

James S. P. [Signature]
19.4.18

HISTORY
OF THE
PUBLIC WORKS DEPARTMENT,
CEYLON, 1796 TO 1913.

COMPILED BY
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Provincial Engineer, Public Works Department.

1918.

VOLUME I.



COLOMBO:
H. R. COTTLE, GOVERNMENT PRINTER, CEYLON.

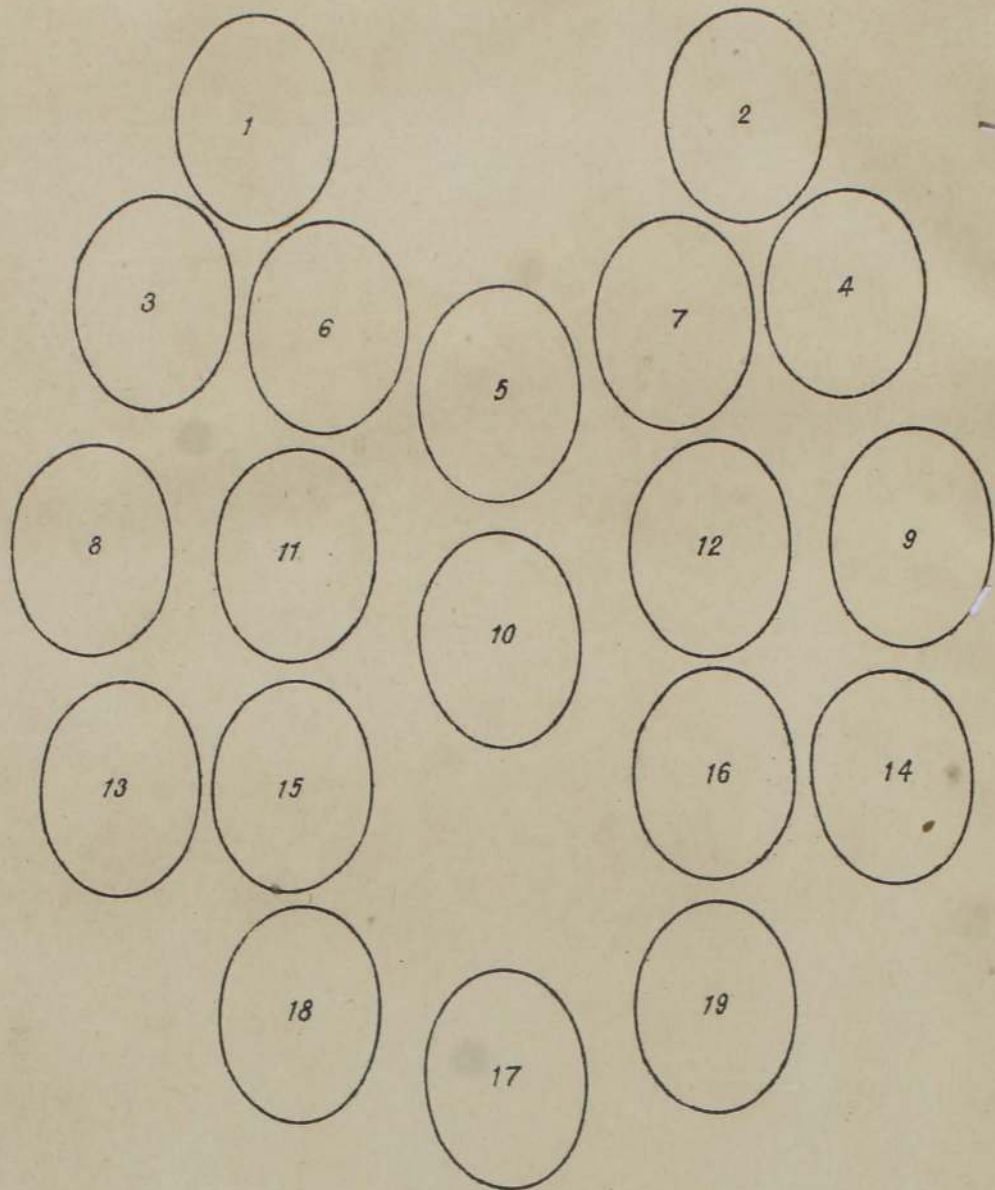
1921.

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DEDICATED
TO
MY BROTHER OFFICERS
OF THE
PUBLIC WORKS DEPARTMENT,
CEYLON.





1. The Hon. Frederick North.
2. Lieut.-General Sir Robert Brownrigg, Bart., G. C. B.
3. Lieut.-General Sir Edward Barnes, K.C.B.
4. The Right Hon. Sir Robert Wilmot Horton, Bart, G. C. B.
5. The Right Hon. James Alexander Stewart Mackenzie
6. Sir J. Emerson Tennent, K. C. B., (Lieutenant-Governor.)
7. The Right Hon. The Viscount Torrington
8. Sir Henry George Ward, K. C. M. G
9. Major-General Henry Frederick Lockyer, C. B., K. H., (Lieutenant Governor).
10. Sir Charles Justin MacCarthy, Kt.
11. Major-General Terence O'Brien, (Lieutenant Governor).
12. Sir Hercules George Robert Robinson, K. C. M. G.
13. Lieut.-General Studholme Hodgson, (Lieutenant-Governor).
14. The Right Hon. Sir William Henry Gregory, K. C. M. G.
15. Sir Arthur Nonus Birch, K. C. M. G., (Lieutenant-Governor).
16. Sir James Robert Longden, K. C. M. G.
17. The Hon. Sir Arthur Hamilton Gordon, G. C. M. G.
18. Sir Arthur Elibank Havelock, G. C. M. G.
19. The Right Hon. Sir J. West Ridgeway, G. C. M. G., K. C. B., K. C. S. I.

NOTE :- The Governors missing from the picture are:-

Lieutenant-General The Right Hon. Sir Thomas Maitland, G. C. B.

Lieutenant-General The Hon. Sir Edward Paget, K. C. B.

Lieutenant-General Sir Colin Campbell, K. C. B.

Sir George William Anderson, K. C. B.



SOME OF THE GOVERNORS AND LIEUT: GOVERNORS
OF CEYLON
1798 - 1896

S. G. O.

From a collection of photographs in
possession of Lady Obeyesekere
Hill Castle Colombo.

PHOTOGRAPHS.

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LIST OF GOVERNORS OF CEYLON.

	<i>From</i>	<i>To</i>
The Hon. the Governor of Madras in Council	Feb. 16, 1796 ..	Oct. 12, 1798
The Hon. Frederick North (after- wards Earl of Guildford) ..	Oct. 12, 1798 ..	July 19, 1805
Lieut.-General the Right Hon. Sir Thomas Maitland, G.C.B. ..	July 19, 1805 ..	Mar. 11, 1812
Lieut.-General Sir Robert Brown- rigg, Bart., G.C.B. ..	Mar. 11, 1812 ..	Feb. 2, 1822
Lieut.-General the Hon. Sir Edward Padget, K.C.B. ..	Feb. 2, 1822 ..	Jan. 18, 1824
Lieut.-General Sir Edward Barnes, K.C.B. ..	Jan. 18, 1824 ..	Oct. 23, 1831
The Right Hon. Sir Robert Wilmot Horton, Bart, G.C.B. ..	Oct. 23, 1831 ..	Nov. 7, 1837
The Right Hon. James Alexander Stewart Mackenzie ..	Nov. 7, 1837 ..	April 5, 1841
Lieut.-General Sir Colin Campbell, K.C.B. ..	April 5, 1841 ..	May 29, 1847
The Right Hon. the Viscount Torrington ..	May 29, 1847 ..	Nov. 27, 1850
Sir George William Anderson, K.C.B. ..	Nov. 27, 1850 ..	May 11, 1855
Sir Henry George Ward, K.C.M.G. .	May 11, 1855 ..	Oct. 22, 1860
Sir Charles Justin MacCarthy, Kt. .	Oct. 22, 1860 ..	May 16, 1865
Sir Hercules George Robert Robin- son, K.C.M.G. ..	May 16, 1865 ..	Mar. 4, 1872
The Right Hon. Sir William Henry Gregory, K.C.M.G. ..	Mar. 4, 1872 ..	Sept. 4, 1877
Sir James Robert Longden, K.C.M.G.	Sept. 4, 1877 ..	Dec. 3, 1883
The Hon. Sir Arthur Hamilton Gordon, G.C.M.G. (afterwards Lord Stanmore) ..	Dec. 3, 1883 ..	May 28, 1890
Sir Arthur Elibank Havelock, G.C.M.G. ..	May 28, 1890 ..	Feb. 10, 1896

ADMINISTRATION BY LIEUTENANT-GOVERNORS
OR OTHERS.

		<i>From</i>	<i>To</i>
Military Governors.	{	Major-General James Steuart	Feb. 16, 1796 .. Jan. 1, 1797
		Major-General Welbore Ellis Doyle Jan. 1, 1797 .. June, 1797
		Brigadier-General Pierre Frederic de Meuron June, 1797 .. Oct. 12, 1798
	Colonel Josias Champagne ..	.. Mar. 14, 1799 .. July 22, 1799
	Major-General John Wilson ..	.. Mar. 19, 1811 .. Mar. 10, 1812
	Major-General Sir Edward Barnes, K.C.B. ..	.. Feb. 1, 1820 .. Feb. 1, 1822
	Major-General Sir James Campbell, K.C.B. ..	.. Nov. 6, 1822 .. Jan. 17, 1824
	Major-General Sir John Wilson, K.C.B. ..	.. Oct. 13, 1831 .. Oct. 22, 1831
	Sir J. Emerson Tennent, K.C.B. ..	.. April 19, 1847 .. May 28, 1847
	Sir Charles Justin MacCarthy, Kt. ..	.. Oct. 18, 1850 .. Nov. 26, 1850
	Do. ..	.. Jan. 18, 1855 .. May 10, 1855
	Major-General Henry Frederick Lockyer, C.B., K.H. ..	.. June 30, 1860 .. July 29, 1860
	Colonel Charles Edmund Wilkinson, R.E. ..	.. July 30, 1860 .. Oct. 21, 1860
	Major-General Terence O'Brien ..	.. Dec. 1, 1863 .. Mar. 30, 1865
	Sir Hercules George Robert Robin- son, Kt. ..	.. Mar. 31, 1865 .. May 15, 1865
	Lieut.-General Studholme Hodgson	July 2, 1868 .. June 12, 1869	
	Sir Henry Turner Irving, G.C.M.G. ..	.. Jan. 4, 1872 .. Mar. 3, 1872
	Sir Arthur Nonus Birch, K.C.M.G. ..	.. April 17, 1874 .. Aug. 14, 1874
	Do. ..	.. Dec. 20, 1875 .. Jan. 29, 1876
	Do. ..	.. Jan. 15, 1877 .. Mar. 31, 1877
	Do. ..	.. May 9, 1877 .. Sept. 3, 1877
	Sir John Douglas, K.C.M.G. ..	.. Feb. 28, 1881 .. Sept. 9, 1881
	Do. ..	.. July 10, 1883 .. Dec. 2, 1883
	Major-General Sir John Chatham McLeod, K.C.B. ..	.. June 21, 1885 .. Nov. 4, 1885
	Sir Edward Noel Walker, K.C.M.G. ..	.. Mar. 15, 1888 .. July 23, 1888
	Do. ..	.. Jan. 5, 1889 .. Feb. 17, 1889
	Do. ..	.. April 14, 1893 .. Sept. 23, 1893
	Do. ..	.. Dec. 21, 1894 .. Jan. 13, 1895
	Do. ..	.. Oct. 24, 1895 .. Feb. 9, 1896

LIST OF COLONIAL SECRETARIES.

H. Cleghorn, Chief Secretary to Government	..	—	1797
R. Arbuthnot	..	Sept. 10,	1801
The Hon. John Rodney	..	Sept. 3,	1806
P. Anstruther	..	May 1,	1833
Sir J. Emerson Tennent, K.C.B.	..	Nov. 29,	1845
Sir Charles J. MacCarthy, Kt.*	..	Jan. 2,	1851
W. C. Gibson, C.M.G.	..	Aug. 10,	1860
Sir Henry Turner Irving, G.C.M.G.	..	June 4,	1869
Sir Arthur Nonus Birch, K.C.M.G.	..	June 3,	1873
Sir John Douglas, K.C.M.G.	..	Aug. 18,	1878
The Right Hon. Sir Cecil Clementi Smith, P.C., G.C.M.G.	..	Nov. 17,	1885
Sir Edward Noel Walker, K.C.M.G.	..	Nov. 10,	1887

* Acted as Colonial Secretary from December 19, 1849.

TABLE OF EVENTS, 1796-1896

1796. Colombo surrendered to the British by Capitulation, February 16. Maritime Ceylon governed from Madras.
 „ The first Pearl Fishery under the English Government yielded £60,000.

Hon. F. North, Governor, 1798-1805.

1798. Ceylon made a Crown Colony, October 12; Hon. F. North (afterwards Earl of Guildford), Governor.
 1802. Maritime Ceylon, by the peace of Amiens, definitely attached to the dominions of Great Britain. The publication of the *Ceylon Government Gazette* commenced March 15.
 1803. Hostilities against the King of Kandy commenced January 31; General Macdowall commanding a detachment sent from Colombo, and Colonel Barbut one from Trincomalee.
 „ Two divisions of the British Army take possession of Kandy, February 21.
 „ Muttuswami (the fugitive Prince) proclaimed King by the British, March 8.
 „ General Macdowall leaves Kandy for Colombo, April 1.
 „ Pilima Talawa and Governor North have an interview at Dambadeniya, May 3, when Pilima Talawa renews his treacherous overtures, which are rejected.
 „ Kandyans attack the British Garrison in Kandy under Major Davie, who capitulates, and is allowed to retire with the troops and Muttuswami as far as Lewela, June 24.
 „ Muttuswami is delivered up at the desire of the Kandyans and put to death, June 25.
 „ Massacre of all the troops, with the exception of Major Davie and Corporal Rumley, whom the King spared, and Captain Humphreys and another officer, who escaped, June 26. (Another account says only one soldier, besides Major Davie, was spared or escaped.)
 „ Torture abolished in Ceylon by the British Government.
 „ Lord Valentia visits Ceylon.
 1804. Captain T. Johnson marched with 300 men from Batticaloa to Kandy returning in safety to Trincomalee on finding the town deserted by the British, September.
 1805. The Kandyans invade the British territory, and are repulsed with great loss at Hanwella by Captain Pollock, February.

