire disconnecting fuzes .....                            | ...     | 5 0 0     |
| 3               | Shutter signalling apparatus .....                                 | 20 10 0 | 61 10 0   |
| 1               | Set of test table fitted complete (Imp. patt.) .....               | ...     | 14 10 0   |
| 1               | Astatic galvanometer, in case complete .....                       | ...     | 5 0 0     |
| 3               | Galvanometers and batteries, for boat service, ditto .....         | 4 0 0   | 12 0 0    |
| 2               | Common ditto, ditto .....  | 2 5 0   | 4 10 0    |
| 2               | 3-coil detector galvanometer complete .....                        | 3 5 0   | 6 10 0    |
| 1               | Reflecting ditto, with shunts complete .....                       | ...     | 15 0 0    |
| 2               | Sets firing resistance coils, complete F.S. and S.M. ....          | 8 0 0   | 16 0 0    |
| 6               | Firing keys .....  | 1 10 0  | 9 0 0     |
| 4               | Retardation firing keys .....                                      | 2 5 0   | 10 0 0    |
| 2               | Reversing keys .....   | 3 10 0  | 7 0 0     |
| 45              | Relays for mines .....   | 2 0 0   | 90 0 0    |
| 45              | Insulation plugs, with wires .....                                 | 0 7 6   | 14 12 6   |
| 1               | Test table for field and boat service complete .....               | ...     | 22 10 0   |
| 3               | Battery switches .....   | 2 5 0   | 6 15 0    |
| 100             | Single binding screws .....  | 0 1 0   | 5 0 0     |
| 100             | Double ditto ditto .....   | 0 1 4   | 6 13 4    |
| 1               | Firing observing arc .....   | ...     | 45 0 0    |
| 2               | Morse sounders .....   | 2 15 0  | 5 10 0    |
| 4               | Telephones .....   | 1 0 0   | 4 0 0     |
| 2               | Morse keys .....   | 1 5 0   | 2 10 0    |
| 2               | Field sounders, in case, complete .....                            | 3 10 0  | 7 0 0     |
| 2               | Platinum wire-clips, on stand .....                                | 1 5 0   | 2 10 0    |
| 25              | lbs. India rubber solution .....                                   | 0 2 0   | 2 10 0    |
| 25              | lbs. India rubber tape, $\frac{1}{2}$ inch .....                   | 0 7 0   | 8 15 0    |
| 3               | Sets jointing tools, complete .....                                | 3 0 0   | 9 0 0     |
| 2               | Cable jointing vyces .....   | 12 0 0  | 24 0 0    |
| 25              | Insulated plates with double binding screws .....                  | 0 3 0   | 3 15 0    |
| 3               | Sets soldering apparatus .....                                     | 1 0 0   | 3 0 0     |
| 1               | Cable condenser .....  | ...     | 6 10 0    |
| 1               | Dynamo quantity exploder (patt. '81) .....                         | ...     | 29 5 0    |
| 100             | Cells firing battery, at .....                                     | 0 15 0  | 75 0 0    |
| 50              | Cells test ditto .....   | 0 4 0   | 10 0 0    |
| 50              | Cells signal ditto .....   | 0 4 0   | 10 0 0    |
| 10              | Cells special fuze test .....                                      | 0 5 0   | 2 10 0    |
| TOTAL .....     |  | ...     | £2492 2 0 |

Such prices to include packing and delivery free on board steamships proceeding by direct route to Hobart.

## C.

*Submarine Mines and Apparatus.*

| No. | Description.   | Rate. |     |     | Cost.      |    |    |
|-----|--|-------|-----|-----|------------|----|----|
|     |  | £     | s.  | d.  | £          | s. | d. |
| 9   | 100 lbs. electro-contact mines, with works complete .....      | 20    | 10  | 0   | 184        | 10 | 0  |
| 120 | Fathoms 2-inch wire rope for mooring .....                     | 6     | 0   | 0   | 7          | 0  | 0  |
| 200 | Fathoms tripping chain .....                                   | 20    | 6   | 8   | 40         | 13 | 4  |
| 20  | Iron thimbles .....  | ...   | ... | ... | 0          | 3  | 0  |
| 30  | Iron shackles .....  | ...   | ... | ... | 2          | 15 | 0  |
| 10  | Iron junction boxes .....                                      | 0     | 7   | 0   | 3          | 10 | 0  |
| 2   | Multiple junction boxes, with disconnectors (patt. '82) .....  | 8     | 0   | 0   | 16         | 0  | 0  |
| 1   | Multiple junction for (1) one 4-core and 4 single cables ..... | ...   | ... | ... | 2          | 10 | 0  |
| 354 | Yards 4-core armoured cable .....                              | ...   | ... | ... | 66         | 0  | 0  |
| 880 | Yards single armoured cable .....                              | ...   | ... | ... | 43         | 0  | 0  |
| 100 | Platinum wire detonating fuses .....                           | ...   | ... | ... | 7          | 10 | 0  |
| 9   | Relays for mines .....   | 2     | 0   | 0   | 18         | 0  | 0  |
| 9   | Insulation plugs, with wires .....                             | 0     | 7   | 6   | 3          | 7  | 6  |
| 1   | Test-table for field and boat service complete .....           | ...   | ... | ... | 22         | 10 | 0  |
| 1   | Set firing resistance coils, complete, F.S. and S.M. ....      | ...   | ... | ... | 8          | 0  | 0  |
| 12  | Field sounders, in cases complete .....                        | 3     | 10  | 0   | 7          | 0  | 0  |
| 50  | Cells firing battery .....                                     | 0     | 15  | 0   | 37         | 10 | 0  |
| 20  | Cells test battery .....                                       | 0     | 4   | 0   | 4          | 0  | 0  |
| 20  | Cells signal battery .....                                     | 0     | 4   | 0   | 4          | 0  | 0  |
|     |  |       |     |     | £477 18 10 |    |    |

Such prices to include packing and delivery free on board steamship proceeding direct route to Hobart.

## D.

*Electric Light and Motor.*

| No.  | Description.   | Rate. |     |     | Cost.     |    |    |
|------|--|-------|-----|-----|-----------|----|----|
|      |  | £     | s.  | d.  | £         | s. | d. |
| 2    | Dynamo-electric machines, giving, when joined in one circuit, a light of 14,000 standard candles .....   | 112   | 0   | 0   | 224       | 0  | 0  |
| 2    | Electric lamps, self acting .....  | 30    | 0   | 0   | 60        | 0  | 0  |
| 1    | Silvered parabolic reflector, 22 in., mounted in lantern, and fitted with cast iron frame, with horizontal and vertical motions, tangent screws, and clamps complete ... | ...   | ... | ... | 90        | 0  | 0  |
| 1    | Focus observer, Siemen's pattern .....   | ...   | ... | ... | 5         | 0  | 0  |
| 1    | Electric dynamometer, Siemen's pattern .....   | ...   | ... | ... | 5         | 10 | 0  |
| 1    | Automatic shunt, large size, new pattern .....   | ...   | ... | ... | 3         | 0  | 0  |
| 1    | Velocimeter .....  | ...   | ... | ... | 2         | 10 | 0  |
| 1    | Gun-metal switch .....   | ...   | ... | ... | 3         | 0  | 0  |
| 1000 | Yards insulated cable .....  | 10    | 0   | 0   | 100       | 0  | 0  |
| 500  | Feet carbon rods .....   | ...   | ... | ... | 25        | 8  | 4  |
| 2    | Spare sets commutators .....   | 0     | 6   | 0   | 0         | 12 | 0  |
| 8    | Spare sets commutator brushes .....  | 0     | 6   | 0   | 2         | 8  | 0  |
| 2    | Spare carbon-holders .....   | 0     | 15  | 0   | 1         | 10 | 0  |
| 1    | Special steam engine, boiler, tank, and feed-pump complete, for steadily driving the dynamo-electric machines, 8 h.p. nominal .....                                      | ...   | ... | ... | 270       | 0  | 0  |
|      | Intermediate shafting, pulleys, &c., secured to cast iron bed-plates, with belting complete .....  | ...   | ... | ... | 35        | 0  | 0  |
|      |  |       |     |     | £827 18 4 |    |    |

Prices to include packing and delivery free on board steamship proceeding by direct route to Hobart.

## APPENDIX I.

Staff Office, 1st August, 1882.

SIR,

WITH reference to the enclosed account for torpedo stores, shipped per s.s. *Southern Cross* and received this day, from the Australian Electric Company, I have the honor to report that the whole of the articles have been received in good condition and perfect, with the following exceptions,—viz., the set of test-table fittings is incomplete. I have enclosed a list which shows the complete set, articles received, and those wanting to complete.

(56) fifty-six binding screws will also be required to be supplied for the remainder of the electrical apparatus, as they cannot properly be said to be complete without them. It is a trifling deficiency, but the screws, being of a special pattern, are not easily obtained.

The spare stores for the engine, value £10 15s., are not included in the Schedule, and consequently will have to come under the head of extra work, and a certificate furnished that they are necessary, and should not be included in the contract price, by the Consulting Military Engineer. There is really no doubt of this, but it is as well to adhere strictly to the agreement to avoid future misunderstanding.

I have, &c.

E. M. TUDOR BODDAM, Capt. and Staff Officer.

To the Hon. the Colonial Secretary.

Forwarded for the perusal and information of the Consulting Royal Engineer.  
COL. SCRATCHLEY, R.E., C.M.G., Public Works Office, Melbourne.

WM. MOORE.  
Aug., '82.

For the Honorable the Colonial Secretary.

Herewith an explanation from the Australian Electric Co., and my remarks thereon. Captain Boddam should now report.

P. H. SCRATCHLEY.  
18. 8. 82.

Melbourne, 27th July, 1882.