Sir Thomas Maitland, Governor, 1805-12.

1805. Right Hon. Lieut.-General Sir Thomas Maitland, G.C.B., Governor; Right Hon. E. C. Lushington, Chief Justice; Hon. John Rodney, Colonial Secretary.
 1806. The Kandyan King constructs the lake at Kandy.

Sir Robert Brownrigg, Governor, 1812-22.

1812. A Pearl Fishery yielded £90,000, March.
 „ General Sir Robert Brownrigg, Governor; Sir Alexander Johnson, Chief Justice; Hon. J. Rodney, Colonial Secretary. Major Davie died in captivity at Kandy.
 1815. War declared against King of Kandy and hostilities commenced, January 10.
 „ British troops enter the Kandyan Territory, February 14.
 „ The Kandyan King taken prisoner in a cave near the Meda-mahanuwara Gap, and conveyed to Kandy by Ekneligoda Dissawa and Lieut.-Colonel Hook, February 18.

1815. Convention for establishing British Government in the Kandyan Provinces concluded, March 2.
1817. Kandyan rebellion commenced by a few Chiefs of the Wellassa (Uva) Districts, September 10. Mr. Wilson, Government Agent at Badulla, killed by the rebels, October.
- .. A severe storm at Colombo, in which several ships and 40 dhonies perished, November 6.
1818. Government House struck by lightning, April.
1819. Cholera for the first time appeared at Colombo, January 20.
1820. A storm of wind and unprecedented fall of rain at Colombo; the ketch "Hope" driven on shore, May 4.
- .. Sir Edward Barnes, Lieut.-Governor, February 1. All Ceylon tranquilized under British rule.
- .. Sir Hardinge Giffard, Chief Justice, and Mr. Justice Byrne, constitute Supreme Court, March.

Sir Edward Padget, Governor, 1822-24.

1822. Major-General Sir James Campbell, Lieut.-Governor, November 6.
- .. Bridge-of-Boats near Colombo completed.

Sir Edward Barnes, Governor, 1824-31.

1824. Lieut.-General Sir Edward Barnes, K.C.B., Governor; Sir R. Ottley, Chief Justice; Hon. J. Rodney, Colonial Secretary.
- .. Building of the Pavilion, Kandy; and of Mount Lavinia House, near Colombo.
1825. First English Steamer, the "Enterprise," in India.
1827. First regular coffee plantation opened.
1828. Nuwara Eliya established as a Military Convalescent Station.
1831. The Kandy Road *viâ* Kurunegala and Galagedara and that *viâ* Kadugannawa finished.
- .. Series of successful Pearl Fisheries from 1828-37.

Sir R. W. Horton, Bart., Governor, 1831-37.

1831. Right Hon. Sir R. W. Horton, Bart., G.C.H., Governor of Ceylon; Sir Charles Marshall, Sir William Norris, and Sir W. Rough, successive Chief Justices, 1833-36; P. Anstruther, Esq., Colonial Secretary.
1832. The Kandy Mail Coach, the first mail coach in Asia, started February 1.
- .. Compulsory labour abolished, September 28.
1834. The Mahaweli-ganga at Gampola rose 60 feet above its usual level.

Right Hon. J. A. Stewart Mackenzie, Governor, 1837-41.

1837. Right Hon. J. A. S. Mackenzie, Governor of Ceylon; Sir Anthony Oliphant, Chief Justice; P. Anstruther, Esq., Colonial Secretary.
- .. Turnour's translation of the *Mahawansa* published.
1838. The Galle Mail Coach first started, July 2.
1841. First stone of St. Andrew's (Scots) Church, Colombo, laid by the Governor.

Sir Colin Campbell, K.C.B., Governor, 1841-47.

1844. A new Province, the North-Western, making six Provinces altogether, created by the inclusion of the Chilaw-Puttalam and Seven Korales districts, October.
- .. Total abolition of slavery in Ceylon, December 20.

1845. Major Rogers, Assistant Government Agent, Badulla, killed by lightning at the Haputale resthouse; remains buried in old cemetery, Nuwara Eliya.
 „ Pioneer Pension Fund established, June 7.
 „ Civil Servants first interdicted from engaging in agricultural or commercial pursuits.
 „ Sir J. E. Tennent landed in Ceylon, November 29.
1846. Cholera rages furiously at Kandy and Jaffna; about 10,000 deaths occur in the latter district.
 „ Foundation stone of Trinity Church laid by Bishop Chapman (March 9); opened for service January 1, 1847.
 „ The final report on the railway trace, Colombo to Kandy, received from the Ceylon Railway Company's Engineer, Mr. Drane, who approved of the Hingula Valley line.

• **Lord Torrington, Governor, 1847-50.**

1847. Sir J. E. Tennent, Colonial Secretary and Lieut.-Governor, April; Lord Torrington, Governor, May; Sir Anthony Oliphant, Chief Justice; Sir J. E. Tennent, Colonial Secretary.
 „ A statue of Sir Edward Barnes erected opposite the Queen's House, June 8.
1848. The Road Ordinance passed, requiring every able-bodied man between 18 and 60 years of age to give six days' labour, or pay a few shillings as commutation, for the maintenance of the roads.
 „ A new cast iron lighthouse erected at Galle, 80 feet high, April 11.
 „ Gongalgoda Banda endeavours to incite a rebellion in the Kandyan country, and marches with followers from Dambulla to Matale, where he arrives July 21.
 „ A detachment of European and Malay troops sent from Kandy defeated the rebels next morning at Wariyapola and dispersed them, 40 being killed, while only one European soldier was injured.
 „ The District of Kandy placed under Martial Law, July 29.
 „ Tumultuous assemblage of 2,000 armed natives at Kurunegala dispersed by 30 of the Ceylon Rifles, July 10.
 „ Martial Law proclaimed in the Kurunegala District, July 31.
 „ Martial Law abolished in the Kandyan Districts, October 10.
1849. The first stone of St. Thomas's Collegiate School laid by Bishop Chapman and the Clergy of Colombo, December 21.
 „ Atrocious attempt at murder committed on the person of Mr. Ralph Tatham of the Public Works Department.
1850. Resignation of Lord Torrington, June 31.
 „ Pigeon express from Galle to Colombo successfully started by the "Observer" Newspaper, September 24, and continued without interruption for eight years, when it was superseded by the telegraph.

• **Sir George Anderson, Governor, 1850-55.**

1851. A fearful gale, during which five ships were wrecked and six lives lost, and considerable damage done to the shipping along the coast, May 2.
1854. The first meeting of the Planters' Association held in the Boarding-House, Kandy, February 17.
 „ Awful thunderstorm bringing in monsoon from 3 to 9 A.M., Rifles Barrack struck by lightning in Colombo, 29 men accoutred struck down and more or less injured, rifles twisted, 40 men knocked down by shock, May 22 (on May 16 storm at Galle, lightning made hole near Fort wall 3 feet diameter by 20 feet deep).
 „ Sir George Anderson requests to be relieved from his duties from February, 1855-September.
 „ Sir George Anderson embarks for England, and the Hon. C. J. MacCarthy takes the usual oaths as Lieut.-Governor, January 19.

Sir Henry Ward, Governor, 1855-60.

1855. Sir Henry Ward arrived in Ceylon and assumed the reins of Government, May; Sir W. O. Carr, Chief Justice, 1854; Sir W. Carpenter Rowe, Chief Justice, 1856; C. J. MacCarthy, Esq., Colonial Secretary.
- „ Three waterspouts seen off Colombo Harbour, 6 P.M., December 7. Continued heavy rain at Mount Lavinia, and not a drop at Colombo, or within 3 miles of it, December 14.
1856. The photographic art first introduced in Ceylon by Mr. Parting, June 24.
- „ A sum of £15,000 is proposed to be devoted to complete a telegraph line of 300 miles from Mannar to Kandy, from Kandy to Colombo, and from Colombo to Galle, September.
1857. The Clock Tower, Colombo, completed, March.
- „ Rajawella Waterworks opened on the property in the Dumbara Valley of Messrs. Tytler and Eliot with the largest pumps for irrigation purposes in the world, driven by means of a turbine wheel to send water from the Mahaweli-ganga through sloping fields of coffee on the hillsides.
- „ The Pearl Fishery yields a gross sum of £20,000, April.
- „ General Havelock, accompanied by troops, wrecked in the P. & O. steamer "Erin" off Kalutara, June.
- „ A fearful gale prevails, during which several vessels were wrecked, July.
- „ A fire at Badulla destroyed one-half of the bazaar, July.
- „ A terrible gale and rain in torrents at Colombo, during which ten vessels (including the "Sibella") were wrecked and several lives lost, November.
1858. First telegraph line (a single wire) opened in Ceylon (constructed by Mr. Bailey) between Colombo and Galle, January 1.
- „ The labour question creates much discussion, March.
- „ The Pearl Fishery at Arippu realized £24,129, April.
- „ P. & O. Steamer "Ava" totally lost on the east coast of Ceylon, April.
- „ Telegraph communication between Colombo and Kandy established, June.
- „ Inauguration of the Ceylon Railway by Sir Henry Ward; after the ceremony about 600 persons of all classes sat down to a rich banquet, August 3.
- „ Submarine cable (guttapercha core) connecting Ceylon with India laid between Thanaikai Point and Talajmannar by Messrs. Wickham and St. Albin in a native brig, September 17.
- „ Telegraph communication from Kandy to Mannar *via* Mihintale opened, October.
- „ Through telegraphic communication between Ceylon and India established, October.
- „ The Gampola bridge completed, December.
1859. A Pearl Fishery yielded £48,215, April.
- „ A sudden rainfall occurred on a coffee estate near Matale, resembling the bursting of a waterspout, whereby several lives were lost, March 2.
- „ The Morse system of telegraphy, in place of the old needle instrument, introduced into Ceylon, July.
- „ An accident, attended with fatal consequences, happened to the Galle coach at Dehiwala bridge, resulting in the loss of the horses and the death of the driver, in the act of saving three lady passengers, who were submerged in the river and in considerable danger, December 16.

1860. The splendid iron lattice bridges which span the Mahaweli-ganga and Pin-oya at Katugastota are opened for traffic by the Governor; after the ceremony 250 guests sat down to a *déjeuner dinatoire*. The festivities concluded with a dance on the bridge, in which His Excellency joined, March 1.
- .. A Pearl Fishery yielded £36,681, March.
- .. The Batticaloa irrigation works create much discussion, April.
- .. Serious defalcations are discovered in the Surveyor-General's Office. The clerk in charge of the accounts tried and convicted of fraud, and sentenced to ten years' transportation, May.
- .. Sir Henry Ward appointed Governor of Madras, June.
- .. The foundation stone of all Saints' Church laid in due form by the Governor, June 21.
- .. Sir Henry Ward takes his departure for Madras, after an able administration of five years, and General Lockyer is appointed Lieut.-Governor, June 30.
- .. Sir Henry Ward expired at Madras from a sudden attack of cholera, August 2.

Sir C. J. MacCarthy, Kt., Governor, 1860-65

1860. Sir Charles MacCarthy is appointed Governor of Ceylon, August 4; Sir Edward Creasy, Chief Justice; W. C. Gibson, Esq., Colonial Secretary.
- .. The steamer "Bengal" arrived at Galle, having on board Sir Charles MacCarthy. His Excellency assumed the office of Governor on October 22.
1861. Dr. Willisford proposes a scheme of water supply for Colombo, March.
- .. Messrs. Harrison and Leake, Civil Engineers, propose to connect the Central Province with Colombo by means of a tramway, June.
- .. Visit of Mr. Smart, Engineer to the Madras Railway, to consider the proposed railway routes, August.
1862. A severe thunderstorm in Colombo, doing much damage to trees and old buildings, many houses in Grandpass inundated, January.
- .. A public meeting held at Badulla to represent to Government the state of the Badulla and Nuwara Eliya road, February.
- .. Night coaches to Kandy and Galle and *vice versa* first started in Ceylon, March.
- .. The Governor announces that Civil Servants of six years' residence in the Island are entitled to one-third of the cost of their passage to England and back, with a similar allowance for their families, April.
- .. The veteran Lieut.-General Fraser, who resided in the Island for nearly forty-eight years, died at Kandy at the advanced age of 72. His name will always be associated with the topographical labours, which resulted in the first really good map of Ceylon, May.
- .. Civil Servants are allowed one-third passage money for every six years' resident service, and for families (a year later), August 16.
- .. Bronze money introduced for the first time into Ceylon, September.
- .. P. & O. Company's Mail Steamer "Colombo," of 1,860 tons, wrecked on the north end of Minicoy Island, Maldives, November.
- .. The "Nova Scotian," a fine vessel of 990 tons, driven ashore in Colombo roadstead by a gale of wind, December.
1863. Mr. Faviell, the Railway Contractor, arrived at Galle, March.
- .. Riot of the Sikhs obtained from India to reinforce the Pioneer Force of the Roads Department in Kandy and elsewhere in the Central Province, August.

1864. The first locomotive engine landed in Ceylon, January
 „ The “ Comet ” (a steam tug intended for use on the Jaffna lake), the first steamboat made in Ceylon, launched, April.
 „ Death of Sir Charles MacCarthy at Spa, September.
 „ The telegraph extended to Trincomalee, September.
 „ Badulla and Haputale battle of the roads with reference to the proper outlet for Uva, September.
 „ Telegraph line from Dambulla to Trincomalee opened, November.
 „ First special train on Ceylon Railway conveying His Royal Highness the Duke of Brabant to Ambepussa, December 27.
1865. Fatal accident on the Ceylon Government Railway at Mahara ; 36 lives (including one European) lost, January.
 „ An outbreak of cholera at Trincomalee ; 120 deaths reported up to February.
 „ Sir Hercules George Robert Robinson appointed Lieut.-Governor of Ceylon, March.
- Sir H. G. R. Robinson, K.C.M.G., Governor, 1865-72.**
1865. Sir Hercules Robinson sworn in as Governor ; Sir Edward Creasy, Chief Justice ; W. C. Gibson, Esq., Colonial Secretary, May 16.
 „ Opening of the railway from Colombo to Ambepussa, October.
1866. A Police Force established in the town of Jaffna, January 1.
 „ First direct telegraphic message from New York received at Galle, August 19.
 „ First telegraphic message received at Galle from San Francisco *viâ* Atlantic cable and Indo-European line (seven days in transmission), October 9.
1867. New telegraphic cable (Hooper's core) between India and Ceylon laid, January.
 „ The first railway engine ascended the Kadugannawa Incline, March.
 „ First railway train from Colombo arrived at Kandy, April 26.
 „ Telegraph to Nuwara Eliya opened, May.
 „ Major Skinner (“the great Ceylon roadmaker”), after fifty years' residence in Ceylon, retires from the Public Service, June.
 „ The Colombo and Kandy Railway opened for traffic, August.
1868. Submarine cable (Hooper's core) laid across the Jaffna lake, June.
 „ Sir Hercules Robinson goes on leave of absence to England ; during his absence Major-General Studholme Hodgson acts as Lieut.-Governor, July.
 „ Unveiling of the statue of Sir Henry Ward at Kandy, August 5.
1869. Telegraph to Jaffna completed, May 20.
 „ The demolition of the walls of Colombo Fort commenced by the blowing up of the Rotterdam Bastion, December 29.
 „ Erection of a lighthouse on the Great Basses Rocks commenced, December 31. (Building finished and in use, March, 1873. The light is visible 20 miles off, at Hambantota.)
1870. The first steamer from India passes through the Suez Canal, January.
 „ The first steamer, the “ Wm. Miller,” arrives at Colombo from Britain *viâ* the Suez Canal, February 10.
 „ The first traction engine landed in Ceylon, February 18.
 „ Ceylon Medical School established in connection with Government Civil Hospital in Colombo, March.
 „ Foundation stone of the Colombo Garrison Hospital laid, August.
 „ Survey of the Nawalapitiya Railway Extension commenced, October.

1871. Colombo Fort walls demolished and the moat filled up, February.
 „ First general Census taken, March 26 (Ceylon contains 2,405,287 inhabitants, of whom there are included within the Colombo Municipality 100,238).
 „ Smallpox raging in Colombo, January to April.
 „ Memorial forwarded by the Ceylon Civil Servants to the Secretary of State petitioning for certain reform, including a partial increase of salaries, June.
 „ The Nawalapitiya Railway Extension entrusted to Messrs. Reid and Mitchell, and commenced, June.
 „ Arrival of Mr. Townshend, Engineer appointed to examine the Colombo Harbour in view of the erection of Dock or Breakwater, August.
1872. New Military Barracks and Hospital on Galle Face opened, February.

Right Hon. W. H. Gregory, Governor, 1872-77.

1872. Right Hon. W. H. Gregory, Governor, lands at Colombo; assumes administration of Ceylon, March 4; Sir E. S. Creasy, Chief Justice; and Hon. H. T. Irving and A. N. Birch, Colonial Secretaries.
 „ Colombo for the first time lighted with gas, August 5.
 „ Sir John Coode's report favourable to the construction of the Colombo Breakwater and Jetties, published September 28.
 „ The P. & O. steamers to and from Australia and Bombay commence calling at Colombo for goods and passengers, October.
 „ Telegraphic communication with Australia established. First message received in Colombo from Melbourne, October 21.
1873. Opening of the Gampola Railway Extension for goods on January 15 and for passengers on February 1.
 „ The Ceylon Rifle Regiment ordered to be disbanded, and the name accordingly omitted from the Army List, April 1.
 „ Mr. Kyle appointed Managing Engineer for the Colombo Breakwater, Sir John Coode being Consulting Engineer, May 22.
 „ Completion of the flying survey from the Elk Plains to Haputale with a view to railway extension, with the result that the incline on the Uva side need nowhere be steeper than 1 in 45, February.
 „ The erection of the Great Basses Lighthouse commenced under the direction of Mr. W. Douglas, C.E., Trinity House Engineer, in December, 1869, completed at a cost of £62,039, March 10.
 „ Contract between Government and Mr. Faviell to connect the Mahara Quarry with the Main Line of railway, and the Colombo Railway Station with Custom-house Point by tramways to carry stone for the Breakwater, cost of both tramways under contract Rs. 208,000, September.
1874. Survey of railway line from Colombo to Moratuwa commenced, and announcement made by Government that the new iron bridge across the Kalu-ganga (to cost Rs. 450,000) is with a view to railway extension to Kalutara, January.
 „ Arrival of Mr. John Kyle and staff to commence active operations on the Colombo Breakwater, June 6.
 „ Publication of the report of Mr. Bateman, C.E., the eminent Hydraulic Engineer, on the water supply of Colombo, based on the information furnished by his Assistant, Mr. Burnet. Unsatisfactory nature of the report demonstrated in the "Observer."
 „ Shocks of earthquake felt generally throughout Ceylon, especially in the coffee planting districts, September 19 and 25.
 „ Opening of the telegraph line to Anuradhapura, October 7.
 „ The British India Company commenced running steamer weekly between Calcutta and Bombay, calling at Colombo, November.

1874. Expenditure on irrigation works in Ceylon in twenty years, £200,000 ; while the imports on rice from India have increased in the same period from 2,852,000 bushels to 5,700,000 bushels.
1875. The telegraph extended to Badulla, April 15.
 „ Railway telegraph to Nawalapitiya completed, June 25.
 „ Contract for the construction of the Moratuwa Railway (11½ miles) taken by Mr. F. D. Mitchell for Rs. 282,049, July.
 „ Tour of Governor Gregory through Sabaragamuwa, and trip on the first steamer ever run on the Kalu-ganga to Kalutara ; the improvement of the river for navigation purposes discussed, August.
 „ The Prince of Wales lands in Colombo, 4 P.M., and drives through Pettah, round the lake, to Galle Face, December 1.
 „ The Prince of Wales goes to Kandy, where he is entertained by the Kandyan Chiefs and Buddhist Priests with a *perahera*. Mr. Gregory created a K.C.M.G., and Messrs. Birch and Douglas, C.M.G., December 23.
 „ The Prince visits Messrs. Leechman & Co.'s and Wall & Co.'s mills at Hulftsdorp and Kotahena, respectively, and lays the foundation stone of the Colombo Breakwater. Display of fireworks on Galle Face, illumination of the city and of the Prince's convoy of warships in the Harbour. Departure of the Prince from Ceylon, December 8.
 „ Official expenditure on account of visit of Prince of Wales Rs. 10,000, besides about Rs. 50,000 of private subscriptions.
1876. Little Basses Lighthouse commenced by Mr. W. Douglas, C.E., June 1.
 „ The telegraph wire extended to Batticaloa ; first telegram flashed to the Governor at Colombo, June 28.
1877. Inauguration of the Kandy Waterworks by Governor Sir William Gregory, January 2.
 „ Opening of the Seaside Railway from Colombo to Moratuwa, March 1.
 „ Little Basses Lighthouse completed, March 25.
- Sir James Robert Longden, K.C.M.G., Governor, 1877-83.**
1877. Swearing in of His Excellency Sir Jas. Longden as Governor in the Council Chamber, Colombo, September 4 ; the Hon. L. B. Clarence, Acting Chief Justice (the Hon. Sir J. B. Phear, Chief Justice, November ; and afterwards Hon. R. Cayley, Chief Justice) ; the Hon. A. N. Birch, C.M.G. (and afterwards Hon. John Douglas, C.M.G.), Lieut.-Governor and Colonial Secretary.
 „ Opening of the Seaside Railway as far as Panadure, September 1.
 „ Visit of Sir John Coode to Colombo *en route* to Australia, for the purpose of examining the Harbour Works, Floodwater Schemes, and other proposed improvements, December 28.
1878. First telegram passed between Colombo and Panadure, February 14.
 „ Cocos Islands in latitude 12° S., long. 97°, annexed to Ceylon, and Proclamation issued, November 23.
1879. Geological report on the country between Colombo and Balan-goda, by Mr. A. C. Dixon, B.Sc., &c., May.
 „ First locomotive crosses the Kalu-ganga at Kalutara by the new bridge, June 12.
 „ South Kalutara Railway opened, November 19.
 „ The town of Kurunegala constituted a Local Board, December 30.
1880. Telegraph opened *viâ* Bombay, Aden, and Zanzibar to South Africa, January.

1880. Contract for Nanu-oya Railway Extension under consideration in England, three or four tenders having been sent in. Special telegram to the "Ceylon Observer" announcing that Messrs. Nowel Bros. & Manning have got the contract for £735,000, April 15.
- " Completion of the inner harbour wall of Colombo Breakwater, and the width reduced from 50 to 34 feet, April 10.
- " Transfer of Telegraphs in Ceylon from the Indian to the Colonial Government, and amalgamation of Postal-Telegraph Department by the appointment of Mr. T. F. B. Skinner, Postmaster-General, as first Director of Telegraphs, July 1.
- " First working electric telephone established in Ceylon between the Colombo offices of Messrs. Alstons, Scott & Co. and their coffee stores, a distance of $2\frac{1}{2}$ miles, July.
- " Opening of the Railway Extension to Matale by Governor Longden (eight months before due date, the contractor, Mr. David Reid, receiving a bonus of Rs. 35,000 from Government); a ball given in the evening by the Matale planters in honour of the event, October 4.
1882. Visit of T. R. H. Princes Albert Victor and George of Wales (as Midshipmen on board H.M.S. "Bacchante") to Ceylon. Arrived at Colombo January 25; lands January 26. Perahera at Kandy January 27-28. Elephant kraal at Labugama February 1-3. Visit to Nuwara Eliya February 4; left February 6.
- " The electric light first displayed in Colombo harbour by the Austro-Hungarian Lloyds ss. "Helios," June 26.
1883. Arrival at Colombo in the ss. "Marieotis" of Arabi and his Egyptian fellow-exiles, who are placed in bungalows in Colombo, January.
- " The "last block" of the southern arm of the Colombo Breakwater laid by Mrs. Kyle, March 1.
- " The first jinriksha imported into Ceylon by Messrs. Whittall & Co., May.
- The Hon. Arthur Hamilton Gordon, G.C.M.G., Governor, 1883-90.**
1883. Sir John Douglas, K.C.M.G., Lieut.-Governor and Colonial Secretary; the Hon. Bruce Lockhart Burnside, Chief Justice; the Hon. Sir John McLeod, K.C.B., Major-General Commanding the Forces.
1884. Nanu-oya Railway opened for passenger and goods traffic as far as Talawakele without ceremony of any kind. Dimbula is thus placed in direct communication with Colombo, November 20.
1885. Preliminary steps taken to connect Ceylon with the grand trigonometrical survey of India, February 7.
- " The highest temperature ever recorded in Colombo $95\cdot8^\circ$, registered in the Surveyor-General's Office, February 20.
- " The railway from Talawakele to Nanu-oya opened for traffic, May 20.
- " Mr. Waring's revised estimate for the Haputale section shows reduction from £600,000 to £500,000, or at the rate of £20,000 per mile, May 23.
- " New railway service inaugurated, with express trains between Colombo and Polgahawela, and refreshment cars between Colombo and Nawalapitiya, October 1.
1886. Sir Arthur Gordon visits Uva (January 20) *via* Ruanwella, Avissawella, Ratnapura, and Balangoda. Uva is proclaimed a separate Province (February 1) with great ceremony at Badulla. After a stay of a few days the Governor returns to Kandy *via* Nuwara Eliya, February.
- " The Labugama reservoir for the Colombo water supply filled, August.

1886. Very heavy rainfall on the hills. The Bridge-of-Boats, constructed by Sir Edward Barnes sixty-four years ago, swept away, several bridges destroyed, and damage done to the railways, August.
1887. Celebration of the Queen's Jubilee in all parts of Ceylon (except Nuwara Eliya), the gaieties being, however, a good deal marred in some places by heavy rain. In Colombo a grand function takes place on Galle Face, where special pavilions had been erected for the occasion. Some 25,000 persons assemble, including nearly 2,000 children from schools and colleges. The record of the Queen's reign read in English, Sinhalese, and Tamil. In the evening illuminations and bonfires take place in all parts of the Island, which are, however, largely a failure, owing to the strong wind blowing, June 28.
- „ Commencement of new landing jetty in Colombo, July.
- „ The Queen's Jubilee celebrated in Nuwara Eliya very successfully, the Governor opening a water supply and fountain presented to the town by Mr. Le Mesurier, the Assistant Government Agent, September 16-17.
- „ The long drought in Ceylon broken by heavy rainfall, especially in the North-Central Province, where the main branch of the sacred bo-tree at Anufadhapura is broken, the branch being subsequently cremated with great respect by the priests, October.
1888. The ss. "Lady Gordon" for the new Ceylon Steamship Company successfully launched, June 28. (She arrives in Ceylon on September 29, and commences running on October 8.)
- „ The Orient steamers commence to call at Colombo (the first being the "Austral" outward bound), September 26.
- „ Official correspondence on the subject of the Maligakanda reservoir published, in which is given the opinion of Sir John Fowler that the breaching was owing to expansion and contraction of the walls, the eminent Engineer recommending that a further sum of Rs. 600,000 be spent in banking up the walls, filling in the cracks with asphalt, &c., October.
- „ An old brass cannon (Portuguese or Dutch) brought up by the dredger in Colombo Harbour, October 20.
- „ The "first sod" of the Haputale Railway Extension cut by the contractor without any ceremony, December 1.
- „ Commencement of the Bentota Railway Extension, December 20.
1889. The first sod of the Uva Railway at the Haputale end cut, April 13.
- „ Death of an old Public Works Department elephant, Sella, formerly the property of the King of Kandy at the supposed age of 100, August 13.
- „ Actual laying of the first portion of the Haputale Railway at Nanu-oya station, August 25.
1890. The Committee appointed to report upon the question of a Graving Dock unanimously recommend the site at Uplands, the Northern Arm of the Breakwater being a *sine qua non*, January.
- „ The Dondra Head Lighthouse lit for the first time, February 8.
- „ Arrival of Sir Arthur Elibank Havelock, K.C.M.G., Governor-elect of Ceylon, in the P. & O. ss. "Clyde," May 26.
- Sir Arthur Elibank Havelock, K.C.M.G., Governor, 1890-96.**
1890. Sir Edward Noel Walker, K.C.M.G., Lieutenant-Governor and Colonial Secretary; the Hon. Sir Bruce Lockhart Burnside, Kt., Q.C., Chief Justice; His Excellency Dunham Massy, Major-General Commanding the Forces.
- „ Departure of Sir Arthur Gordon and his staff in the P. & O. ss. "Carthage," May 29.