THE HON. THE COLONIAL SECRETARY, HOBART,

To THE AUSTRALIAN ELECTRIC COMPANY, LIMITED.

| To  | £   | s. | d. | £    | s. | d. |
|---|-----|----|----|------|----|----|
| 1 special steam engine, boiler, tank, and feed-pump complete, for driving Electric Light Machines ..... | 270 | 0  | 0  |      |    |    |
| 2 cable-jointing vyces at £12.....  | 24  | 0  | 0  |      |    |    |
| 820 fathoms 2-in. steel-wire rope at £6 .....   | 49  | 4  | 0  |      |    |    |
| 1200 ditto $\frac{3}{4}$ -in. tripping chain at £20 6s. 8d. ....  | 244 | 0  | 0  |      |    |    |
| 14 multiple junction disconnecter boxes at £8 .....   | 112 | 0  | 0  |      |    |    |
| 5 ditto boxes for 4-core at 50s. ....   | 12  | 10 | 0  |      |    |    |
| 61 iron connecting boxes at 7s. ....  | 21  | 7  | 0  |      |    |    |
| 54 base plugs at 7s. 6d. ....   | 20  | 5  | 0  |      |    |    |
| 6 firing keys at 30s. ....  | 9   | 0  | 0  |      |    |    |
| 4 retardation firing keys at 45s. ....  | 9   | 0  | 0  |      |    |    |
| 2 reversing keys at 70s. ....   | 7   | 0  | 0  |      |    |    |
| 1 set test-table fittings .....   | 14  | 10 | 0  |      |    |    |
| 3 battery switches at 45s. ....   | 6   | 15 | 0  |      |    |    |
| 2 Morse sounders at 55s. ....   | 5   | 10 | 0  |      |    |    |
| 2 Morse keys at 25s. ....   | 2   | 10 | 0  |      |    |    |
| 2 platinum wire clips, 25s. ....  | 2   | 10 | 0  |      |    |    |
|   |     |    |    | 810  | 1  | 0  |
| Extra spare stores, being wearing parts of steam engine—  |     |    |    |      |    |    |
| 2 pairs of main shaft brasses .....   | 3   | 18 | 6  |      |    |    |
| 1 pair large end connecting rod.....  | 2   | 0  | 0  |      |    |    |
| 1 set piston rings and springs .....  | 1   | 0  | 0  |      |    |    |
| 1 set furnace bars .....  | 3   | 9  | 0  |      |    |    |
| 6 gauge glasses and washers .....   | 0   | 7  | 6  |      |    |    |
|   |     |    |    | 10   | 15 | 0  |
|   |     |    |    | £820 | 16 | 0  |

Sent for shipment by s.s. *Southern Cross*, per Hobart, cases marked A E C within diamond—A E C.

THE HON. THE COLONIAL SECRETARY, HOBART,

To THE AUSTRALIAN ELECTRIC COMPANY, LIMITED.

| To  | £   | s. | d. |
|---|-----|----|----|
| 5 drums for 4-core and single-core cable, at £5.....        | 25  | 0  | 0  |
| Spare stores for steam engine as per previous invoice ..... | 10  | 15 | 0  |
|   | £35 | 15 | 0  |

Melbourne, 10th August, 1882.

Torpedo Stores, Hobart.

*Test-table Fittings.*—Binding screws, terminals, and platinum-wire bridge charged in separate items. (See Schedule.)

56 *Binding Screws.*—I do not know what this refers to. Please ask Captain Boddam for particulars, and for what purpose the screws are required.

*Spare Stores for Engine.*—These stores were sent out from England with the engine as being necessary in case of accident, and it was thought advisable to send them on to Hobart.\* Colonel Scratchley concurred verbally with this.

ROBERT E. JOSEPH.

Sydney, Australian Club, 8. 8. 82.

Tasmanian Contract.

SIR,  
OBLIGE me with immediate replies to the enclosed papers from Hobart.

Yours faithfully,

P. H. SCRATCHLEY.

Manager Australian Electric Co., Melbourne.

Mr. Joseph's remarks forwarded.

To Col. Scratchley.

H. BYRON MOORE.

\* I did, and omitted one article—1 firing observing arc, £45—to meet this extra cost.—P. H. S.

LIST of Test-table Fittings.

August 1st, 1882.

| Articles.   | Supplied. | Wanting to complete. | Required by Regulation. |
|---|-----------|----------------------|-------------------------|
| Bridge platinum wire.....   | —         | 1                    | 1*                      |
| Discs insulated for terminals, with binding-screws and insulated plug ..... | 3         | —                    | 3                       |
| Plates { Commutator—15 terminal .....                                       | —         | 1                    | 1                       |
| { 9 plate with binding screws .....   | 1         | —                    | 1                       |
| { Insulating square with binding-screw and 3 spring plugs.....              | 6         | 6                    | 12                      |
| Plugs, solid { With binding screws .....                                    | 6         | 6                    | 12                      |
| { With ebonite head .....   | 3         | 9                    | 12                      |
| Screws, brass-binding .....   | —         | 100                  | 100                     |
| Terminals, double.....  | —         | 12                   | 12                      |

\* With the test-table.

APPENDIX K.

The Australian Electric Company, Limited, Melbourne, 14th August, 1882.

SIR,  
HEREWITH I have the pleasure of forwarding the Bond between Messrs. Fehon and Kernot and your Government, duly signed.

Yours faithfully,  
H. BYRON MOORE.

The Hon. the Colonial Secretary, Hobart.

Know all Men by these presents that we William Meeke Fehon of Collins-street West in the City of Melbourne in the Colony of Victoria Gentleman one of the Directors of the Australian Electric Company Limited and William Charles Kernot of the Melbourne University in the said Colony Esquire also a Director of the said Company are jointly and severally held and firmly bound to the Honorable William Moore now holding the office of Colonial Secretary of the Colony of Tasmania and his successor or successors in the said office in the sum of Three hundred and fifty Pounds to be paid to the said Colonial Secretary his successor or successors for the due payment whereof we hereby bind ourselves and each of us our and each of our heirs executors administrators and every of them jointly and severally firmly by these presents.

Sealed with our Seals.

Dated this twelfth day of August in the year of our Lord one thousand eight hundred and eighty-two.

WHEREAS by a certain Contract made the day of one thousand eight hundred and eighty- BETWEEN the Australian Electric Company Limited (thereinafter called the Contractors) of the one part and the Colonial Secretary of Tasmania for the time being (thereinafter called the Colonial Secretary) of the second part the Contractors did covenant with the Colonial Secretary to execute and perform the several works and supply all materials and everything of every kind respectively named described and referred to in the Conditions of Contract and Schedules of Prices thereto respectively annexed to be supplied by and on the part of the Contractors for the sums stated in the Schedules of Prices subject to the Conditions of Contract complete AND the Contractors did thereby covenant with the Colonial Secretary and the Colonial Secretary did thereby covenant with the Contractors to perform fulfil and observe comply with and submit to the conditions stipulations and requisitions and all matters and things contained and expressed or reasonably to be inferred from the said Conditions of Contract and the said Schedules of Prices and by and on the part of the Contractors and the Colonial Secretary respectively to be performed fulfilled and observed AND it was thereby mutually covenanted and agreed between the Colonial Secretary and the Contractors that the said Conditions of Contract and the Schedules of Prices should form part of such Contract and that the same should be read and construed in the same manner and in all respects as if the said Conditions of Contract and Schedules of Prices were therein set forth Now the condition of the above written Bond or obligation is such that if the said Australian Electric Company Limited shall well and faithfully perform fulfil and keep all and every the terms provisions covenants agreements in the said Contract contained and agreed to be by it performed and carried out and if the said William Meeke Fehon and William Charles Kernot their and each of their heirs executors and administrators shall from time to time and at all times hereafter save defend keep harmless and indemnified the said William Moore Colonial Secretary or his successor or successors of from and against all losses costs charges and expenses which they or either of them respectively shall or may sustain or be put to for or by reason or means or on account of the non-performance of all or any of the terms provisions covenants and agreements in the said Contract contained and agreed to be by them the Contractors performed and carried out and in such manner that the said William Meeke Fehon and William Charles Kernot and their and each of their respective heirs executors and administrators shall or may be answerable to the said William Moore Colonial Secretary and his successor or successors for such losses costs charges and expenses in such manner and in the same degree as if the said William Meeke Fehon and William Charles Kernot had been a party or parties to the said Contract and had been thereby constituted a Contractor therein and had entered into the covenants and agreements therein contained and no further then the above written Bond or obligation to be void and of no effect otherwise to remain in full force and virtue.

Signed sealed and delivered by the said William } W. M. FEHON.  
Meeke Fehon and William Charles Kernot }  
in the presence of } W. C. KERNOT.

H. BYRON MOORE.

Arrived in Tasmania within sixty days, and stamped in my presence this twenty-ninth }  
day of August, 1882. } (Stamp, 5s.)  
G. PATTEN ADAMS, Collector of Stamp Duties.

## APPENDIX L.

Staff Office, 26th September, 1882.

SIR, IN continuation and in further explanation of my letter, 26th August, 1882—

*Test Table Fittings.*—There is no question as to the quality of the articles supplied, which is everything that could be desired, nor as to the price, which is very reasonable. The schedule provides for a complete set at a certain price (in my opinion sufficient), and a complete set ought therefore to be supplied, or a rebate made for the articles charged extra.

*Cable Drums.*—Considering that we have other drums of a proper description, I do not think the wooden drums supplied would be of use. The question is, could the cable, with proper regard to safety, have been packed more cheaply?—I think not.

I have, &amp;c.

E. M. TUDOR BODDAM, *Captain and Staff Officer.*

The Hon. the Chief Secretary.

FORWARDED to Colonel Scratchley for his consideration and decision.

COL. SCRATCHLEY, C.M.G., R.E., *Public Works Office, Melbourne.*B. TRAVERS SOLLY, *Under Secretary.*  
27th Sept., '82.

I PROPOSE looking into this matter when I visit Hobart.

P. H. SCRATCHLEY, *Col., R.E.*  
15. 10. 82.

Under Secretary.

## APPENDIX M.

Hobart, 1st November, 1882.

## ORDER FOR TORPEDO BOAT.

SIR,

(1.) OUT of the sum of £10,700 voted by Parliament for "armament of batteries and torpedo boat," the sum of £3490 should be appropriated towards the purchase of the boat, estimated cost £3150, and freight £340, the latter sum being approximate only; £3150 is the amount charged by Messrs. Thornycroft & Co., the builders to the New Zealand Government, which has recently ordered four of these boats. The Victorian Government have also ordered two boats of the same size, and one larger one, from the same firm.

(2.) I annex a draft specification for the boat, accompanied by a drawing of same, being design 1073, representing the design approved for the New Zealand boats.

(3.) I recommend that a copy of the specification be forwarded to the Agents in London for the Tasmanian Government, with instructions to enter forthwith into a contract with Thornycroft & Co. for the supply of the torpedo boat. The Agents should be requested to consult the Agents-General for New Zealand and Victoria, who, no doubt, would show the Tasmanian Agents their contracts. The same conditions should be included in the Tasmanian Contract, and the design and building of the boat conducted under Admiralty supervision.