1892. News of the death of the Right Hon. Sir William Henry Gregory, K.C.M.G., reaches Ceylon, and is received with very great regret, March 8.
- „ The system of measuring criminals known as “ Anthropometry ” introduced to Ceylon by Dr. H. Thornhill, May.
- „ Death at the age of 77 years of Mr. A. M. Ferguson C.M.G., senior editor and proprietor of the “ Ceylon Observer,” and a colonist of over 55 years’ standing, December 26.
1893. Sudden death of an old colonist, Mr. A. S. Burnett, C.E., while superintending the new bridge over the Kelani-ganga, due to apoplexy, January 18.
- „ Foundering of the M.M. ss. “ Niemen ” at Kattiravela, about 20 miles south of Trincomalee, January 22.
- „ Breaking of the “ little monsoon ” with unprecedented severity, several deaths from lightning on Galle Face, the *muttu* and horse of carriage (in which Mr. D. Noble and Mr. A. M. Gepp were driving) being struck by lightning and both instantaneously killed, April 22.
- „ The new Board of Trade steamer “ Ceylon ” arrives at Colombo and is taken charge of by Captain Channer, April 29.
- „ Wreck of the four-masted ship “ Earl of Shaftesbury,” bound from Bombay to Rangoon in ballast, on a reef near Ambalangoda. Six lives are lost, including that of the Captain T. B. Maynard and Second Officer, May 7.
- „ At a meeting held in Kandy it is resolved to erect a hall in Kandy for the use of planters as a memorial of the late Mr. A. M. Ferguson, C.M.G., June 9.
- „ Opening of the Haputale Railway Extension for traffic, June 19.
- „ Death at Brighton of Colonel Francis C. H. Clarke, R.A., C.M.G., Surveyor-General, and Commanding Officer of the Volunteers of Ceylon, August 27.
- „ Accidental death by drowning in the sea at Mount Lavinia of Mr. M. S. Crawford of the Civil Service, who had only returned from leave from Europe the previous night, September 28.
1894. Promotion of the Director of Public Works to a seat in the Legislative Council, January.
- „ An elephant kraal about 8 miles from Ratnapura, January.
- „ Opening of the Kurunegala Railway Extension, February 14.
- „ Appointment of Dr. W. R. Kynsey as a Member of the Legislative Council in room of Hon. R. K. MacBride, who had gone on leave, April.
- „ Removal of the Upland tortoise to Victoria Park, Cinnamon Gardens, February 20 (it, however, dies on March 24).
- „ Nuwara Eliya Hotel struck by lightning, a number of windows being smashed, telephone damaged, and a blue gum tree stripped of its bark. Bungalow of Bathford estate, Dikoya, also struck by lightning and considerably damaged, Mr. Holford having the hair of his head singed, and a kangany, to whom he was talking at the time, being seriously injured, April 11.
- „ Arrival of Mr. J. H. Bostock, who is to be in charge of the Colombo Harbour Extension Work, April 24.
- „ Opening of the Galle Railway Extension, May 7.
- „ Finding of treasure, consisting of a gold alms bowl, a number of pearls, a crystal shrine, and some bones, evidently relics, in excavating the ruins at Toluville, August.
- „ Elephant kraal at Maduwanwala, in the Ratnapura District, August.
- „ Capture of a young whale, 6 feet in length, and the washing ashore of the carcass of another measuring about 50 feet in length, at Ambalangoda, August 7.

- 1894 Information brought to Ceylon of the running ashore on a hidden reef near the Maldivé Islands of the German steamer "Erlangen," August 27.
- " Opening of the Bandarawela Railway Extension, September 3.
- " Arrival of Mr. W. Matthews, the Consulting Harbour Engineer, from Europe for the purpose of inspecting the Colombo Harbour Works, October 20.
- " Departure of His Excellency the Governor Sir Arthur E. Havelock and Lady Havelock on a month's visit to North India, December 21.
1895. Laying of the foundation stone of the Lady Havelock Hospital for Women and Children by His Excellency Sir Arthur Havelock, January 17.
- " Successful laying of the new Indo-Ceylon cable, March 17.
- " Opening of the Victoria bridge over the Kelani river at Colombo to traffic, May 24.
- " Serious railway collision at Galle through the neglect of pointsman on duty, injuring about forty passengers, and badly damaging the engine and carriages, June 5.
- " Installation of electric light by Messrs. Boustead Bros. in Colombo, July.
- " A whale 45 feet long cast ashore near Galle, July.
- " Occupation of the new General Post and Telegraph Office, August 19.
- " Appointment of Sir Arthur E. Havelock as Governor of Madras, and of Sir Joseph West Ridgeway as his successor in Ceylon, September.
- " Opening of the Matara Railway Extension for traffic, December 17.
1896. Conferring of K.C.M.G. on Mr. W. C. Twynam, Government Agent of the Northern Province, January 1.
- " Arrival and reception of Sir Joseph West Ridgeway, the new Governor of Ceylon, February 10.
- " Completion of the first railway engine made in Ceylon for the Ceylon Government Railway at Maradana, May.
- " Elephant kraal at Kurunegala, June.
- " A large whale 20 feet in circumference washed ashore at Kataluwa, near Galle, September.
- " Opening of the Lady Havelock Hospital for Women and Children, the ceremony being performed by Lady Ridgeway, October 12.

(*Extracts from Tables of Events by A. M. & J. Ferguson.*)



S. G. O.

CAPTAIN GAULTERUS SCHNEIDER
Colonial Engineer and Land Surveyor General

1812 - 33

Born at Jaffna	...	...	1772
Died at Colombo	...	...	1841

PUBLIC WORKS, CEYLON.

VOLUME I.

CHAPTER I.

MILITARY FORTS AND BRIDLE ROADS, 1796-1820.

IN 1796 there were no carriage roads in Ceylon, except, perhaps, 1796. in the vicinity of the towns, and Governor North on his tour round the Island in 1800 started from Colombo with 160 palanquin bearers, 400 coolies, 2 elephants, 6 horses, and 50 lascars. The journey as far as Tangalla was done in palanquins and on horseback, and from thence to Trincomalee by sea.

The Rev. James Cordiner, Chaplain to the Garrison of Colombo (1799-1804), who accompanied the Governor on his tour, states: "At Trincomalie a small curricule was purchased by the Governor for the purpose of affording an agreeable exercise at those stations where business required his residence for a considerable length of time All the way from Trincomalie to 'Pulaculla' (on the road to Nilaveli), a distance of four English miles, the road is exceedingly good, and carriages are driven upon it with perfect ease and safety." This is the first mention of a carriage road in British times, and it connected Trincomalee with the salt pans at Nilaveli. No further mention is made of the curricule during the remainder of the tour, which was probably taken to pieces and carried on coolies' heads for the greater part of the way.

The next reference to roads in Ceylon is found in Percival's 1803. "Account of the Island of Ceylon," published in 1803, and in it the following table of roads is given:—

- (1) Trincomalee to Mannar.
- (2) Mannar to Colombo.
- (3) Colombo to Point de Galle, Matara, and Batticaloa.

In his introduction, he states: "The road along the coast of the Island commencing at Trincomalie and proceeding by Jaffnapatnam, Mannar, Colombo, Point de Galle, Matura, and Batticolo with the names and distances of the different stations and resting places on the road both for passengers travelling and the people employed to convey the tapal or letter bags, chiefly taken from a very late survey made by the Postmaster of Ceylon."

Anthony Bertolacci was Postmaster-General of Ceylon in 1803, and there appears to have been a regular tappal service along the line of roads mentioned by Percival, and regular communications

established between the various forts along the coast. In those early days distances were measured by country leagues. A league being equal to about six English miles. Percival states that "The natives divide their league into two 'Camouchies,' which means the changing between palanquin bearers to rest themselves in turn when carrying passengers." From Trincomalee to Mannar he gives the distances as follows :—

			Leagues.
Trincomalee to Mulativo	..	..	14
Mulativo to Jaffnapatnam	..	..	12
Jaffnapatnam to Mannar	..	..	15½
Total			41½

The time allowed for the tappal runners was 66 hours, and the distance was divided into twenty-one halting stations, the names of which are given in the table.

Mannar to Colombo.

			Leagues.
Mannar to Potalum	..	..	13½
Potalum to Chilaw	..	..	5¾
Chilaw to Negombo	..	..	6
Negombo to Colombo	..	..	4
Total			29¼

The time allowed for the tappal runners was 57 hours, and there were twenty-five halting stations on the road.

Colombo to Point de Galle and Matura.

			Leagues.
Colombo to Caltura	..	..	4¾
Caltura to Point de Galle	..	..	9
Point de Galle to Matura	..	..	5¼
Total			19

The time allowed for the tappal runners was 29½ hours, and the distance was divided into fourteen halting stations. He gives the distance from Matura to Batticaloa as about 123 English miles, and states that no tappal was run beyond Matura. The total distance round the Island is given as follows :—

			English Miles.
Trincomalee to Mannar	..	..	250
Mannar to Colombo	..	..	160
Colombo to Batticaloa	..	..	220
Batticaloa to Trincomalee	..	..	70
Total			700

Tables are also given of the route taken by General MacDowal from Colombo to Kandy, 95 miles, and of Mr. Boyd from Trincomalee to Kandy, 167 miles.

All these roads were mere clearings through the forest, similar to those that exist at the present time between the Naval-aar and Kirinda, south of Batticaloa and Kuchchaveli, and Mullaittivu in the Northern Province, practicable for rough cart traffic during the dry season, but impassable during the rains.

The next reference to roads in Ceylon that the compiler has been able to find is a reference in the *Gazette* of May 11, 1814, to a tour made round the Island by Governor Brownrigg:—

Governor Brownrigg, accompanied by Mrs. Brownrigg, Doctor A. High, Deputy Inspector-General of Hospitals, Captain Brownrigg, Deputy Adjutant-General, the Rev. Mr. Bisset, Chaplain (his brother-in-law and Private Secretary), and officers of his staff went on tour round the Island, leaving Colombo on February 28, 1814, and proceeding by Arippu, Jaffna, Trincomalie, to Batticaloa, which was reached on April 30. The greatest part of H. E.'s tour round the Island has been made in a one-horse chaise, being the only instance but one of any wheeled carriage having been used on the northern roads for many years, and in fact they are generally considered impossible. The roads have lately been very generally widened and improved, and it is hoped that in the course of a few years they will become, if not equal to the fine road from hence to Galle, the greater part of which rivals the turnpikes of England, perfectly practicable and easy for travellers. The several resthouses have in like manner been put in good order, and new ones are building where the same are considered necessary.

THE RULES OF THE ROAD.

The rules of the road are a paradox quite,
In your chaise as you're driving along.
If you keep to the left you are sure to go right.
If you keep to the right you'll go wrong.

It will be noted that at this early date the road from Colombo to Galle was a "fine road rivalling the turnpikes of England."

John Davy, M.D., F.R.S., who was on the Medical Staff of the Army in Ceylon from August, 1816, to February, 1820, in his book "An Account of the Interior of Ceylon," published in 1821, gives an account of the mode of travelling and of the roads in the Island of this period. A copy of his map of Ceylon of 1821 is annexed showing the bridle roads that existed at this time connecting forts and military posts. His first excursion into the interior was from Colombo to Adam's Peak:—

On the 15th of April, 1817, at dawn I set out from Colombo in company with my friends, the Rev. George Bisset, William Granville, Esq., and Mr. Moon; on the 17th we reached Ratnapoora and on the evening of the 19th the summit of the Peak, distant from Colombo only 66 miles.

Our mode of travelling varied with the nature of the road and country. The first sixteen miles we went expeditiously in gigs, over an excellent road, through a populous country On leaving the great maritime road at Pantura to strike into the Interior we exchanged our gigs for the indolent Indian vehicles, palanqueens, in which we were carried as far as Ratnapoora, in Saffragam, about 43 miles from Colombo over a pretty good new road The first night was spent in their palanqueens at Horina, and the next morning the journey was continued to Ratnapoora.