(4.) A report as to the proposed mode of sending the boat to Tasmania should be called for, and in this matter also the Tasmanian Agents had better be guided by what has been settled for New Zealand and Victoria.

I have, &amp;c.

P. H. SCRATCHLEY.

The Hon. the Chief Secretary, Hobart.

*SPECIFICATION to govern the supply of a Second Class Spar Torpedo Boat.*

THE boat to be of a pattern similar to that supplied to Her Majesty's Admiralty, and to be capable of maintaining a speed of 17 knots, being of the following dimensions:—Length, 63 ft.; beam, 7 ft. 6 in.; draught, 3 ft. 4 in.

It is to be fitted with a single spar torpedo in the bow, and battery complete, the torpedo being capable of being discharged by contact or at the will of the operator.

The boat to be built of steel, galvanised, with boilers having a steel shell and internal tubes, and firebox of Lowmoor iron.

The engines to be of the direct acting compound type, capable of developing 150 i.h.p., and fitted with pumps and surface condenser, similar, in all respects, to those supplied to the English Admiralty.

The boat is to be furnished with two balanced rudders, and to turn equally well going ahead or astern, to be fitted so as to exhaust below the water-line, and rendered invisible at night by substituting smoke-ports, controllable by the steersman, for funnels.

*General Conditions.*

The whole work to be subject to the inspection and approval of an officer appointed by Her Majesty's Admiralty, and to fulfil the following conditions within reasonable manufacturing limits.

The whole of the forgings to be perfectly sound, clean, and free from all defects and flaws of all kinds. All ironwork not named to be of Best Best Staffordshire, or equal quality.

The castings to be sound, clean, and free from blow-holes.

The timber to be sound, free from knots and objectionable shakes; to be thoroughly seasoned and free from sap.

All surfaces in contact to be well fitted and coated before being secured.

The whole to be completed in a thoroughly workmanlike manner, and in general accordance with the design No. 1073 hereto annexed; and, before being taken over by the Agents for Tasmania, to be passed by the Admiralty officers.

P. H. SCRATCHLEY.  
1. 11. 82.

## CONTRACT WITH AUSTRALIAN ELECTRIC COMPANY.

I recommend that a letter be written to the Company embodying the following points:—

(a.) That the Government is unable to admit the charge of £25 for the five drums for the cable, as they are practically packing-cases, without which the cable could not have been sent out without risk of injury. The drums are of no use to the Government, as the cable is to be coiled in the tank.

(b.) As to the test-table fittings, the Government consider that a complete set should be supplied, in accordance with the terms and Schedule of Contract, the Imperial Regulation pattern being followed; or the Company should make a rebate for the articles charged extra.

In the same letter I recommend that the attention of the Company should be drawn to the pattern of the electro-contact mines, a copy of Captain Boddam's letter of the 3rd November being forwarded to the Company (attached and marked A.)

P. H. SCRATCHLEY.  
3. 11. 82.

*Under Secretary.*

*Staff Office, 3rd November, 1882.*

SIR,

I HAVE the honor to point out that the pattern of Submarine Mine supplied by the Australian Electric Company is only suitable for a very small portion of the torpedo defence of this harbour. The water is very deep, and requires a Mark IV. mine. This is clearly pointed out as necessary in the Manual for Submarine Mining, and the contract provides that only the pattern required by the Imperial Regulation, as provided for therein, is to be supplied.

It would be well to distinctly inform the Company that no more mines of this pattern can be received.

I have, &c.

E. M. TUDOR BODDAM, *Captain and Staff Officer.*

*The Hon. the Chief Secretary.*

*Staff Office, 6th March, 1883.*

SIR,

I HAVE the honor to inform you that the Australian Electric Company, contrary to instructions conveyed in your letter of the 15th November last, and contrary to their own expressed intentions,—*vide* letter from the Secretary, 22nd November, 1882,—have forwarded (37) thirty-seven torpedo cases of the wrong pattern.

It is needless to point out that as this kind of mine is only of use in water of a depth not exceeding five (5) fathoms, that, even if properly constructed, it is unsuitable for submarine defence of this harbour.

The attention of the Company was drawn to this fact, with the concurrence of Colonel Scratchley, so that the pattern of mine cannot have been approved by him.

The mines are badly constructed, and are, moreover, defective in the following particulars:—

(a.) They are constructed of unseasoned timber.

(b.) The joints have been left open instead of being secured with some suitable compound.

(c.) The cases have never been subjected to proper hydraulic pressure. The joints are opening even now.

I would recommend that the Government refuse to take delivery, and return them by the *Southern Cross*, which leaves to-morrow.

I have, &c.

E. M. TUDOR BODDAM, *Captain and Staff Officer.*

*The Hon. the Chief Secretary.*

*The Australian Electric Company, Limited, Melbourne, 4th April, 1883.*

SIR,

In reply to your favour of 7th March, I at once communicated the complaints contained in Captain Boddam's letter of 6th March, of which you kindly sent me copy, to Captain Joseph, our Engineer, who reports as follows.

*Electro Contact Mines.*

There appears to be a misunderstanding about the pattern. The mines sent are perfectly suitable for the purpose they were intended for, and if there is any serious fault in their construction I am not aware of it. The only departure from the pattern described in the "Manual" is the substitution of wrought iron instead of "cast" for the mouthpiece and the large cover (Mark 4) to afford facilities in loading, and these departures were made for reasons described further on. In the "Manual" four patterns of electro-contact mines are described,—two with wooden jackets and two of iron alone. In our tender and its acceptance there was nothing whatever to show that any other but those with the wood jackets were to be supplied; on the contrary, the different kinds of wood used for such purposes were under discussion by Colonel Scratchley, Captain Boddam, and myself; and I have now before me a memo. sent over by Captain Boddam with the specific gravity of various Tasmanian woods used for buoys, so that it was evident that, although not specified, there was no intention that the patterns with wooden jackets were not to be supplied.

In the Royal Engineer Extracts of Submarine Mining for 1881, experiments made with Marks 1 and 4 cases are thus described:—"Explosion of 100 lbs. gun cotton at a distance of 100 feet,—Mark 1, jacket slightly bulged, case dry and uninjured; Mark 4, case slightly indented, dry, and uninjured. Explosion of 500 lbs. gun-cotton, at a distance of 102 feet.—Mark 7, head of jacket bulged in, screws just started, otherwise uninjured, cast-iron mouth-piece fractured. Mark 4, head of case bulged in, open crack 2 inches wide, and rupture along rivets for 3 feet. *General Remarks on Cases.*—The weak part of Marks 1 and 2 is the cast-iron head. With Mark 4 mines are rendered unserviceable by sinking, and whilst the primer case remains dry, there is no means of finding this out from the test-room.

On the face of these, the latest experiments, together with others and our own experience in the matter, and the absence of anything to show that such pattern would be objected to, the whole of the cases were made, and I think a little consideration will show that the pattern supplied was the best for the purpose. Apart from my connection with the Company, I see no reason whatever that the mines should be rejected. There is no difficulty in laying, mooring, and keeping them in order in the Hobart waters in their proper and suitable positions, or any position where an electro-contact mine can be serviceable, and, as pointed out in my letter to Captain Boddam, in certain



parts of the river means would be taken by those who were engaged in laying them to render them serviceable in every part.

Trusting the above report will explain the matter to your satisfaction,

I have, &c.

*The Hon. the Chief Secretary.*

GEO. W. SELBY, JUN., *Manager.*

REFERRED to the Staff Officer for his observations.

WM. MOORE  
10th April, 1883.

*Staff Office, 12th April, 1883.*

SIR,

In reply to your Memo. dated 10th April, forwarding letter from the Secretary Australian Electric Company, I beg to point out that I objected to the pattern of mine merely on account of its want of buoyancy.

This I did not do merely on guesswork, although it is laid down in the specification for this pattern of mine that it should not be used beyond a depth of (5) five fathoms.

I weighed the mine and found its weight empty to be 635 lbs., and its displacement by measurement 940 lbs., leaving an available buoyancy of only 305 lbs. The weight of the charge, works, attachments, and 15 fathoms of cable and wire-rope, comes to 270 lbs., leaving, when loaded, an available buoyancy of only 35 lbs., against an available buoyancy of 71 lbs. in the English pattern of mine similarly loaded.

For this reason mainly I rejected the pattern of mine supplied.

I might add that, on receiving the further shipment of mines, to make certain of the correctness of my calculations, I rendered a mine watertight and loaded it; it sank readily with a weight of 310 lbs., showing my calculation was practically correct.

I lay great stress on the way the mines are jacketed. A mine jacketed under hydraulic pressure (2800 lbs.) and well caulked with marine glue and painted as the English pattern of mines are, will not only absorb very little water, but be a great protection against the explosive force of a counter mine; while, on the other hand, the mines supplied would perform neither of these duties.

I consider Baltic or Californian pine preferable to kauri, as they will absorb weight for weight far less water.

Unless the mines are provided with better and larger jackets (this could be done without any great expense), I do not think that they will be found suitable, nor would I undertake to pass them either as regards suitability of pattern or quality of workmanship.

I have, &c.

E. M. TUDOR BODDAM, *Captain and Staff Officer.*

*The Hon. the Chief Secretary.*

*The Australian Electric Company, Limited, Melbourne, 23rd April, 1883.*

SIR,

In reply to your letter of 14th April, I enclose copy of our Engineer's reply to Captain Boddam's letter of 12th April, copy of which was kindly forwarded me from your office. Captain Boddam is quite right with regard to the want of buoyancy for 15 fathoms, but it was understood on our part, after due discussion with General Scratchley, that the mines were to be laid in depths of from six to nine fathoms, and the buoyancy is ample for that depth.

With regard to the seasoning of the wood jackets, we are sure that the timber, when used, was in thoroughly good order; but I respectfully submit that no wood will stand in a climate like ours. There are in the possession of the Torpedo Department of this Colony torpedoes jacketed and corked in England, as described by Captain Boddam, but which have shrunk far more than ours have, or are ever likely to shrink. However, if Captain Boddam will state how much buoyancy he requires, we are quite willing to meet his views, our desire being to fulfil our contract to your entire satisfaction.

Will you kindly forward me a cheque for 80 per cent. of the value of the other stores you have received?

Trusting we may soon come to a settlement of this question, involving as it does serious loss of interest on our side,

I am, &c.

*The Hon. the Chief Secretary, Hobart.*

GEORGE W. SELBY, JUN., *Manager.*

COPY OF CAPTAIN JOSEPH'S REPORT.