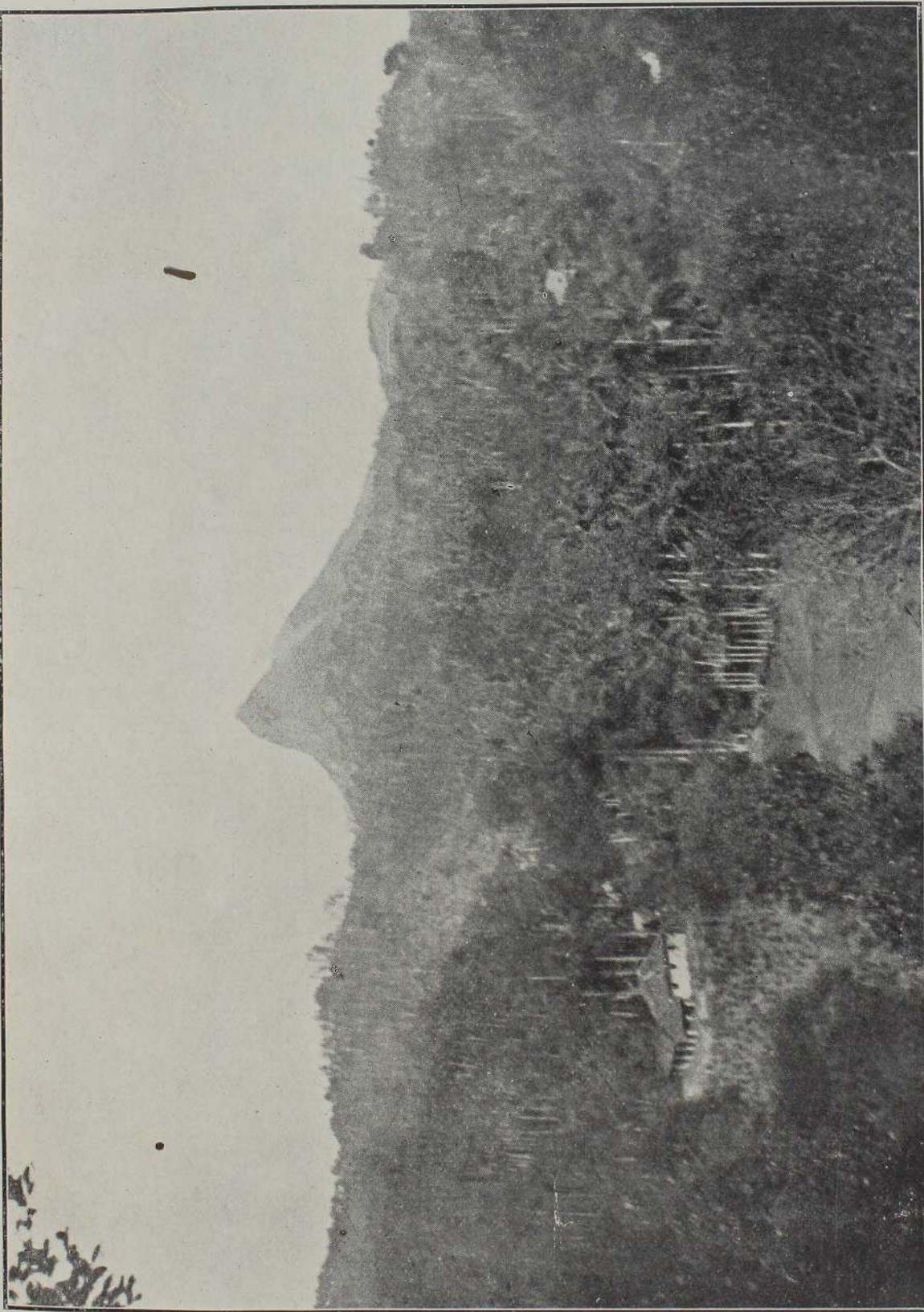
Ratnapoora is a military post situated on a low hill on the right bank of the Kalu-ganga. It is surrounded by fertile little plains, beautifully wooded hills and magnificent mountains At Ratnapoora we left our palanqueens and proceeded towards the mountains each in a chair lashed to two bamboos and carried on men's shoulders. The night was spent at "Palabatula," and at dawn the next morning the party started for the summit on foot My next visit to the Interior was in attendance in a medical capacity on his Excellency the Governor, who left Colombo in company with Lady Brownrigg for Kandy on the Fifth of August, 1817 The

distance of Kandy from Colombo by the common road which we went through the Three and Four Korles is eighty-five miles. The first stage is to Hanwelle, a little fort on the Kelany-ganga, eighteen miles off Between Hanwelle and Avisahavelle the next stage, distant about eleven and a half miles, the country has a wild aspect. It was a border country, between the Kandyans and our old possessions; and in consequence almost a desert Avisahawelle is an inconsiderable village On a low but steep conical hill just by the resthouse there are the remains of a small military post which has been unoccupied and neglected since we have had possession of the Interior. Ruanwelle the next stage is eight and half miles from Avisahawelle. Three years ago this place was almost a desert, but is now a flourishing station. It is advantageously situated on a point of land at the confluence of the clear Kelany-ganga and the turbid Gooragooya-oya. A fort is nearly completed in which there are excellent quarters for officers and men. Idamalpane, the next stage, is eleven miles. This is a small military post ill-situated amongst jungly hills by which it is commanded. Hettymulle, another small military post, is only five miles from Idamalpane. Fort King, the next stage, is seven miles distant I was induced by curiosity to stop on the brow of one of the nearer hills to look at the cavalcade passing on the opposite—it made an imposing appearance; and I shall briefly describe it, to give an idea of the manner in which a Governor travels in Ceylon,—and in this instance, an individual particularly averse to all show and display. First, slowly ascending the hill, appeared three tusked elephants gaily caparisoned, each with a bell hanging from his side which made a clear and mournful sound. Next followed a party of the Ceylon light dragoons, who, though well mounted, had a very diminutive appearance compared with the elephants; their brisk gait, too, was as great a contrast as their size to the grave and measured motion of the huge animals going before them. The Governor next came in view, carried in a tom-john (Sedan chair), then followed Lady Brownrigg in a similar vehicle; the officers attending the Governor rode after, and the rear was brought up by another party of dragoons.

Fort King, deriving its name from Captain King, R.S.C., who planned and superintended the work, is quite a recent creation and still unfinished The fort is building in a most substantial manner on a low hill that commands the ferry of the Maha-oya, a considerable stream, on whose banks many a bloody battle was fought between the Singalése and Portugese.

Amanapoora, eight miles from Fort King, is the next stage, the Bellany mountain intervening The Bellany mountain may be about three thousand feet above the level of the sea. Its ascent is laborious, but less so than I expected; and infinitely less than it was before the new road was made. The Governor and Lady Brownrigg were carried in their tom-johns all the way, without being obliged to get out once; and it is possible, though not humane or considerate, to ascend it on horseback. The toil of the ascent is amply rewarded; the traveller breathes a fresh, cool air; is shaded by noble forest-trees, with which the whole mountain is covered; and when he stops to rest himself, he enjoys every now and then magnificent prospects. Till you reach the top there are only two small descents: one, into a narrow, deep glen, through which a torrent rushes, and the other, into a hollow, where a few soldiers are stationed for the purpose of felling trees and making shingles for the buildings at Fort King. The torrent in the first glen divides the Four Korles from Yattineura.

The descent is short, and pretty gradual. You have an extensive view of the country before you, extremely hilly, and bounded by distant and apparently lofty mountains, but, altogether, not so grand as the scenery on the other side. You see Amanapoora quite close to you, on a steep hill, merely divided from that on which you stand by a deep glen; the British flag was flying on the fort; and we could



S. G. O.

THE BALANE
Alagala Peak

3390 feet
From Amunupura Village.

observe distinctly a number of officers assembled, watching the Governor's approach. We soon descended one hill, and ascended the other. On the Governor's entering the fort a salute was fired, consisting of several discharges from a brass cannon, the effect of the reverberation amongst the hills was very remarkable. The troops, consisting of two companies, one European and the other native, were drawn up to receive His Excellency. It was a pleasure to observe the fresh and healthy looks of our countrymen, with whom this mountain air seemed to agree extremely well.

Amanapoora is a considerable military station. The fort situated on the top of a precipitous hill, about two thousand feet above the level of the sea, has a very commanding aspect, and is naturally strong

Kandy is twelve miles from Amanapoora. The country between the two places is hilly and difficult. The hills in general are covered with wood; the valleys, which are narrow and deep, are cultivated with paddy. Five miles from Amanapoora we passed Dodanwelle, through a delightfully cool avenue of iron trees, many of which have attained a great size. These constitute a sacred grove, and belong to two or three small wihares that are built under their shade. Not quite three miles from Kandy we crossed the Mahawelle-ganga, at the Ganoroowe ferry

On the 26th of September the Governor, having brought to a conclusion some urgent business which detained him in Kandy, His Excellency continued his journey, with Lady Brownrigg and suite; and, on the 3rd of October, arrived at Trincomalie, distant 128 miles.

The first stage was thirteen miles to Kohimbeaweletene, a small village in Matele, where a handsome bungalow had been prepared by the natives for the Governor's reception. Crossing the Mahawelle-ganga at the Watapaloga ferry, we proceeded through a beautiful part of Doombera to the Atgalle Pass, which, by a continued descent of about three miles between the lofty Hoonisgirikandy on the right, and mountains of minor magnitude on the left, leads directly from the high or mountainous country into the low, or rather hilly region, between which there is a difference of perpendicular elevation of about 1,000 feet. It was by this pass that Captain (now Lieutenant-Colonel) Johnson effected his hazardous retreat with the little force he had marched from Batticaloa to Kandy in 1804

The next stage was to the little military post of Nalande, distant from the preceding about fifteen miles. The intermediate country is a continuation of the valley that we had entered below the Atgalle Pass, and its features are very similar, excepting that it exhibits less cultivation, and its scenery is more wild and wooded. About two miles on the road, in the neighbourhood of the only extensive paddy fields that we saw, the ground was pointed out to us where a military post had been established in 1803, called Fort M'Dowall (Matale). Little did those who constructed that fort imagine, that in so short a time hardly a trace of it would remain; and little did we think, that in a still shorter period its buildings would re-appear, and a busy scene start up in the midst of the jungle:—this is actually the case. Fort M'Dowall is now a permanent station, where an agent of government for the province constantly resides, with a detachment of troops

From Nalande to Minere, a distance of forty-three miles and a fatiguing journey of two days, there is surprisingly little variety of country or scenery

Kandelle (Kantalai), distant from Minere twenty-nine miles, is a journey of two days. The country between Minere and Pulian-Kadavette, the intermediate halting place, is a very agreeable succession of wood and plain

The next stage beyond Kandelle, at the distance of thirteen miles, is Tamblegam, a small village near the shore of the bay of the same name.

The country between Kandelle and Tanglegam is very uninteresting, being low, wooded, and uncultivated.

From Tanglegam the Governor and his party proceeded to Trincomalie, distant fourteen miles, by water, across the bay in the Admiral's barge.

1819. The next excursion made by Doctor Davy was through Uva to Kataragamuwa, which he undertook for the greater part alone, and lasted seven weeks :—

On the 11th of March, 1819, I set out from Colombo and proceeded to Hanwelle, where I slept From Hanwelle we went to Avisahawelle; and from thence across the south-west portion of Saffragam to Ratnapoora, through a part of the country little known to Europeans lying at the foot of the frontier mountains Though the distance from Avisahawelle to Ratnapoora is only thirty miles, yet, owing to the many impediments in the way, we were nearly three whole days on the road

Between Ratnapoora and Balangodde, a distance of twenty-nine miles, which we travelled in two days, there is considerable variety of country At Balangodde, during the rebellion, a military post (probably the site of the present resthouse) was established, which is still occupied. The fort, containing rude barracks and officers' quarters, stands on the top of a commanding hill, and is defended by a parapet and ditch. Below the fort is a cantonment for native troops, a small bazaar, and the house of the Dissave of the upper part of the province. The breast-work and ditch, with which this house is surrounded, mark the period at which it was built, and the apprehension of its proprietor of being taken by surprise, and carried off or put to death by his countrymen

The next stage beyond Balangodde is Alutneura, about seven miles distant, and rather less elevated. The country between the two places is very like that in the immediate neighbourhood of the former, but better cultivated. About a mile from Balangodde we came to Weleway oya, already a pretty wide and deep stream, which we crossed on a raft made of bundles of bamboos, piled on one another and tied together

Kalapahane, the next stage, is about fourteen miles from Alutneura. At the distance of half a mile from our resting place, we came to the Belhool oya, which is always a considerable stream, and now flooded by the late rains, it had a formidable appearance. We crossed it with some difficulty, fording it naked, and helping each other The next stage is to Velangahena (Haputale), eight miles distant, across the Idalgashena, the summit of which is about 4,700 feet above the level of the sea. This is the principal pass from Saffragam into Upper Ouva Velangahena is a small military post, which was established during the rebellion, and is still occupied. If Himbleatawelle be not an exception, it is the highest inhabited spot in Ceylon

Himbleatawelle, fifteen miles from Velangahena, is also a military post, of the same date as Velangahena and still occupied. Owing to its great height and situation, the views from it are very extensive, including not only the greater part of the Upper Ouva, but also a considerable portion of the mountainous district of Walapany

From Himbleatawelle to Badulla, distant 8 miles, there is almost one continued descent, which in many places is steep and difficult. Badulla is the principal station of Ouva; it is the residence of the agent of government, and the headquarters of the officer commanding the district. It is situated on a gently rising ground, about 2,100 feet above the level of the sea. . . . Badulla itself is an inconsiderable place; its only fortification is a small star fort (site of present Kachcheri) in which the Commandant resides, in an old Singalese house, which was formerly a royal palace. The buildings are few, and confined

chiefly to officers' quarters of a very humble description, a barrack for European troops, a good hospital, a native cantonment, and a small bazaar

From Badulla I had the pleasure of making an excursion into Lower Ouva and Welassey, in company with Mr. Wright (Agent of Government) and Mr. Moon. On the 28th of March we set out from Badulla and proceeded over a very hilly and rugged road to Passera, distant eight miles and a half

I had much pleasure in noticing a spot, just by the roadside, on a little rising ground that was pointed out to me as the scene of an act of heroism and feeling, of the most noble and disinterested kind, which was performed during the height of the rebellion. I shall quote the part of the general orders in which it was noticed at the time by the Governor, and in which its history and eulogium are happily combined: "In concluding these orders, it is with feelings no less gratifying that the Commander of the Forces places on record a display of heroism most honourable to the individuals who achieved it, in the instance of Lance Corporal M'Laughlin, of the 72d, and a detachment of four rank and file of that regiment; six rank and file (Malays) of the 1st, and six rank and file (Caffries) of the 2d Ceylon; when on their march, on the 16th ult., from Passera to Badulla.

"This small party was beset about midway by a horde of rebels in a thick jungle, who fired on the detachment from their concealment, killing two soldiers of the light infantry of the 73d (James Sutherland and William Chandler) on the spot, and immediately showing themselves in numbers around this little band of brave soldiers, whom they no doubt considered a certain prey; but regardless of their menaces, and faithful to their fallen comrades, ten of these gallant men encompassed the dead bodies of their brother soldiers, while Corporal M'Laughlin with the remaining five, fought their way to Badulla at two miles' distance, through some hundred Kandyans, to report the situation of the detachment they left surrounded by so immense and disproportionate a force, in conflict with which they continued for two hours, when, being relieved by a party detachment by Major M'Donald under the command of Lieutenant Burns, of the 83d regiment, from Badulla, they had the triumph of seeing the insurgents fly before them, and of bringing in the dead bodies of their comrades to be honourably interred." It is a singular circumstance, I may add, that after the generous determination was formed to hazard their lives in so perilous a manner to defend the dead bodies of their companions in arms, not another man was hit by the fire of the enemy, though exposed to it uncovered and stationary in one place for so long a time The small military post at Passera, established during the rebellion, and still occupied, stands on a steep hill of no great elevation, above a torrent, and commands a view of the valley, which before the rebellion was well cultivated and pretty populous. It is about 1,500 feet above the level of the sea.