*Electro-Contact Mines, Hobart.*

I have read Captain Boddam's report on the E.C. cases supplied by this Company. From the figures he supplies it simply shows that while he has calculated for depths of 15 fathoms, my calculation was for from six to nine fathoms. The cases supplied have an excess of buoyancy to either Mark I. or II. cases described in the "Manual," when empty and without mooring lines or cable. It is a matter of regret that the particular pattern of mine or required buoyancy was not originally described; but as this Company can only be desirous of dealing equitably in the matter, I suggest that Captain Boddam be asked to state the amount of buoyancy he desires for the cases, and that the jackets be altered to provide for such buoyancy.

(Signed) ROBERT E. JOSEPH, A.S.T.E. & E., *Electrical Engineer, A. E. Co.*

April 23, 1883.

FORWARDED to the Staff Office.

H. E. SMITH, C. C.,  
*For Under Secretary, absent.*  
26th April, 1883.

COPIED and returned.

E. M. TUDOR BODDAM, *Captain and Staff Officer.*  
5th May, 1883.

*Staff Office, 4th May, 1883.*

SIR,

In reply to your Memo. *re* torpedo cases, I have the honor to report that I am making experiments to ascertain the least amount of buoyancy that would be necessary for the mines required for the Colony.

A certain number of mines will not require to be altered, and some half dozen or so will require an extra amount of buoyancy; and to avoid putting the Company to any unnecessary expense, I will give them full particulars as to the requirement of the case. In the meantime it would be desirable for the Company to inform the Government how and when they wish the mines to be returned for alteration, and thus avoid delay.

It is, of course, very unfortunate that this mistake has occurred, but I beg to point out that, before giving the order for the stores, the Government went to the expense of having an enlarged plan of the mine-field prepared by the Company's Engineer, so that it can hardly be attributed to a want of proper information that the mistake has occurred.

No account for 80 per cent. of stores supplied has been received that remains unpaid; but to avoid delay I have forwarded one, which could be signed on behalf of the Company, and a cheque forwarded for the amount.

The electric light apparatus is complete, and no account for the same has been yet received; besides which it would be impossible for me to give the necessary certificate until the remainder of the stores are supplied and the machine tested in a complete state by means of the dynamometer.

It is most desirable that the contract should be completed without further delay; the delivery of the balance of the stores is now overdue (6) six months, and we are being put to considerable inconvenience by their non-receipt.

I have, &c.

E. M. TUDOR BODDAM, *Captain and Staff Officer.*

*The Hon. the Chief Secretary.*

*The Australian Electric Company, Limited, Melbourne, 15th May, 1883.*

DEAR SIR,

In reply to your letter of 8th instant, and copy of Captain Boddam's letter of 4th instant enclosed therewith, kindly return the mines, requiring alteration to meet Captain Boddam's views, through Messrs. Wm. McCulloch & Co.'s agents, Messrs. Justin Brown & Co., instructing them to ship them to us by first steamer leaving Hobart for this port, collecting freight and insurance at this end.

Our Engineer informs me that the bulk of the balance of the stores overdue are now packed ready for shipment, but we have detained them pending your decision *re* altering the mines.

I am obliged by the voucher for £130 6s. 8d., which I now return duly signed.

When the whole of the stores are delivered, if you desire it, our Engineer, Mr. Joseph, will go over to Hobart, thoroughly explain the whole of the apparatus, and give some useful hints regarding the management of the electric light apparatus.

Yours, &c.

GEO. W. SELBY, JUN., *Manager.*

*The Hon. the Chief Secretary, Hobart.*

FORWARDED to the Staff Officer, who will be good enough to take steps for the return of the mines in the manner pointed out. The Staff Officer will also state whether he thinks it desirable that Mr. Joseph should come to Hobart.

*The Staff Officer.*

WM. MOORE.  
18th May, 1883.

*Hobart, 22nd June, 1883.*

SIR,

I HAVE the honor to point out the unsatisfactory manner in which the contract for the supply of Torpedo Stores is being carried out by the Australian Electric Company.

It is now more than six months since the date fixed for the completion of the contract, and upwards of £1200 worth of material is still unsupplied.

Six weeks ago (since which time there have been no less than nine (9) direct steamers to Hobart) the Company informed the Government that the balance of the stores were ready for shipment, and none whatever have been yet supplied.

It is contrary to the custom to extend contracts without enforcing the penalties contingent thereon, except in cases of fire, strikes, or causes beyond the control of the contractors; and as the Government are being put to considerable inconvenience by the delay, I would recommend that unless the whole of the stores are supplied (with the exception of the mine cases lately returned) within fourteen days, that the contract be terminated.

I have, &c.

E. M. TUDOR BODDAM, *Capt. & Staff Officer.*

*The Hon. the Chief Secretary.*

*Hobart, 23rd June, 1883.*

SIR,

In reply to your Memo. on telegram from Manager Australian Electric Company, herewith returned, I have the honor to forward specification for the guidance of the Company in constructing the mine cases to be supplied.

The Government have already clearly pointed out in what manner the mines supplied were defective, so that I am at a loss to understand why further information is required.

I have, &c.

E. M. TUDOR BODDAM, *Capt. & Staff Officer.*

*The Hon. the Chief Secretary.*

*SPECIFICATION to govern the supply of Thirty-five (35) One hundred pound (100-lb.) Electro-Contact Cases to be supplied to the Government of Tasmania.*

*Materials and Workmanship.*—The timber used to be well seasoned pine, free from defects, and having a specific gravity not higher than .575. The woodwork when completed to be kept in a properly covered shed, and not exposed to the weather before shipment. The whole of the workmanship to be of the best obtainable within ordinary manufacturing limits.

*Iron-work.*—The ironwork as supplied may be re-used without alteration, except that the long bolts connecting the top and bottom cross plates will have to be screwed to receive two nuts, one above and one below the lower cross plates, to prevent the jacket sliding on the removal of the lower nut.

*Jackets.*—The jackets to be built up of any convenient number of segments between nine and eighteen, running their entire length, and cemented together with marine glue. They shall be turned up in a lathe, and bound at the centre and ends by wrought-iron hoops. The whole to be subjected to a pressure of 2800 lbs. on the square inch in an hydraulic press, to ensure the joints fitting. The jackets of twenty-seven (27) of the mines to be of such a size that when the mine case and jacket are loaded with a weight of 350 lbs. they shall float. In the case of the balance (8) of the jackets, the buoyancy of the empty case and jacket complete shall be three hundred and ninety pounds (390 lbs.)

Chief Secretary's Office, Hobart, 29th June, 1883.

SIR,

I HAVE to call your attention to the Conditions of the Contract for the supply of certain Torpedo Stores between the Australian Electric Company and this Government, which provides, *inter alia*, that "the Contractor shall truly fulfil and satisfactorily complete his undertaking in all its parts on or before the 1st day of December, 1882, &c., &c.," and "failing such completion he shall be liable to pay to the Government of Tasmania as and for liquidated damages the sum of one pound (£1) sterling per centum on the amounts of the accepted tender for each and every week which may elapse between the appointed and actual time of completion and delivery, &c., &c."

It is now more than six months since the date fixed for the completion of the Contract, and upwards of £1200 of material is still unsupplied.

Moreover, six weeks ago the Government were informed that the balance of the stores were ready for shipment, since which time there have been nine direct steamers to Hobart, but no stores have been received.

Very considerable inconvenience has been experienced from the protracted delay in the fulfilment of their contract by the Company: and unless remaining stores are forwarded immediately, I shall be under the necessity of recommending the enforcement of the penalties which have accrued.

Your prompt attention to this matter is requested.

I have, &c.

WM. MOORE.

GEORGE W. SELBY, JUN., Esq., Manager of the Australian Electric Company, Limited, 28, Queen-street, Melbourne.

The Australian Electric Company, Limited, 28, Queen-street, Melbourne, 11th July, 1883.

SIR,

IN reply to your favours of the 27th and 29th June respectively, I have to say that the increased buoyancy desired by Captain Boddam is being provided for, and that the larger part of the £1200 alluded to in your letter of 29th June is for the Torpedo Cases now undergoing alteration. The balance of the stores are in hand, and the work is being pushed on. Kindly forward me some Government forms of account that I may draw for 80 per cent. of stores already supplied, and oblige

Yours faithfully,

GEORGE W. SELBY, JUN., Manager.

The Hon. the Chief Secretary, Hobart.

FORWARDED for the perusal and observations of the Staff Officer.

WM. MOORE.

18 July, 1883.

Staff Office, 20th July, 1883.

SIR,

IN reply to your Memo. on letter from Australian Electric Company, dated 11th July, the utmost value that could be placed on the mine cases returned for alteration would be about £200.

The Company appears to have delayed the contract merely to suit their own convenience, and I would therefore beg respectfully to suggest that unless the contract is completed (with the exception of the supply of the mine cases) during the current month, that it be terminated, and the stores ordered from England.

I have, &c.

E. M. TUDOR BODDAM, Capt. & Staff Officer.

The Hon. the Chief Secretary.

Chief Secretary's Office, Hobart, 24th July, 1883.

SIR,

I HAVE the honor to acknowledge the receipt of your letter of the 11th instant, in reply to mine of the 27th and 29th ultimo, in which you state that the larger part of the £1200 mentioned by me is for the torpedo cases now undergoing alteration.

Upon reference to the Staff Officer, he states that "the utmost value that could be placed on the mine cases returned for alteration would be about £200." The important fittings connected with those cases remain unsupplied, and there is no such necessary connection between the mine cases and the fittings as to warrant the supply of the latter being deferred.

You inform me that "the balance of the stores are in hand, and the work is being pushed on." I have so repeatedly received similar assurances from the Company without any approach to a fulfilment of the contract that the Government are compelled to notify for your information that unless the contract is completed during the month of August next the penalty will be strictly enforced.

I have, &c.

WM. MOORE.

GEORGE W. SELBY, JUN., *Esq., Manager of the Australian Electric Company, Limited, 28, Queen-street, Melbourne.*

IN my opinion the Government can enforce payment of the penalty of £1 per week, in accordance with the last clause of the conditions of contract. There is no provision in the conditions of contract authorising the Government to annul the contract by reason of undue delay on the part of the contracting company.

ROBT. P. ADAMS.  
28. 9. 83.

*The Chief Secretary.*

## A. -- CONDITIONS OF CONTRACT.

### INTERPRETATION CLAUSE.

*Contract* shall mean and include the whole of the documents subscribed or signed by the Contractor herein comprised or hereunto attached.

*Government* shall mean the Responsible Ministers of the Government for the time being.

*Consulting Military Engineer* shall mean the Consulting Military Engineer of the Tasmanian Government, or any person who may from time to time be appointed to perform the duties of that office.

*Superintending Officer* shall mean any officer or officers appointed to perform the duty by the Government of Tasmania.

*Contractor* shall mean and include the Australian Electric Company, Limited, carrying on business in Melbourne, in Victoria.

*Words* importing the singular number only shall include the plural number, and words importing the plural number shall include the singular number.

### SECURITY.

For the due fulfilment of this Contract in all its parts the Contractor will be required to give security to the amount of (£350) three hundred and fifty pounds sterling, by the joint and several bond of two of the Directors of the Company, and sign the formal Indenture of Contract, together with the Conditions of Contract and Schedule of Prices, as guarantee of his agreement thereto.

### MATERIALS AND WORKMANSHIP.

The whole of the materials used in the execution of this Contract to be the best of their respective kinds. All apparatus and equipment to be so constructed that the several parts of similar articles will agree and exactly fit those of any other, so as to require no numbering or arranging for putting together. The work to be executed in every detail with perfect finish, in the most workmanlike manner, and to the entire satisfaction of the Superintending Officer.

### PATTERN.

The whole of the apparatus to be of a pattern approved by the Consulting Military Engineer, and, where not specially provided for, to be of the latest Imperial pattern, as detailed in the Manual for Submarine Mining, <sup>7896</sup><sub>4816</sub> Horse Guards, War Office, 12th June, 1880.

The Electric Light Apparatus to be of approved construction, furnished and fitted as detailed in Schedule D. attached, of the full candle power specified, and complete in every detail. The motor for actuating the dynamo-electric machines to be complete in every particular, thoroughly suitable for and capable of steadily driving the machines aforesaid, and for producing the full candle power specified continuously and without serious detriment to any of its parts. The engine to be of approved and simple construction, of the full power specified; all working parts to be easy of access and accurately fitted. The engine should be capable of being driven by any workman of ordinary intelligence. The boiler to be of approved construction, and completely furnished with all necessary mountings. The firebox to be entirely of the best Lowmoor or other iron equal thereto, and so constructed as to ensure economy in fuel, combined with compactness and durability.

### INSPECTION.

The Consulting Military Engineer shall be at liberty, when he so thinks fit, to examine all materials and apparatus during the process of manufacture, and to be present from time to time as aforesaid at the proving, testing, or otherwise examining of the said material and apparatus, and the Contractor shall afford him every facility and such tools and materials as he may need for the due performance of these duties.

### TESTING.

All apparatus which in the opinion of the Consulting Military Engineer shall require to be tested, shall be tested by proper machinery, and in accordance with the instructions laid down in the Manual for Submarine Mining aforesaid. All materials and apparatus shall sustain fairly the full required test both wholly and in part, be of the specified power and dimensions, and perfect in every particular.

### GUARANTEE.

The Contractor shall guarantee all tested apparatus; and if any of the guaranteed apparatus aforesaid should prove defective or become fractured or unserviceable through fair wear and tear within twelve months after the supply of the same, the Contractor shall supply other in the place thereof free of charge.

### EXTRA WORKS.

No claim for extra work shall be allowed unless such work shall have been expressly ordered in writing by the Consulting Military Engineer.

## EFFECT OF PRICES.

The sums and prices mentioned and set forth in the Schedules hereunto attached, subject to these conditions, shall be accepted by the Contractor in full satisfaction and discharge of and for all and every description of work referred to in these Conditions of Contract and Schedules attached, and for the ultimate completion of the work contracted for, perfect in every particular.

## DELIVERY.

The whole of the apparatus, machinery, and equipment enumerated in the Schedules hereto attached shall be delivered by and at the expense of the Contractor free on board ship to the Port of Hobart.

## CONTRACTOR TO BE ANSWERABLE FOR DELIVERY.

The Contractor shall be answerable for the safe custody and delivery of each and every article enumerated and included in this Contract, and for the careful packing and stowage on board ship of the same; and he shall replace, free of charge, all material, apparatus, machinery, or equipment damaged through neglect in these respects. All articles to be insured at the cost of the Government.

## DISPUTES.

In case of any doubt, dispute, or difference of opinion arising with respect to the meaning of these conditions or Schedules of Prices, every such doubt, dispute, or difference of opinion shall be referred to and decided by the Consulting Military Engineer, whose decisions shall be made as required, and the decisions so made shall be binding, final, and conclusive upon all parties, notwithstanding any rule in court either in law or equity to the contrary.

## DISCHARGE OF CONTRACTOR.

The Government shall have full power to discharge the Contractor from the performance of this Contract provided the workmanship or material is not satisfactory in the opinion of the Consulting Military Engineer.

## PAYMENT.

The Contractor shall be entitled to payment for his work in manner following (that is to say):—To instalments equal to 80 per cent. of the *prima facie* value of the amount of work executed, and to the balance, whatsoever the same may be found to amount to, so soon as the responsibility of the Contractor shall cease and determine and shall have been entirely fulfilled, such instalment, or such balance only, to be considered due and owing on the receipt of a true and proper claim, the correctness of which shall have been certified to in writing by the Superintending Officer.

## COMPLETION.

The Contractor shall truly fulfil and satisfactorily complete his undertaking in all its parts on or before the First day of December, 1882, by which date he shall deliver, in a complete workmanlike and efficient condition, all apparatus, machinery, and equipment, and everything whatsoever enumerated, specified, or reasonably inferred to be included in this Contract, complete in every detail, and in accordance with the true spirit and intent of these Conditions.

## FAILURE TO COMPLETE.

If the Contractor shall fail in the due performance of this Contract by and at the time hereinbefore mentioned, he shall be liable to pay to the Government of Tasmania, as and for liquidated damages, the sum of (£1) one pound sterling per centum on the amount of the accepted tender for each and every week which may elapse between the appointed and actual time of completion and delivery provided for; or the Government may deduct the same from any money in their hands due or to become due to the Contractor.

Staff Office, 20th July, 1883.

SIR,

IN reply to Memo. on letter 17 July, Australian Electric Company, as I have already pointed out, the Electric Light plant is incomplete; there are no means of testing it yet supplied; only one of the lamps are to hand, and that one appears defective. It is quite impossible for me to certify that it is suitable for the purpose.

Unless the balance of the plant is at once supplied and the Company's Engineer sent to put it in order, I would recommend its return.

I have, &c.

E. M. TUDOR BODDAM, Capt. & Staff Officer.

The Hon. the Chief Secretary.

The Australian Electric Company, Limited, 28, Queen-street,  
Melbourne, 6th August, 1883.

SIR,

YOUR favours of 24th July to hand. By the *Esk*, which left this port on Wednesday last, were shipped forty-seven circuit-closer works, the remaining one, making forty-eight in all, will go forward with the thirty-five mine cases now undergoing alteration to meet the views of Captain Boddam. These "works" have been completed some time, but were kept at our factory packed and ready for shipment, pending the alterations to the cases. I enclose our account for 80 per cent. of the value of 13 complete mines, at £20 10s. each; also our account for 80 per cent. of the value of the Electric Light plant already delivered.

Yours faithfully,

GEO. W. SELBY, JUN., Manager.

The Hon. the Chief Secretary, Hobart.

FORWARDED to the Staff Officer.

B. TRAVERS SOLLY.

9 Aug. '83.

*The Australian Electric Company, Limited, 28, Queen-street,  
Melbourne, 16th August, 1883.*

SIR,

On the 14th instant six cases of Torpedo apparatus, consisting of electric light plant and contact discs and jointing tools, were shipped by Messrs. W. McCulloch and Co. to your address. The goods forwarded were as follows:—

|   | £           | s.        | d.       |
|---|-------------|-----------|----------|
| 1 silvered parabolic reflector, 22", in lantern, complete ..... | 90          | 0         | 0        |
| 1 Dynamometer.....  | 5           | 10        | 0        |
| 3 Boxes jointing tools, at £3.....                              | 9           | 0         | 0        |
|   | <u>£104</u> | <u>10</u> | <u>0</u> |

- 1 Focussing lamp } Returned after repairs.  
1 Part of jointing vyce }  
47 Contact discs, which should have accompanied the circuit-closer covers, but were packed in separate case in error at our works.

The reflector and apparatus require care in removing from the packing case. The surface of the reflector has been covered with wax to preserve it from damp. The wax must be carefully removed, so as not to scratch the surface.

In using the electro-dynamometer the centre and *thick* wire terminals are for powerful currents, and the following formula for use in this case gives the current in *ampères*; viz.— $\sqrt{\text{angle of torsion} \times 2.95} = \text{current in ampères}$ . The centre and *thin* wire terminals are for weak currents:— $\sqrt{\text{angle of torsion} \times 1.00} = \text{current in ampères}$ .

To use the instrument, proceed as follows:—Pour a little clean mercury in both holes in the woodwork, so as to make a perfect connection with the suspended wire coil. Adjust the coil to zero by means of the levelling screws and milled head, then if necessary bring the index hand to zero by shifting it by means of the small capstan-head screw; note that the coil swings freely. The milled head at the back is to raise and lower the coil. Care must be taken not to break the thread nor injure the wire spring. On passing a current through the coils, the centre one will be deflected; then turn the index hand by means of the milled head at the top until the coil hand returns to zero (360). Read off the angle through which the index hand has moved, and apply the above formula. Note:—This formula holds good for the spring as sent out only; any alteration in the spring will alter the value.

This shipment completes the electric light plant, with the exception of two items—the belting and one focus observer. With respect to the former, our Mr. Joseph addressed a private note in February last to Captain Boddam, suggesting that he should procure the requisite length at Hobart, as we do not know how much is required. Mr. Joseph tells me that up to the present he has not received any information as to the length required. With respect to the latter, its value is £5, and it will be sent you on the 28th instant. Each article we have supplied belonging to the electric light plant is complete in itself; we are therefore at a loss to understand the delay in payment of our account of 80 per cent. of the value of same. We require the money. Were such apparatus ordered from home, payment in full would be required on shipment of same, and no responsibility would be taken after the goods were on board the ship.