Alipoota, to which we proceeded the day following, is eight and a half miles distant from Passera, and about 700 feet lower Alipoota is the principal military station of Lower Ouva. The post is situated on a hill, in a pretty populous neighbourhood

From Alipoota Doctor Davy continued his journey to Kotabowa in Welassey, distant about twenty-two miles.

Kotabowa is a considerable moor-village, and it is our principal military station in Welassey. The post, surrounded by a low breast-work, with a ditch inside, is situated on a little plain skirting the village. The quarters of the officers and men are made of a framework of stakes, lined and covered over with paddy-straw.

Though the district of Welassey is not very low, its climate is, like that of the plains, subject to long droughts, and to periodical sickness. The most unhealthy months are July, August, and September, when the wind is generally from the north-west, and the country parched

with drought. Last year the most unhealthy season ever known was experienced. Of two hundred and fifty Europeans in the district, between the 11th of July, 1818, and the 20th of October, only two escaped disease, and of those attacked by the endemic fever, about two hundred died, including five officers. The two who escaped disease, amidst this universal sickness, were, fortunatley, the Commanding Officer, Captain Ritchie, and the Medical Officer, Mr. Hoatson, whom we had the pleasure to find still at the post, in the enjoyment of uninterrupted health.

On the 3rd of April we left Kotabowa and returned to Alipoota. Welassey abounds in game. On our way back we saw an elephant, a wild hog, and an elk, and very many peacocks. One of the prettiest sights I have ever witnessed was eight of these birds collected in a small tree.

On the 5th of April we continued our excursion into Lower Ouva, and proceeded to Katragam by way of Boutle and Talawa, a distance of forty miles, which we accomplished in three days.

The return journey from Kataragamuwa was made through Welleway and up the "Apotella" pass to Velangahena.

On reaching Velangahena the effects of the journey in Lower Ouva were too visible on the whole party, and particularly on our servants and coolies, the majority of whom were indisposed, and more or less affected with fever of the intermittent kind.

After halting a day, and taking leave of Mr. Moon, who returned to Colombo, by way of Saffragam, Mr. Wright and myself proceeded to Fort M'Donald, in hope of being able to cross the mountains, and pass into Kotmale; a district into which very few Europeans had yet penetrated and no one by the route that we meditated. The distance of Fort M'Donald from Velangahena is about seventeen miles.

About half a mile from Fort M'Donald we passed by the hill on which Lieut.-Colonel M'Donald (from whom the adjoining post has its name) made a remarkable stand, during the rebellion, against the whole force of the country assembled under the command of Kappitipola. On this hill, of gentle ascent, with the advantage only of not being commanded, the gallant Colonel, with a party composed of sixty rank and file, for eight days in succession, stood and repelled the attacks of about seven or eight thousand Kandyans. And, it is very remarkable, that though half the enemy perhaps were armed with muskets, and our men were much exposed to their fire, particularly in the charges which they made to keep the Kandyans at a distance, not one of them was killed or wounded. After waiting two entire days at Fort M'Donald, in expectation of a favourable change of weather, Mr. Wright and I parted; he to return to Badulla, and I to continue my journey through some other parts of the country which I had not yet visited.

On the 17th of April I ascended the Dodanatukapella and proceeded over the mountains to Maturatta, at the distance of sixteen miles, which we reached in eight hours. The military post at Maturatta is remarkably situated on a little hill, a process as it were of the mountain, about 2,700 feet above level of the sea; Though this post is of a very humble description and rude construction, —the work of a small detachment of troops, aided only by the natives— it is not void of interest.

From Maturatta I proceeded to Marasena, and from thence to Kandy, a total distance of twenty-six miles. After halting at Kandy five days, chiefly on account of the indisposition of myself and of several of my people, one of whom died of cholera, and another had a very narrow escape from remittent fever, I set out on the 26th of April, on my return to Colombo by the way of the Seven Korles.

My first day's journey was to Meddawallatene, in Toompane, distant from Kandy about twelve miles. The Hariseapattoo, which intervenes between Katigastotte, the ferry of the Mahavelle-ganga, which we crossed, and the Girriagamme pass, which we descended

The little military post of Meddawallatene is situated on rising ground at the bottom of the Girriagamme pass, and at the head of the Galgedera pass. It is almost surrounded by paddy fields, which are bounded by fine wooded and rocky heights, that reminded me of the Troshachs From Meddawallatene we proceeded to Koornagalle, in the Seven Korles, distant eighteen miles. Koornagalle, where I halted a day, is our principal station in the extensive and fertile district of the Seven Korles From Koornagalle, we proceeded to Giriulla, twenty-two miles distant Dambadinia, about five miles from Giriulla, which, it is said, was formerly a royal residence, is now only remarkable for a lofty naked and insulated rock, that rises perpendicularly out of the plain Giriulla is only a very few feet above the level of the sea, and though the station of a temporary commissariat store, affords no accommodation to the traveller. Colombo is thirty-eight miles distant from Giriulla, which we reached on the 1st of May.

It is remarkable that the distances between forts and military posts given by Doctor Davie differ so little to those between the same places of the present day, clearly showing that the existing main roads follow to a great extent the line of the original bridle paths of a hundred years ago :—

	1817.	1918.
Colombo to Kandy	85 ..	72
Do. Panadure	16 ..	16·25
Do. Ratnapura <i>viâ</i> Horana and Nambapana	43 ..	42·50
Do. Hanwella	18 ..	18·13
Hanwella to Avissawella	11½ ..	11·28
Avissawella to Ruwanwella	8½ ..	11·34
Kandy to Nalanda	28 ..	30·25
Nalanda to Dambulla	15 ..	15
Avissawella to Ratnapura	30 ..	26·59
Ratnapura to Balangoda	29 ..	27·23
Balangoda to Haputale (Velangahena Fort)	34 ..	31·79
Haputale to Badulla	23 ..	24·64
Badulla to Passara	8½ ..	11·80
Kandy to Kurunegala	30 ..	25·60
Avissawella to Kitulgala (Pasbage Fort)	24 ..	24·08

The distance from Colombo to Kandy in 1817 was 85 miles, against 72 of present time, as the original road ran through Hanwella, Avissawella, Ruwanwella, Hettimulla, Attapitiya (Fort King), and across the Balani Pass to Peradeniya and Kandy, as shown on accompanying plan. This was the only direct road from Colombo to Kandy in 1817, and was in use to about 1823, when work on the new line of road was sufficiently advanced to admit of rough cart traffic; the new road was not fully completed and bridged till 1832.

The historic Balani Pass was for centuries the scene of desperate fighting, as it was the key to the Kandyan country. Late in the sixteenth century it was taken by the Portuguese, who held possession of it for a short period, but they were soon afterwards surrounded and experienced a total rout. In 1638 the Pass was again the scene of hard fighting and of the defeat of the Portuguese. In 1763 it was taken by the Dutch, but only remained in their possession for a short time. It was by this route that the Embassy marched to Kandy in 1800 under General MacDowal. The escort reached Sitawaka on March 18, but took to April 5 to cross the Pass. It was taken and lost by the British in 1803, and finally recaptured in 1815.

Major Skinner, in his book "Fifty Years in Ceylon," mentions that he crossed this Pass in 1818 when marching a detachment of troops from Trincomalee to Colombo :—

From Kandy the second day's march was down the old Ballany Pass over which three years before my father had brought up his battery of heavy guns, one of them a 42 pounder for the taking of Kandy. It was a marvel to me how he could have accomplished it : I subsequently learnt that he had parbuckled the guns up from tree to tree . . . the mountain path was so narrow, broken, steep, and rocky that it was quite impossible for any horse or rider."

Sir Emerson Tennent, in his History of Ceylon, writes regarding the roads in the Island when Sir Edward Barnes assumed the Government in 1820 :—

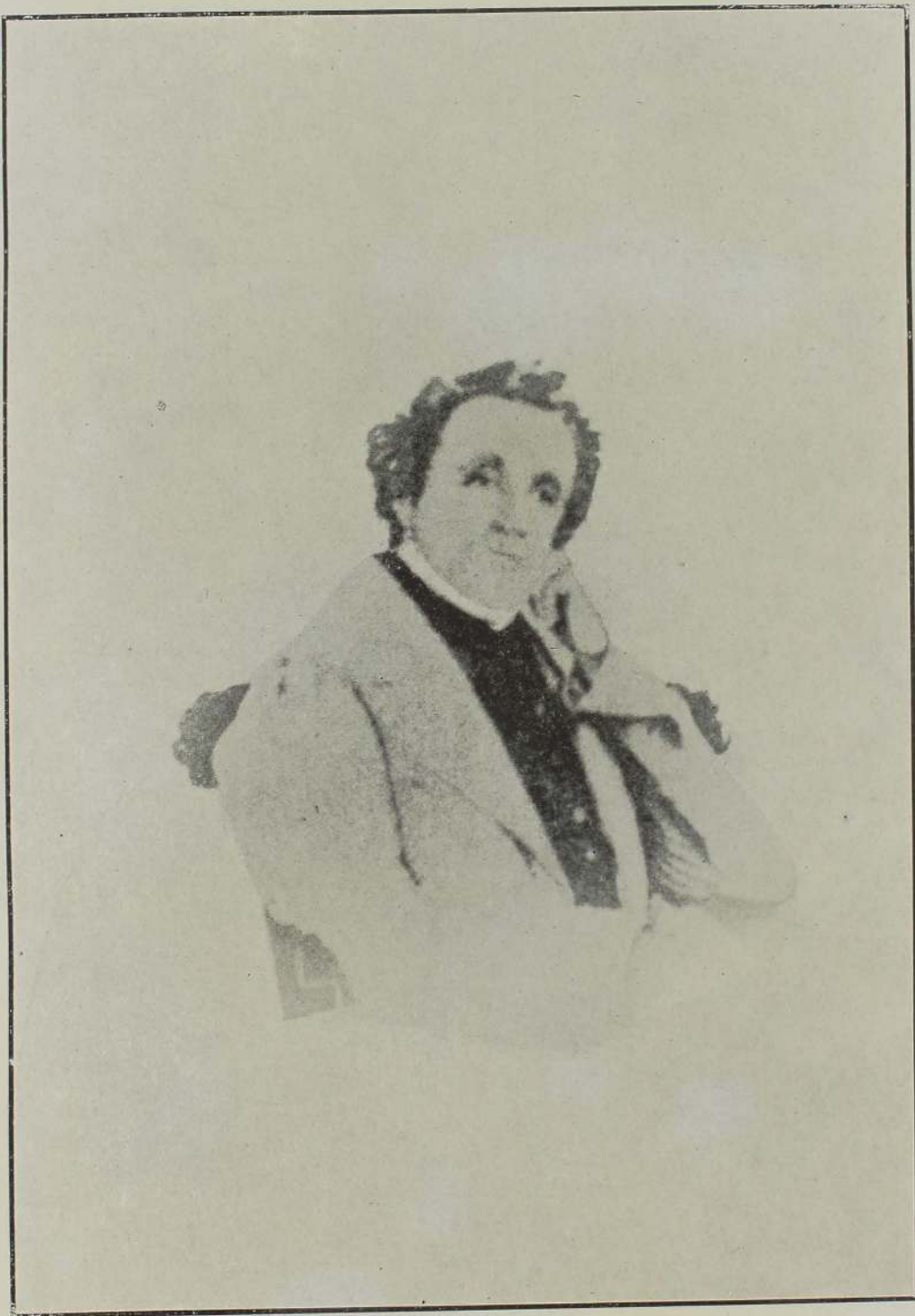
No portion of British India can bear comparison with Ceylon, either in the extent or the excellence of its means of communication : and for this enviable pre-eminence the colony is mainly indebted to the genius of one eminent man, and the energy and perseverance of another, Sir Edward Barnes, on assuming the Government in 1820, had the penetration to perceive that the sums annually wasted on hill-forts and garrisons in the midst of wild forests might, with judicious expenditure, be made to open the whole country by military roads, contributing at once to its security and its enrichment. Before the close of his administration he had the happiness of witnessing the realization of his policy ; and of leaving every radius of the diverging lines, which he had planned, either wholly or partially completed. One officer who had been associated with the enterprise from its origin, and with every stage of its progress remained behind him to consummate his plans. The officer was Major Skinner, the present Commissioner of Roads in Ceylon. To him more than to any living man the colony is indebted for its present prosperity ; and in after years, when the interior shall have attained the full development of its productive resources, and derived all the advantages of facile communications with the coast, the name of this meritorious public servant will be gratefully honoured in close association with that of his illustrious chief.

The old Kandy Road across the Balane Pass, 1820.

" Marshes and quagmires, puddles, pools, and swamps,
Dark matted jungles and long plashy plains,
Exhaling foetid airs and mortal damps,
By Kandian perfidy miscalled a road,
Through which the luckless traveller must wade,
Uncheered by sight of man—or man's abode,
Gladly I give to you these farewell strains,
Nor e'er again would your repose invade,
I loathe your noisome fogs—your poisonous mud,
And the sad stillness of the sultry wood,
Without a sound the sickening heart to cheer,
Oh, when shall I the Western breezes hear,
Bearing old Ocean's intermittent roar,
As wave succeeding wave, assails the sounding shore ? "

Sir Hardinge Giffard, Chief Justice of Ceylon, 1820-7.

Note.—Sir H. Giffard died on the homeward voyage, 1827.



S. G. O.

LIEUT: GENERAL JOHN FRASER

Assistant Quarter Master General

Director of the Island Works.

1820 - 1832

Died at Kandy, May 29th 1862.

CHAPTER II.

ROAD CONSTRUCTION UNDER LIEUTENANT-GENERAL JOHN FRASER, ASSISTANT QUARTERMASTER-GENERAL, 1820-1832, AND MAJOR SKINNER, 1833-1867.

IN 1820 Lieutenant-General John Fraser, Assistant Quarter-**1820.**
master-General, was appointed Director of the Island Works, and the great military roads from Colombo to Kandy and from Ambepussa to Kurunegala were commenced and completed to Kandy in 1825, and Kurunegala about the same date; that from Kurunegala to Kandy over the Galagedara Pass was completed in 1821, and from Kurunegala as far as Dambulla in 1827. The Kandy-Matale road was opened in 1831, and continued to Dambulla in 1832, and to the boundary of the Eastern Province in 1833 (Forbes).