With regard to the statement in your letter of the 24th July, 1883, that "the utmost value that could be placed on the nine cases returned for alteration would be about £200," surely the Staff Officer must refer to the nine cases retained at Hobart, not to the thirty-five cases sent back to us for alteration to meet Captain Boddam's views. The timber in each case cost us £3 19s. in the rough, the ironwork £6, galvanising £1. The segments of the jackets had to be fitted together, ends fitted, the whole turned, cast-iron mouth-pieces made and fitted, bolts, &c., bringing up the bare cost in each case to rather over £15, or £550 for the 35 cases. With regard to sending our engineer over to prove the efficiency of the plant, I may say that the plant was thoroughly tested (with the exception of the steam-engine, about which there can be no mistake) before it left our works, and that competent authorities outside our Company can testify to its efficiency. Should, however, your Government desire some information on the subject, we are quite willing that our Engineer should go over to Hobart and prove its efficiency, but at the expense of your Government.

The 200 platinum wire fuses await shipment, but up to the present time we have not been able to get a vessel to take them. The fuses are detonating. Can you suggest any means of forwarding them to Hobart, or help us in this matter?

I enclose our account for 80 per cent. of the value of goods forwarded by the *Esk* on the 14th instant, and shall be obliged by the receipt of a draft in payment of this account and the one forwarded you on the 6th instant, together amounting to £447 2s. 8d.

Believe me, &c.

GEO. W. SELBY, JUN., *Manager.*

*The Hon. the Chief Secretary, Hobart.*

P.S.—Thank you for the telegram *re* contact discs.—G. S.

*Staff Office, 21st September, 1883.*

SIR,

I HAVE the honor to report that the circuit-closing apparatus received from the Australian Electric Company is defective in the following particulars:—

The wooden discs perforated for the detonation have been drilled out too small; every one of them will have to be enlarged.

The larger proportion of the contact discs have been eaten away considerably with rust. In some cases the power of the spindle has been reduced, which will necessitate the weight of the top being reduced to correspond. No spiral springs, friction plates, or washers have been supplied with them.

The above alterations should be made at the expense of the Company before payments are made.

I have, &c.

E. M. TUDOR BODDAM, *Capt. & Staff Officer.*

*The Hon. the Chief Secretary.*

Staff Office, 21st September, 1883.

Sir,

I HAVE the honor to again point out the necessity for the Electric Company sending over at once an Engineer to put the electric light in order, and also to furnish full instructions for the use of the apparatus of special pattern which have been supplied.

It was distinctly agreed by the Company before entering into the contract that the Company's Engineer should be sent over, charging only actual travelling expenses.

In all contracts where deviations are made from the specified patterns, full working drawings and instructions are forwarded; and as a large quantity of the apparatus supplied is not according to the pattern used in the Imperial service, it is necessary that proper working drawings and instructions should be supplied, or personal instruction given.

I have, &amp;c.

E. M. TUDOR BODDAM, Capt. &amp; Staff Officer.

The Hon. the Chief Secretary.

Staff Office, 21st September, 1883.

Sir,

I HAVE the honor to forward herewith a Return showing the exact state of the contract entered into by the Government with the Australian Electric Company for the supply of submarine mining stores and apparatus.

The Company asked for nine (9) months to complete their contract in. That time has already been considerably more than doubled, and yet stores to the extent of £1020 5s. have not been supplied, and others to the value of £284 are still in a defective state.

Under the final clause—"Failure to complete"—it is provided that one pound (£1) per centum on the amount of the accepted contract may be deducted from any money due or to become due to the contractor for each and every week which shall elapse between the appointed and actual time of completion. Forty-two (42) weeks at £37 4s. 7d. would give £1563 12s. 6d., which amount we are enabled to deduct from the amounts due or becoming due to the contractors.

I therefore beg to suggest that as the Company do not appear desirous of carrying out the wishes of the Government in the matter, that the whole of the stores unsupplied be ordered by the first mail in October from England, and that electric light plant also be ordered, unless that supplied by the Company is proved to be satisfactory by that time. The cost of the above could be deducted from the money due or to become due to the contractor. This will leave the Company at liberty to supply the remainder of the stores or not as they may desire.

If by any chance the contract were completed before the arrival of the order in England, it might be countermanded by telegram at the expense of the Company.

I have, &amp;c.

E. M. TUDOR BODDAM, Capt. &amp; Staff Officer.

The Hon. the Chief Secretary.

## RETURN of Submarine Mining Apparatus ordered from the Australian Electric Company, Melbourne.

| Description of Article.                            | Number of each article ordered. | Number received. | Wanting to complete. | Remarks.   |
|--|---------------------------------|------------------|----------------------|--|
| 100 lbs. E. C. mines, with works complete .....    | 54                              | 19               | 35                   | No small washers, spiral springs, friction plates, or spanners received for any of the mines. Six large washers short. |
| Fathoms 2-inch steel wire rope for mooring ...     | 820                             | 820              |                      |  |
| Fathoms 3-inch tripping chain .....                | 1200                            | 1200             |                      |  |
| Iron thimbles .....                                | 120                             | 120              |                      |  |
| Iron shackles .....                                | 180                             | 180              |                      |  |
| Iron connecting boxes, complete .....              | 61                              | 61               |                      |  |
| Multiple junction disconnecter boxes .....         | 14                              | 14               |                      |  |
| Multiple junction boxes for (one) 4-core cable.    | 5                               | 5                |                      |  |
| Mile armoured 4-core cable .....                   | 1m. 354yds.                     | 1m. 354yds.      |                      |  |
| Miles armoured single cable .....                  | 3                               | 3                |                      |  |
| Cable drum 3-knot 4-core cable .....               | 1                               | 1                |                      | About half received.   |
| Cable drum 3-knot single cable .....               | 1                               | 1                |                      |  |
| Platinum wire detonating fuzes .....               | 200                             | ...              | 200                  |  |
| Platinum wire disconnecting fuzes .....            | 100                             | ...              | 100                  |  |
| Shutter signalling apparatus .....                 | 3                               | 3                |                      |  |
| Set of test table fittings complete (Imp. patt.).. | 1                               | Part             | only.                |  |
| Astatic galvanometer in case .....                 | 1                               | 1                |                      |  |
| Boat galvanometers and batteries .....             | 3                               | ...              | 3                    |  |
| Common galvanometers and batteries .....           | 2                               | 2                |                      |  |
| 3-coil detector galvanometers complete .....       | 2                               | 2                |                      |  |
| Reflecting ditto .....                             | 1                               | ...              | 1                    | No washers received.   |
| Sets firing resistance coils, complete .....       | 3                               | 3                |                      |  |
| Firing keys .....                                  | 6                               | 6                |                      |  |
| Retardation firing keys .....                      | 4                               | 4                |                      |  |
| Reversing keys .....                               | 2                               | 2                |                      |  |
| Relays for mines .....                             | 54                              | ...              | 54                   |  |
| Insulation plugs .....                             | 54                              | 54               |                      |  |
| Field and boat test table, &c. ....                | 2                               | ...              | 2                    |  |
| Battery switches .....                             | 3                               | 3                |                      |  |
| Single binding screws .....                        | 100                             | 100              |                      |  |
| Double ditto ditto .....                           | 100                             | 100              |                      | 1  |
| Firing observing arc .....                         | 1                               | ...              |                      |  |
| Morse sounders .....                               | 2                               | 2                |                      |  |
| Telephones .....                                   | 4                               | ...              | 4                    |  |
| Morse keys .....                                   | 2                               | 2                |                      |  |
| Field sounders, in case, complete .....            | 4                               | 4                |                      | 2  |
| Platinum wire-clips, on stand .....                | 2                               | 2                |                      |  |

| <i>Description of Article.</i>  | <i>Number of each article ordered.</i> | <i>Number received.</i> | <i>Wanting to complete.</i> | <i>Remarks.</i>                     |
|---|--|-------------------------|-----------------------------|-------------------------------------|
| Lbs. India rubber solution .....  | 25                                     | 25                      |                             |                                     |
| Lbs. India rubber tape .....  | 25                                     | 25                      |                             |                                     |
| Sets jointing tools .....   | 3                                      | 3                       |                             |                                     |
| Cable jointing vyces .....  | 2                                      | 2                       |                             |                                     |
| Insulated plates with double binding screws ...   | 25                                     | 25                      |                             |                                     |
| Sets soldering apparatus.....   | 3                                      | ...                     | 3                           |                                     |
| Cable condenser .....   | 1                                      | ...                     | 1                           |                                     |
| Dynamo quantity exploder (patt. '81).....   | 1                                      | ...                     | 1                           |                                     |
| Cells firing battery .....  | 150                                    | 150                     |                             |                                     |
| Cells test ditto .....  | 70                                     | 70                      |                             |                                     |
| Cells signal ditto .....  | 70                                     | ...                     | 70                          |                                     |
| Cells special fuze test .....   | 10                                     | ...                     | 10                          |                                     |
| Dynamo-electric machines, giving, when joined in one circuit, a light of 14,000 standard candles .....                                  | 2                                      | 2                       | ...                         | Defective in workmanship and power. |
| Electric lamps, self acting.....  | 2                                      | 2                       | ...                         | Defective.                          |
| Silvered parabolic reflector, 22in., mounted in lantern, and fitted with cast-iron frame, with horizontal and vertical motions, &c..... | 1                                      | 1                       |                             |                                     |
| Focus observer, Siemen's pattern.....   | 1                                      | ...                     | 1                           |                                     |
| Electric dynamometer .....  | 1                                      | 1                       |                             |                                     |
| Automatic shunt, large size (new patt.) .....   | 1                                      | 1                       |                             |                                     |
| Velocimeter .....   | 1                                      | 1                       |                             |                                     |
| Gun-metal switch .....  | 1                                      | 1                       |                             |                                     |
| Yards insulated cable .....   | 1000                                   | 1000                    |                             |                                     |
| Feet carbon rods.....   | 500                                    | 500                     |                             |                                     |
| Spare sets of commutators.....  | 2                                      | ...                     | 2                           |                                     |
| Spare sets of brushes .....   | 8                                      | ...                     | 8                           |                                     |
| Spare carbon-holders .....  | 2                                      | 2                       |                             |                                     |
| Special steam engine, boiler, tank, and feed-pump, complete, for steadily driving D.E. machines, 8 h.p. nominal, &c. ....               | 1                                      | 1                       |                             |                                     |

E. M. TUDOR BODDAM, *Capt. & Staff Officer.*

22 September, 1883.

*The Australian Electric Company, Limited, Melbourne, 27th September, 1883.*

DEAR SIR,

I HAVE been obliged to draw upon you on account of Torpedo Stores supplied to the extent of £447 2s. 8d., and trust you will honor our draft on presentation by the Commercial Bank. The fact is, we have been expecting this money from day to day, and made our financial arrangements accordingly. The balance of our contract goes forward by the first steamer next week, with the exception of the fuses and torpedo cases; the former cannot be shipped by passenger boats; the latter are being pushed on with. The alterations desired by Captain Boddam have given us a great deal of extra trouble. I would point out that although we are behind with our contract, we have met you in every way. Besides, you have surely sufficient security for the completion of the work when we have only drawn 80 per cent. of our work to date.