On the completion of the road from Kandy to Matale compulsory **1831.**
labour in Ceylon was gradually abolished, and the following circular was addressed to Collectors of Districts :—

Abolition of Compulsory Labour in Ceylon.

THE COLLECTORS OF DISTRICTS.

Chief Secretary's Office,
Colombo, November 12, 1831.

SIR,—THE Right Honourable the Governor being desirous to follow up the steps already adopted for the gradual abolition of compulsory labour in this Colony, I have it in command to point out to you the course it will be necessary for you to observe in pursuance of this important measure.

You will not, hereafter, consider yourself at liberty to exact the gratuitous labour of any person.

When labourers are required for the public service for payment, you will use every effort to engage volunteers, and you will in no case compel the services of any individual. If the difficulty experienced in procuring volunteers in your district is attributable only to the inadequacy of the rate of wages allowed, and in order that the Governor may know how far the measures you are now instructed to adopt are effectual in superseding what has hitherto been deemed to be the necessary demand for the compulsory labour of the inhabitants, I am to direct that you do invariably make an entry in your diary of every order given by you for procuring labourers not being volunteers, and that at the termination of each month you transmit to me a full return showing the number of persons so employed, and the period of their employment, and stating distinctly the circumstances which have rendered their compulsory employment unavoidable.

The Governor is disposed to believe that if travellers are left to provide themselves with coolies on all occasions the difficulty of procuring the means of transport would be found much less formidable than is generally supposed, and even if the cessation of the compulsory assistance now afforded were for a time productive of some personal inconvenience, we are prepared to expect that it would only be temporary. I am, therefore, to desire that you do not use any compulsion for the purpose of procuring the means of transport for travellers, unless in cases of urgent necessity for the assistance of persons travelling on the public service.

You will report the consequences of this arrangement at the end of six months for His Excellency's information.

I have, &c.,

P. ANSTRUTHER,
Deputy Secretary to Government.

In December, 1831, it was proposed that two light four-wheeled carriages should run daily between Colombo and Kandy, and the following prospectus was issued :—

Prospectus of the Establishment of a Mail Coach between Colombo and Kandy.

December, 1831.

It is proposed that two light four-wheeled carriages shall run daily, between Kandy and Colombo, one leaving Colombo at 4 A.M., and the other leaving Kandy at the same hour every morning. The journey to be performed in about 14 hours from Colombo to Kandy, and in 12 hours from Kandy to Colombo.

The carriage is intended to carry the mail and light parcels, no luggage being allowed.

It is proposed that a sufficient number of horses shall be ready at each station for the private carriages of travellers. This, however, will depend upon the future demand; the present object being the establishment of a public carriage.

The capital required for this undertaking (calculated at £2,000) is to be raised by shares at £50 each. The undertaking will not commence until this sum has been subscribed, which has been calculated to be sufficient to defray the estimated cost of the outfit £570, and also the expenditure for the first year, estimated at £1,065. These sums with £365 for wear and tear will amount to £2,000, the sum it is proposed to raise.

The income, including the sum granted by Government for carrying the mail, is estimated at £1,835, leaving a surplus of £405 to be divided among the shareholders.

The entire management of the concern to be vested in a Committee of five persons, viz., three at Colombo, one at Kandy, and one at an intermediate station on the road. The accounts to be balanced and laid before the shareholders once every year by the Committee, but a majority of the shareholders may demand a statement of their affairs at the end of every quarter.

Tickets for seats and for post horses to be procured; and parcels received and booked at the Post Offices of Colombo and Kandy. Tickets for intermediate distances will also be issued by proper persons on the road.

As an undertaking of so extensive a nature will require some time for its complete arrangement, it is in contemplation to establish a one-horse carriage, as soon as possible, for the accommodation of the public. Of this due notice will be given in the *Gazette*.

Government will guarantee to the shareholders the conveyance of the mail for five years, provided that the letters during that period be carried at the rate now fixed.

Government will receive £30 per annum in lieu of all tolls from the mail carriages, but if at the end of any one year the average profit of all the preceding years should exceed 7 per cent. upon the capital subscribed, a sum equal to the established tolls will be paid to the Government until the profits fall below 7 per cent.

List of Shareholders.	Shares.	£
His Excellency the Governor ..	6 ..	300
Sir J. Wilson ..	2 ..	100
Hon. R. Boyd, Esq. ..	2 ..	100
Hon. W. Granville, Esq. ..	1 ..	50
Mr. Tufnell ..	4 ..	200
Mr. Layard ..	1 ..	50
Mr. Anstruther ..	2 ..	100
Mr. Wright ..	1 ..	50
Mr. Brownrigg ..	1 ..	50



Thomas Skinner

S. G. O.

The Hon: Major THOMAS SKINNER C.M.G.
In Charge of Road Construction 1820 - 40
Commissioner of Roads 1841 - 50
Civil Engineer & Commissioner of Roads ... 1850 - 67
Died at Guilford,
24th July 1877.

List of Shareholders.	Shares.	£
Mr. Wilmont	1 ..	50
Mr. Turnour	1 ..	50
Sergeant Davidson	2 ..	100
Captain Stannus	1 ..	50
Dr. Forbes	1 ..	50
Kickwick	1 ..	50
Mr. Power $\frac{1}{2}$ —Don Solomon Dias Modliar $\frac{1}{2}$	1 ..	50
Dr. Kinnis	1 ..	50
Colonel Hamilton	1 ..	50
Captain Schneider	1 ..	50
Colonel Clifford	1 ..	50
Captain Pearson	1 ..	50
Mr. Armour	1 ..	50
Mr. Vanderwick	1 ..	50
C. de Saram, Modliar and others	1 ..	50
Mutoosamy	1 ..	50
C. Jagatellek Modliar and others	1 ..	50
The 1st and 2nd Adigars	1 ..	50
3rd Adigar and other Chiefs	1 ..	50
	47	2,000

(*The Ceylon Literary Register.*)

The road up the Kadugannawa Pass was constructed by Captain 1832. W. F. Dawson, Commanding Royal Engineers, Ceylon, as also that over the Galagedara Pass. He died in Colombo on March 28, 1829, and a monument to his memory was erected at the top of the Kadugannawa Pass in 1832, which bears the following inscription:—

CAPTAIN W. F. DAWSON.

During the Government of General Sir E. Barnes, G.C.B.,
Commanding Royal Engineers,

Ceylon,

Whose Science and Skill planned and executed this Road
and other Works of Public Utility.

Died at Colombo,
28th March, 1829.

By a Subscription among his Friends and Admirers in Ceylon
this Monument was raised to his Memory,

1832.

Regarding this monument, Major Skinner writes in " Fifty Years in Ceylon " :—

A singular coincidence occurred in reference to the monument erected to his memory on the top of the Kadugannawa Pass, which was one of the triumphs of his skill. The foundation of his column was laid at the same time as that to the memory of His Royal Highness the Duke of York, late Commander-in-Chief, at the entrance of the Park at the end of Waterloo Place. The dimensions of these two memorials are identical, the only difference in them being that Dawson's monument is built of brick, whereas that erected by the nation to the memory of the Commander-in-Chief of the Army, in a conspicuous position in the metropolis, is of granite, surmounted by a statue of His Royal Highness.

The monument consists of an obelisk 125 feet in height, and cost the sum of £342. 7s. 11d.

There is no record of the construction of the section of road from the boundary of the Eastern Province to Trincomalee, which was probably constructed at a date prior to 1833. The bridge-of-boats at Grandpass was constructed in 1822 by Lieutenant-General Fraser, Assistant Quartermaster-General, also "Gordon's bridge" on the 59th mile of the Kandy road, named after Captain Gordon, Commandant of Fort King. The "Nanu-oya" bridge on the 67th mile was constructed by Captain Brown, Royal Engineer, in 1826, and "Mawanella" by the same officer in 1832. In the same year the satinwood bridge at Peradeniya consisting of a single span of 205 feet was completed. This bridge was designed by Lieutenant-General Fraser, and erected by Captain Brown.

The road from Kandy to Nuwara Eliya was commenced in 1827 and completed ten years later (Forbes). All these roads, with exception to the Kandy and Kurunegala roads, were rough clearings through the forest, and with no permanent bridges or culverts, the approaches to rivers and streams being graded to facilitate wheel traffic. They were mostly constructed by Military Officers and compulsory labour, which was not abolished till 1832.

In 1833 the Island was divided into five Provinces, the Western, Central, Southern, Northern, and Eastern, and a Civil Engineer (Mr. F. B. Norris) appointed on the retirement of Lieutenant-General Fraser. Road construction was continued under his direction and that of the Commissioner of Roads appointed in 1841, with Assistant Civil Engineer and Subordinate Military Officers, up to 1852. In 1845 the North-Central Province was added.

1836. At this time a lengthy correspondence took place between the Governor Sir Wilmot Horton and the Major-General Sir John Wilson regarding the employment of Military Officers as civilians, and the following letter from the Colonial Secretary, Mr. P. Anstruther, to the Assistant Military Secretary throws some light on the question :—

Extract from Correspondence with Assistant Military Secretary in 1836.

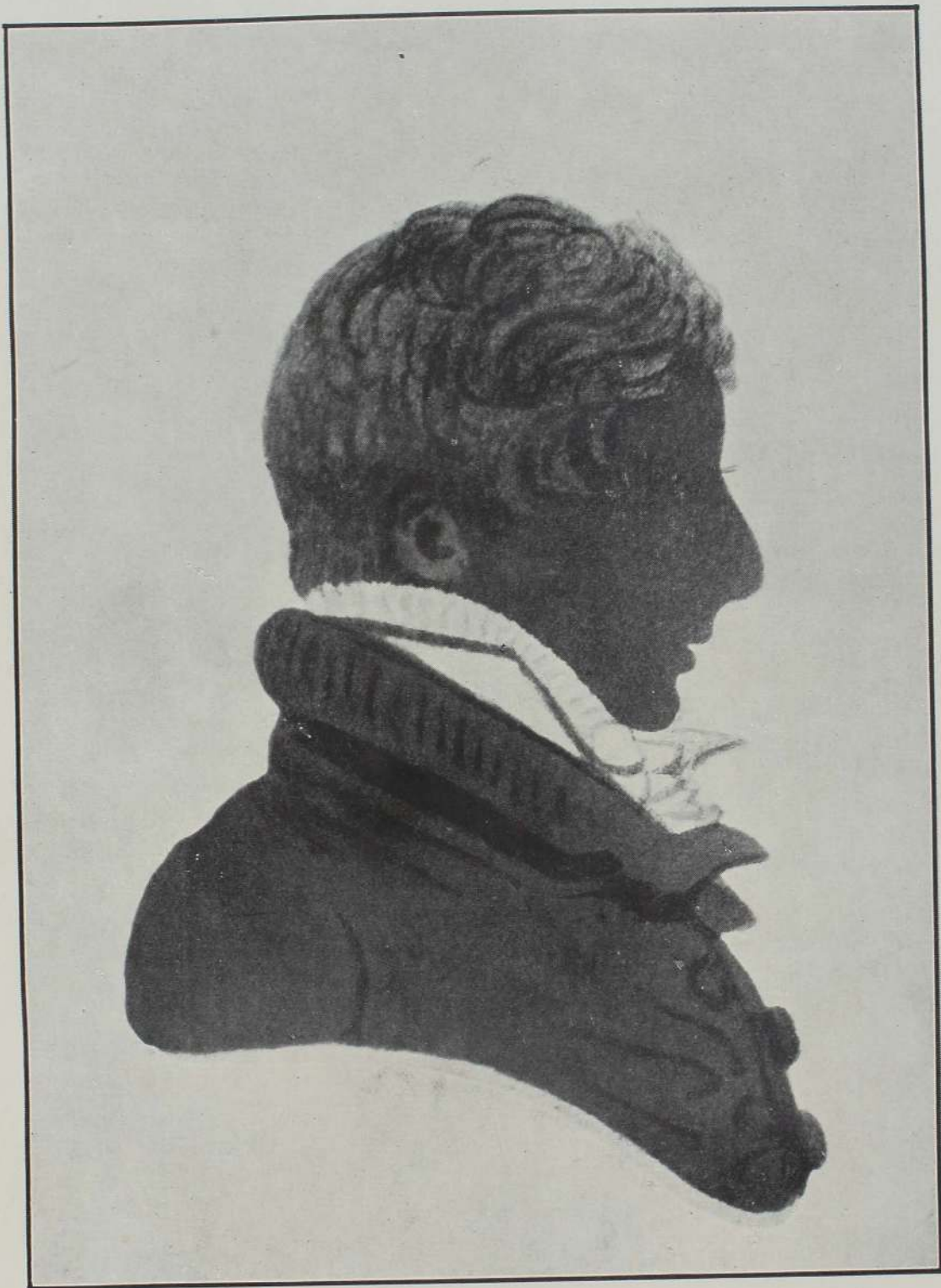
THE ASSISTANT MILITARY SECRETARY.

Nuwara Eliya, April 14, 1836.

SIR,—IN reference to your letter of the 19th March, I am directed by the Right Hon. the Governor, previous to offering some detailed remarks upon the scale laid down in that letter of the number of officers necessary to be retained for regimental services in each Regiment serving in Ceylon, to offer some preliminary observations for the most serious consideration of the Major-General.

If the Major-General will turn to the Report of the Commissioners, printed by the House of Commons, page 29, he will find the following statement :—

"There are twenty-five principal appointments in the Island, to which the gentlemen of the Civil Service are alone eligible. The means of selection, therefore, are much too limited, and most of the Government Agencies for the Kandian Provinces have accordingly been held by officers in Ceylon who have performed these duties efficiently and creditably upon small salaries, in addition to their Military allowances."



S. G. O.

CAPTAIN WILLIAM FRANCIS DAWSON
Commanding Royal Engineers
Ceylon
During the Government of General SIR E. BARNES G. C. B.

In the year 1833 there were nine Military Officers employed civilly, seven under the designation of Agents of Government, one as Judicial Agent, and one as Sitting Magistrate.

Agents of Government.