Yours faithfully,

GEO. W. SELBY, JUN., *Manager.*

*The Hon. the Chief Secretary, Hobart.*

*Chief Secretary's Office, Hobart, 4th October, 1883.*

SIR,

I AM in receipt of your communication of the 27th ultimo, to which I replied by telegram yesterday in the following words:—"Government are not prepared to honor draft until balance of contract, as advised by you, has been received. Letter by post."

The manner in which the contract is being carried out is most unsatisfactory, and the delay in its completion so serious that the Government cannot but express their surprise at the request contained in your letter now under acknowledgment.

By the conditions of the contract everything was to be delivered in a complete, workmanlike, and efficient condition on or before the 1st December, 1882. We are now in the first week of October,—ten months from that date,—and the contract is still uncompleted.

I forward copies of two letter from the Staff Officer. As regards the contents of the first, I must request that you will authorise the alterations and repairs referred to to be executed at the Company's expense; and as regards the second, that you will instruct your Engineer to visit Hobart without delay, as originally agreed to, in order that no further time may be lost in testing the electric light; and that full instructions be also furnished for the use of the apparatus, together with working drawings of the same.

The repeated failures of the Company to carry out their promises of an early fulfilment of the contract necessitate my reminding you that the penalty for non-completion up to the present time amounts to over £1500; and unless the Company at once take the necessary steps to meet the wishes and requirements of the Government, instructions will be issued to the Law Officers of the Crown to enforce the penalties which have accrued.

I have, &c.

WM. MOORE.

GEO. W. SELBY, JUN., *Esq., Manager Australian Electric Company, Bourke-street East, Melbourne.*



Staff Office, 20th November, 1883.

SIR,

HAVING been requested by the Hon. the Treasurer to prepare a statement of moneys paid and to be paid to the Australian Electric Company on account of the contract entered into by them for the supply of Submarine Mining Stores, I have the honor to report as follows :—

The total value of the stores to be supplied by the Company is £3722 19s. 2d. There are yet stores to the value of £913 15s. unsupplied, and others to the value of £362 5s. which no superintending officer could in their present state certify as according to the conditions of the contract ; this leaves £2446 19s. 2d. as the value of the stores actually supplied according to contract. Eighty per cent. of this amount would be £1957 11s. 4d. due to the Company under the conditions of the contract. The Company have, however, received £2030 14s. 1d. The Company drew on the Government for £447 2s. 8d. on account of the last shipment of stores, and as it was an urgent case the draft was paid, although the whole amount was not strictly due under the contract.

The contract is now close on twelve months behind time, and in any other case the penalty of £1600 leviable would have been enforced. The Government are being put to great inconvenience by the non-fulfilment of the conditions of the contract, besides breaking through their rules ; and if contracts are not to be made binding on all persons alike, the whole business of the Government will become a farce.

I have, &c.

E. M. TUDOR BODDAM, *Capt. & Staff Officer.*

*The Hon. the Chief Secretary.*

*The Australian Electric Company, Limited, 28, Queen-street,  
Melbourne, 5th February, 1884.*

SIR,

By the *Te Anau*, leaving this port to-day, I have instructed Messrs. W. McCulloch and Co. to ship the 35 torpedo cases which have been altered to meet the views of Captain Boddam, as contained in yours of 8 May last and enclosure. I regret the long time it has taken to get these alterations carried out, but they are a really good job, and well seasoned timber has been employed. Our Engineer, Mr. R. E. Joseph, will proceed to Hobart by the *Pateena* on arrival of the English mail. He will give your department all the scientific and technical information required for the management of the various electrical appliances we have supplied.

Yours faithfully,

GEO. W. SELBY, JUN., *Manager.*

*The Chief Secretary, Hobart.*

FORWARDED for the information of the Commandant.

B. TRAVERS SOLLY.

7 Feb., 1884.

*Head Quarters, Staff Office, Hobart, 1st October, 1884.*

SIR,

IN reply to your letter dated 24th September last, forwarding me a copy of a communication by the Officer Commanding Launceston Volunteer Artillery on the 40-pounder guns of position supplied for the defence of the Tamar, I have the honor to report as follows :—

A reference to these guns will be found in my Report on the Defences of the Colony, which the Committee, I presume, can obtain access to, but it would perhaps be better to write here more fully on the subject.

Two "guns of position," namely, guns which can be taken about by horses and placed in any position favourable under existing circumstances for attack or defence, were recommended by the Military Advisers of the Government in order to be placed in a defensive work at Brown's Bluff for the defence of the Tamar in time of war. In Major-General Scratchley's letter ordering the new armament for the Colony, these guns are specified in the following extract which I make from that communication :—" (c) Two 25-pr. Armstrong guns of position (New Type) for Launceston, or two 40-pr. B.L. or M.L. Service pattern guns."

As the range over the Nelson Flats is not a long one, guns firing a heavy shell with a considerable velocity were requisite, and these requirements were found to exist in the 40-pounders in question. They were chosen by Major-General Scratchley and myself, with the concurrence of General Harding Steward, the Military Adviser for the Colonies, an officer of very high scientific attainments, and for many years connected with the Ordnance Select Committee.

They are guns of new type with the breech action now introduced into the British Service, and made by the firm of Sir W. Armstrong & Co. (the Director of whose works, Captain Noble, R.A., is one of the first artillerists in the world) for various European nations. They are of the same construction as the 13-pounders at Hobart and the 6-in. now being made for the Alexandra Battery, as also the guns of the Victorian gunboats and those for the new batteries at Port Phillip Heads.

The mechanism of all breech-loaders is more or less delicate and requires careful handling, but the objection has now been universally waived by every power that uses modern artillery, in consideration of the manifest advantages arising from the use of breech-loaders giving a high velocity and great penetration.

I fail to see why the Tasmanian Volunteers should not be entrusted with the same type of gun that is being used everywhere else where muzzle-loaders have been done away with.

The 40-pounders in question only weigh 24 cwt. against 35 cwt. in the obsolete, weak, and objectionable old type 40-pounder ; they are therefore handier for transport. The charge is 10 lbs., double that of the above-mentioned obsolete guns, and the velocity is 1500 feet against 1180.

The new pattern steel projectiles are manufactured by Sir W. Armstrong & Co. for these guns as for other "natures" of ordnance which he turns out, and the steel shell holds an immense bursting charge, amounting to 7 lbs. 7 oz., by far the largest ever used with a shell of this calibre. A chilled shell is also supplied, so that the gun ranks as a light armour-piercing weapon as well as a gun of position.

When the Officer Commanding the Launceston Volunteer Artillery speaks of the inadvisability of getting ammunition from Sir W. Armstrong & Co., he cannot be aware that the Firm manufacture it in large quantities for all their guns, and that the supply is equal to any demand that may be made upon them.

It has been proposed by me to increase the equipment of every gun in the Island by 50 rounds in addition to forming a reserve, and if the Government will grant the funds the ammunition will be forthcoming.

I presume that Captain Collins is also unaware that Sir W. Armstrong & Co. have supplied the new guns that have been recently made for the Australian Colonies, and that their guns are more powerful than those hitherto made in the Royal Arsenal.

I enclose a table in reference to this subject (marked A), and also a copy of the specification relative to the guns in question (marked B), which please return.

The difference in rifling with the polygroove gun and gas-check projectile is of no moment whatever, the rotation being given by the gas-check.

Captain Collins appears to refer to a description by Colonel Owen of the French breech action prior to its modification and introduction into the British Service. This latter is the mechanism of the 40-pounder combined with the elastic steel gas-cup invented by Captain Noble, and now used in all guns made by the firm up to the 12-inch.

The 40-pounders are also intended for service at George Town in connection with the proposed Torpedo Defences of that place, and being very light for their proportionate power, and well adapted for placing in any position in the vicinity of either the West and East Tamar roads, where it may be requisite to oppose an enemy. Four horses are sufficient for the transport of these guns by road.

The heavy guns spoken of in Captain Collins' Report it is proposed to mount in the new Battery at Garden Island, and plans have been submitted to Government.

The reference to a "certain description of powder" (par. 7) relates to a remark made by me to Captain Collins concerning the "cocoa" powder which is to be used in the 6-inch guns now coming out from Elswick, but does not relate to the 40-pounder, the cartridges for which are filled with the ordinary "pebble" powder.

The 7-pounder M.L. jointed gun is by no means weak at the trunnion screw, and has rendered valuable service in recent wars. It is intended for use in this Island with a field force, as it can be taken anywhere in the bush. The equipment has been applied for this year.

The whole of the ammunition for all the guns supplied by the Elswick Firm has been detained in England pending the termination of a correspondence between Sir Wm. Armstrong & Co. and the Government relative to cases for the powder. This matter having been satisfactorily arranged, the supply will be despatched from Elswick at an early date.

At a recent lecture given by me at Launceston, the manufacture of Sir Wm. Armstrong's ammunition was described and other details explained, concerning which Captain Collins does not appear to have possessed information at the time of his writing the communication before me.

It is not necessary for me to enter here into a technical description of the guns in question, or speak of their superior power over the old type guns still in use in the British Service, as I presume the Committee are content to leave the choosing of the ordnance ordered for the defences of the Country to those who are artillerists and competent to act in such matters.

I much regret, however, that Hon. Members should have thought fit to have found fault in the House with new guns of the latest and most modern construction, chosen for the Colony by professional men from such an eminent firm as that of Sir W. Armstrong, Mitchell & Co., more particularly as at the time the guns had not been used nor drilled with, the ammunition (a portion of which had passed my inspection in September last) had not arrived in the Island, and the Officers of the Corps to which they were handed over were ignorant of their merits and capabilities.

I have, &c.

*The Hon. the Chief Secretary.*

W. V. LEGGE, *Lieut. R. R.A., Colonel Commandant,  
Late Instructor Gunnery, 2 B. R.A.*

P.S.—Reference to the objections against the 25-pounder new type and old pattern Service 40-pounder guns will be found in my Report above referred to.—W. V. L.

A.

TABLE showing the Comparative Power of New Type Armstrong Guns and Old Type Guns of the English Service, the latter in black figures.

| Size of Gun. | Weight of Gun. | Length of Gun. | Length of bore. | Charge. | Shot. | Velocity.        | Total energy of Shot. | Energy per inch of shots circumference. | Thickness of plate the shot can penetrate. |
|--------------|----------------|----------------|-----------------|---------|-------|------------------|-----------------------|---|--|
| Inches.      | Tons.          | Calibres.      | Calibres.       | lb.     | lb.   | Feet per second. | Foot tons.            | Foot tons.                              | Inches.                                    |
| 4.724        | 2.2            | 35             | 33              | { 12    | 40    | 1700             | 802                   | 53.3                                    | 7.4  |
| 6.3          | 5              | 21.7           | 17              | { 16    | 40    | 2100             | 1223                  | 82.7                                    | 9.3  |
|              |                |                |                 | 10      | 80    | 1240             | 353                   | 43.5                                    | 6.5  |
| 6            | 4              | 28             | 26              | 40      | 80    | 2000             | 2219                  | 118.4                                   | 11.2                                       |
| —            | 5              | 34             | 32              | 50      | 100   | 2000             | 2774                  | 148.0                                   | 12.5                                       |
| 7            | 7              | 21             | 18              | 30      | 115   | 1540             | 1881                  | 86.6                                    | 9.5  |
| 8            | 11.5           | 28             | 26              | { 90    | 180   | 2030             | 5143                  | 206                                     | 14.7                                       |
| —            | 13.5           | 32             | 30              | { 100*  | —     | 2100             | 5504                  | 221                                     | 15.3                                       |
| 9            | 12             | 17             | 14              | 100     | —     | 2200             | 6041                  | 242                                     | 16.0                                       |
|              |                |                |                 | 50      | 253   | 1420             | 3607                  | 128                                     | 11.7                                       |
| 10           | 25             | 28             | 26              | 190     | 400   | 1950             | 10,547                | 338                                     | 18.8                                       |
| 10           | 18             | 18             | 14.6            | 70      | 410   | 1364             | 5288                  | 169.3                                   | 13.4                                       |
| 10           | 25†            | 32             | 30              | 230     | 450   | 2100             | 13,761                | 441                                     | 21.6                                       |
| 10           | 27             | —              | —               | —       | —     | —                | —                     | —                                       | —  |
| 12           | 25             | 15             | 12              | 85      | 614   | 1300             | 7195                  | 191.8                                   | 14.3                                       |
| 12.5         | 38             | 20             | 16              | 210     | 818   | 1546             | 13,554                | 346.8                                   | 19.2                                       |

\* Ribbon construction. † Steel gun, latest design.

CONTRACT FORM A.

COLONY—TASMANIA. DEPARTMENT—COLONIAL DEFENCES.

Requisition No. 2160.

ESTIMATE for supplying the Crown Agents for the Colonies with Ord. Carriages, &c.

| Quantity. | Detailed Description of Articles.  | Rate. | Amount.             |
|-----------|--|-------|---------------------|
| 2         | 40 pr. B.L.R. guns of position, with carriages, limbers, stores, and fittings complete, in accordance with the accompanying specification and schedule.<br>A few rounds for testing the capability of one of the above guns at our range ..... | ...   | £ s. d.<br>1205 4 0 |
|           | Packing in best manner for shipment .....  | ...   | 60 5 0              |
|           |  |       | £1265 9 0           |

We do hereby agree, &c., &c., except that delivery is to be made in London within 124 days.

For SIR W. G. ARMSTRONG, MITCHELL & CO., LIMITED,

(Signed) A. NOBLE, Director.

SPECIFICATION to govern the supply of Two (2) 40-pounder Breech-loading Armstrong Guns, of 24 cwt. (nominal) with Travelling Carriages and Limbers of special construction.

1. *Guns*.—The guns to be breech-loaders of the latest pattern, giving as high a muzzle velocity as is compatible with a weight of (about) 24 cwt. in the gun, and a total weight, exclusive of personal equipment, behind the splinter bar, of (about) 70 cwt.
2. *Sights*.—The guns to be pierced for all necessary sights, and sighted with the usual sights, viz. :—Tangent scale of steel, with head forged solid on the bar, graduated up to 15°, and fitted with a bronze sliding leaf, giving deflection up to one degree, also a bronze adjusting nut for small vertical adjustment. Trunnion sight, consisting of a pillar, collar and socket of gun metal (permanently fixed), the head to have the usual hog-backed top.
3. *Carriage*.—The carriage to be formed of two bracket sides, connected by diaphragms and a trail eye. Wrought iron trunnion bearings and axletree beds, steel axle, and siege 60-inch wheels. The trail to be of steel plate, securely framed, and stayed by flanged steel plate diaphragms. The trail eye to be steeled where it rests on the limber hook. The trunnion bearing is to be of wrought iron, and securely rivetted to the brackets. The axletree to be a steel forging, having a small lateral travel in its bed. It should be connected to the brackets by spiral steel tempered stays. The axle passing through eyes formed on the ends of the stays. The stays to be connected together and to the brackets by a steel bolt, the brackets being specially strengthened for this purpose.
4. *Wheels*.—The wheels to be 60", Madras pattern, with bronze naves, fitted with phosphor bronze bushes. The tyres to be of steel. The width of track to be 5' 2".
5. *Elevating Gear*.—To be of the most approved pattern, worked with a worm and wheel, and fitted with friction slipping gear to ease the strain on the teeth.

6. *Side Arms and Small Stores.*—The usual attachments should be provided for the side arms and small stores usually carried on the carriage.

7. *Limber.*—The limber to consist of a box girder axletree, formed of a steel axle rivetted to flanged steel side plates and steel top plate; steel splinter bar and wrought iron limber hook, steeled where the trail eye rests, and with steel key. The splinter bar to be fitted with four-horse draught, *i.e.*, with a pair of frame shafts on the near side of the single shafts, and an outrigger at each end of the bar to take a swingletree. Each outrigger to be strengthened by a stay to the washer on the axle.

8. *Limber Boxes* to be provided, two to each limber; to be of steel, and fitted up to carry 12 projectiles and 12 cartridges, together with the proper proportion of time and percussion fuzes. The whole of the necessary fittings to be inserted, and the necessary equipment and small stores to be provided in each limber necessary for the proper service of the gun or limber, complete in every detail.

Personal equipment or camp equipage is not included.

*SCHEDULE of 40-pr. Guns, Carriages, and Stores to accompany Estimate of this date to the Crown Agents for the Colonies.*

|   |   |
|---|---|
| 2 40-pr. guns.  | 4 Sponges.  |
| 2 Carriages and limbers.                              | 4 Rammers.  |
| 2 Sets accessories, as follows:—                      | 2 Tompions, expanding.                            |
| 4 Vent bolts (1 in gun).                              | 4 Spare sponge cloths.                            |
| 8 Obturating cups (1 in gun).                         | 4 Sets priming irons.                             |
| 6 Brass discs.  | 6 Lanyards.                                       |
| 2 Loading tubes.                                      | 4 Fuze-hole rymers.                               |
| 2 Levers for breech screws.                           | 2 Copper funnels.                                 |
| 2 Box keys for nuts of pin for fixing obturating cup. | 6 Fuze keys.                                      |
| 2 Keys for head of pin for fixing obturating cup.     | 2 Brushes.  |
| 4 Keys for adjusting nuts.                            | 2 Leather buckets.                                |
| 2 T keys for bolts for fixing breech ring and studs.  | 2 Tube boxes, with straps.                        |
|   | 4 Fuze pockets, with straps.                      |
|   | 20 Common shell, with cartridge bags, powder, &c. |

*Head Quarters Office, 21st August, 1884.*

SIR,

I HAVE the honor to report that on the 28th ultimo I wrote to the Manager of the Australian Electric Company requesting that the relays which were returned for alteration in February last might be forwarded with as little delay as possible.

I have as yet received no reply; and as these articles were unserviceable, and, according to the conditions of the Contract, should have been made good if returned within twelve months of the date of supply, I consider it only businesslike that I should have been communicated with concerning the progress made by the Company towards replacing them.

There are also other articles to be supplied just as necessary to complete the plant, and concerning which I have heard nothing. I have the honor to request that you will be good enough to draw the attention of the Company to the dilatory manner in which they are fulfilling the terms of their Contract, and forward this letter.

The articles alluded to must be delivered by the end of September to enable the year's training to be carried out.

I have, &c.

W. V. LEGGE, *Colonel Commandant.*

*The Hon. the Chief Secretary.*

*Tasmania, Chief Secretary's Office, 27th August, 1884.*

SIR,

I HAVE the honor to forward herewith copy of a letter from the Colonel Commandant calling attention to the delay which has occurred in connection with the due fulfilment of the terms of the Australian Electric Company's Contract with the Tasmanian Government.

It is much to be regretted that the Company should have given occasion for such frequent complaints on the part of the Military authorities on account of the unsatisfactory manner in which the Contract has been carried out, and I have now to request that you will cause immediate attention to be paid to the requirements of the Commandant.

I have, &c.

ADYE DOUGLAS.

GEO. W. SELBY, JUN., *Esq., Manager of the Australian Electric Company, Limited, 28, Queen-street, Melbourne.*

*Head Quarters Office, 16th September, 1884.*

SIR,

I HAVE the honor to point out that no reply has been received to my communication of the 21st ultimo having reference to the relays and other electrical apparatus long overdue from the Australian Electric Company under their Contract for the supply of submarine mining apparatus.

The matter is becoming serious, as any further delays in the matter will prevent satisfactory instruction being carried out, or the regular course of training for the year being gone through by the Engineers.

I have, &c.

W. V. LEGGE, *Colonel Commandant.*

*The Hon. the Chief Secretary.*

*Tasmania, Chief Secretary's Office, 17th September, 1884.*

SIR,

I HAVE the honor to call your attention to my letter of the 27th ultimo, enclosing copy of a communication from the Commandant of the Local Forces, to which no reply has been received.

The unwarrantable delay on the part of the Company to carry out their Contract has already caused most serious inconvenience, and I must again request your immediate compliance with the requirements of the Commandant.

I have, &c.

ADYE DOUGLAS.

G. W. SELBY, JUN., *Esq., Manager of the Australian Electric Company,  
Limited, 28, Queen-street, Melbourne.*