1. Badulla ..	..	Major Douglas,
2. Three Korles	..	Captain Law,
3. Four Korles	..	Captain Pearson,
4. Matelle ..	..	Captain Forbes,
5. Maturatte	..	Captain Kelson,
6. Alepoot ..	..	Captain Rogers,
7. Madawelletene	..	Captain Macpherson,

Judicial Agent.

8. Seven Korles	..	Captain Firebrace,
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Sitting Magistrate.

9. Kandy	Captain Wynn.
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Whereas at the present moment in 1836 there are only six officers employed civilly under the designation of District Judges and Assistant Agents :—

District Judges and Assistant Agents, 1836.

Badulla ..	..	Captain Rogers,
Matelle ..	..	Captain Forbes,
Nuwera Ellia	..	Captain Kelson,
Hambantotte	..	Lieut. Morris (temporarily),

Assistant Agent.

Kornegalle	Captain Firebrace,
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District Judge.

Kornegalle	Captain Macpherson,
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The Assistant Agencies and District Judgeships

Of the Three Korles	..	Mr. Steward,
The Four Korles	..	Mr. Whiting,
And Madawelletene	..	Mr. Rodney.

are now filled by Civilians, and the situation of Sitting Magistrate in Kandy held by Captain Wynn has been abolished. The number of officers serving civilly as District Judges and Assistant Agents in 1833 has, as already observed, been reduced from nine to six in April, 1836

(Signed) P. ANSTRUTHER, C.S.

(*Literary Register*, February, 1888.)

The following were the amounts provided for in the Estimates 1844. of 1844 for the Civil Engineer, Surveyor-General, and Commissioner of Roads Department :—

CIVIL ENGINEER AND SURVEYOR-GENERAL.

	£	£
An estimate of the sums which may be required towards the execution of the under-mentioned services and works, in addition to Fixed Establishment and stores	..	— 21,000
Salaries, contingent	..	188
Tools, instruments, wagons, and carts	..	450
Elephants ..	..	483
Travelling expenses	..	220
Miscellaneous ..	..	146
		————— 1,487

Charges brought to account by the Government Agents.

	£	£
For surveying		3,000
<i>Western Province.</i>		
For general service	600	
For incidental repairs of public buildings and works ..	2,640	
For incidental repairs to roads, &c., within the town of Colombo	2,500	
For carrying on works already sanctioned by the Legislative Council	4,460	
For new works under £200 each	1,235	
For other new works :—		
To provide for a Lunatic Asylum	1,500	
Building offices for the Assistant Agent and District Judge at Kegalla	253	
Building a grain shed near the Custom-house of Colombo ..	531	
Do. Panadure	337	
For making new roads in the Maradana Cinnamon Garden ..	1,000	
To keep open the canal between Kalutara and Puttalam ..	3,000	
		18,056
<i>Southern Province.</i>		
For general service	227	
For incidental repairs of public buildings and works ..	1,112	
For incidental repairs of roads, &c., within the towns of Galle and Matara	400	
For carrying on works already sanctioned by the Legislative Council	979	
For new works under £200 each	532	
For other new works :—		
For completing the Assistant Agent's house at Hambantota ..	286	
		3,536
<i>Eastern Province.</i>		
For general service	143	
For incidental repairs of public buildings and works ..	176	
For incidental repairs of roads, &c., within the town of Trincomalee	200	
For carrying on works already sanctioned by the Legislative Council	31	
		550
<i>Northern Province.</i>		
For general service	350	
For incidental repairs of public buildings and works ..	132	
For incidental repairs of roads, &c., within the town of Jaffna ..	150	
For carrying on works already sanctioned by the Legislative Council	1,380	
For new works under £200 each	475	
For other new works :—		
Additions to the gaol at Jaffna	200	
Alterations of Supreme and District Court-house at Jaffna ..	353	
		3,040
<i>Central Province.</i>		
For general service	480	
For incidental repairs of public buildings and works ..	440	
For incidental repairs to roads, &c., within the town of Kandy ..	1,000	
For carrying on works already sanctioned by the Legislative Council	2,150	
For new works under £200 each	258	
For other new works :—		
For erecting a substantial masonry Arch of 12 feet span and 12 feet roadway over the stream intersecting the Trincomalee road at 1½ mile from Kandy	276	
For making sundry additions to the gaol at Kandy, and of repairing and improving the same	474	
Expense of facing and dwarf walling 600 running feet of the bund at Kandy	250	
For constructing a resthouse at Campola	574	
		5,902

	£	£
Unforeseen contingencies	—	1,000
Government moiety in aid of public works to be undertaken by private individuals in sums not exceeding the amount of private contributions	—	200
Provided that the total expenditure of the Civil Engineer and Surveyor-General's Department, inclusive of Fixed Establishment, stores, and all other charges shall not exceed £31,000..	—	<u>36,771</u>

Recapitulation.

Contingent salaries	188
Tools, instruments, wagons, and carts	450
Elephants	483
Travelling expenses	220
Miscellaneous charges	146
Surveying	3,000
General service	1,800
Incidental repairs of public buildings and works	4,500
Incidental repairs of roads, &c., within towns	4,250
Carrying on works already sanctioned by the Legislative Council	9,000
New works under £200 each	2,500
Other new works	6,034
To keep open the Canal between Kalutara and Puttalam	3,000
Unforeseen contingencies	1,000
Government moiety in aid of works to be undertaken by the inhabitants	200
	<u>36,771</u>

COMMISSIONER OF ROADS.

An estimate of the sums which may be required towards the execution of the under-mentioned services and works, in addition to the Fixed Establishment and stores	—	20,000
Two officers to be employed in tracing and opening new roads at 15s. each per diem	549	
Four officers superintending pioneers, at 7s. 6d. per diem	549	
General service : Central Province	513	
General service : Northern Province	156	
Tools, instruments, wagons, and carts	800	
Elephants	850	
Clothing for four divisions of pioneers	550	
Travelling expenses of the Commissioner of Roads and officers of his Department	450	
Miscellaneous	350	
	<u>4,767</u>	

Including unexpended Balances of unfinished Estimates of previous Years.*Charges brought to account by the Government Agents.**Roads.*

Ordinary and necessary Repairs.

Colombo to Kandy	7,000
Ambapusse through Kurunegalle to Kandy and from Kurunegalle to Dambool	3,000
Kurunegalle to Puttalam	300
Colombo to Galle	3,000
Colombo to Jaffna	1,000
Kandy to Trincomalie	1,500
Kandy to Nuwara Eliya	1,000
Kandy to Badulla	500
Galle to Hambantota	500
Repair of roads in the peninsula of Jaffna	500
Repair of roads from Aripo to Anuradhapura	250
	<u>18,550</u>

<i>Restoration and Improvement of Old Roads.</i>		£	£
Negombo to Veyangoda	.. ..	500	
Ballapane to Ruanwelle	.. ..	500	
Panadure through Horane to Nambapane	.. ..	150	
Colombo to Hanwelle, Avisawelle, and Tallagamme	.. ..	1,500	
Kalutara to Agglewatte	.. ..	250	
Negombo to Kurunegalle	.. ..	300	
Badulla to Nuwara Eliya	.. ..	600	
Repair and restoration of parish roads in the Northern Province		500	
Point Pedro to Valwattytorre	.. ..	800	
Prolongation of Mallagam road to the coast	.. ..	450	
		—————	5,550
<i>Continuation of Roads already begun in former Years.</i>			
Yatiantota to Gampola	.. ..	2,000	
Badulla to Hambantota	.. ..	1,000	
Badulla to Kalupahane	.. ..	350	
Galle to Baddegama	.. ..	500	
Chavakachcheri to Elephant Pass	.. ..	1,000	
Sangany to the coast	.. ..	800	
		—————	5,650
Surveying, tracing, and opening new lines of roads in the several Provinces	.. ..	—	5,000
Clearing the Gintota river	.. ..	—	500
Unforeseen contingencies	.. ..	—	2,000
Donations in aid of works to be undertaken by the inhabitants..		—	500
Provided that the total expenditure of the Commissioner of Roads Department, inclusive of Fixed Establishment, stores, and all other charges shall not exceed £33,000	.. ..	—	42,517
		—————	66,402
<i>Royal Mail Coach to Kandy.</i>			

The following were the regulatinos and Committee of Management in 1844 :—

The mail leaves Colombo daily at 5 A.M. (Sundays excepted), and arrives at Kandy at 4.30 P.M. Leaves Kandy daily (Sundays excepted) at 5 A.M. and reaches Colombo at 4 P.M.

(Offices in King street, Colombo, and Post Office, Kandy.)

Clerks : Mr. P. de Silva, Colombo ; Mr. A. C. Savapattey, Kandy.

Committee of Management.

Major G. T. Parke, Chairman and Manager.

F. Saunders, Esq.
R. H. Fitzroy Somerset, Esq.
E. R. Power, Esq.
R. Jeffery, Esq.
R. Christian, Esq.
Lieut. Bird.

D. Davidson, Esq.
S. Butler, Esq.
Hew Steuart, Esq.
Mr. H. A. Jansz.
Mr. J. P. Ebert.

<i>Fares.</i>		£	s.	d.
From Colombo to Kandy and <i>vice versa</i>	.. ..	2	10	0
From Colombo to Maha Haine and intermediate stations	.. ..	1	5	0
From Colombo to Ootooankandy	.. ..	2	0	0

1846. In 1846 Mr. J. A. Caley, who was in charge of the Central Province, states in his evidence before the Commission that was held on the Public Works Department in 1864 : " In 1846 works in progress in the Central Province were bridges on the Matale and Kurunegalle roads, repairs to Peradeniya bridge, and metalling of the Peradeniya road." Major Skinner, in his evidence before the same Commission, states that metalling of the Kandy road was commenced in 1841. In 1847 construction of bridges on the Matale and Kurunegala roads was continued, and a survey made of the road from Matale to Trincomalee.

In 1848 Major Skinner, Commissioner of Roads, wrote a "Memo- 1848.
randum regarding the Roads (then existing) in Ceylon, their present
Condition, and Treatment recommended." This document has
fortunately been preserved, and a copy will be found on page 214.
He states briefly :—

Road from Colombo to Kandy, 72 Miles.—The first 35 miles is in a very precarious condition, the thin crust of 4 inches of metal with which it has been repaired is worn through, and it is in vain to attempt to patch it by means of depôts Restriction of means for the upkeep and repair of this main line has been carried to an injurious extent. The system must be changed, or the road cannot be preserved in a state to bear the traffic it is subject to. He recommends an expenditure of £15,000 for repairs to be spread over four years.

Ambapussa through Kurunegalle to Kandy, 48 miles.—This road has never been completed, most of the bridges are temporary many portions have never been metalled or gravelled To properly bridge, drain, and metal this line would not cost less than £30,000. It is, however, in its present state a very useful road in dry weather.

Colombo to Galle, 72 Miles.—This is nothing more than a gravelled road throughout. Its improvement from a sandy track to its present condition has been of very slow progress. The traffic on it is very limited, but being the high road from Colombo to all parts of the world, it cannot be neglected It ought not to have less than £2,000 a year for its upkeep, though I am sorry to say this has been limited to £1,500.

Galle to Matara, 28 Miles.—This road is so shaded with coconut trees that it will always cost money to keep it in good order. The traffic is, however, so limited that £500 a year is as much as it can claim.

Matara to Hambantota, 51 Miles.—Many years ago the road from Matara to Tangalle (23 miles) was a tolerably fair carriage road, but for the past ten or twelve years it has been barely passable for vehicles, thence to Hambantota it is little better than a sandy track.

Colombo to Negombo, 23 Miles.—This road runs parallel with the sea coast and a navigable canal. Traffic on it is not therefore heavy.

Negombo to Puttalam, 61 Miles.—This road is of like manner, and ought to be relieved of all heavy traffic but unfortunately the canal is often impassable for boats, and the road is too sandy to be available for heavy cart traffic. The bridges, however, have been constructed of very durable material, and they should be kept up. £10 per mile from Colombo to Puttalam should be allowed, 80 miles of which are in charge of this Department.

Kandy to Trincomalie, 114 Miles.—The only portion that can be kept up with our present means is that from Kandy to Matale, 18 miles. The remaining 96 miles will require £15,000 to bridge and drain As regards the portion just mentioned (Kandy to Matale) much is required to be done. It has many temporary bridges, is insufficiently drained, and requires metalling. Very extensive coffee districts are dependent on this line of road.

Puttalam to Kurunegalle, 53 Miles.—The importance of this road is very great, but its condition most miserably bad parts resemble a brick field more than anything else.

Negombo to Veyangoda, 19 Miles.—This is an important little road but has never been properly put in hand, but improved from time to time. £5 to 600 a year judiciously expended on this road for a few years would improve it exceedingly.

Negombo towards Kurunegalle, 15 Miles.—This has only been carried out to the further Sugar Estate that of Mr. George Fraser. It is very useful to the town of Negombo. I am of opinion that when the labour order passes, this road should be carried across the Maha-oya to Kurunegalle.

Kurunegalle to Dambulla, 33 Miles.—This is important, as the great direct military line connecting Colombo and Trincomalie, but it has never been finished, and would cost a large sum to complete.

Dambulla to Jaffna, 150 Miles.—From Dambulla to the edge of the Jaffna lake at Pass Beschuter, the distance is 118 miles, the character of the road is merely that the jungle on an average of about 24 to 30 feet has been rooted and surface levelled for about 12 to 15 feet, and may have cost about £35 a mile.

Kandy through Gonegama to Badulla (Lower Badulla road), 54 Miles.—This line is the most unsalubrious I have ever known in the country, and it is a curious fact that not a bazaar man or settler of any kind has ever established himself on the road to my knowledge since it was first opened. (*Note.*—This remains true to the present time.) It is the only direct line of communication between Kandy, Bintenne, Batticaloa, and the eastern coast, and must not therefore be abandoned.

Kandy through Gampola, Nuwara Eliya, to Badulla, 85 Miles.—The portion from Peradeniya to Gampola is, I regret to say, in no condition for the very heavy traffic it is subject to. I should desire to have it widened and properly metalled at once, but as there is a scarcity of that material, we must be content with gravel, of which there is an abundance of very good quality.

From Gampola to Ramboda the road is in fair order, but the Attebage and some other minor bridges with timber platform need vigilant attention. The lower six or seven miles of the Ramboda Pass is tolerably fair, but the upper portion of it is execrable, and will need larger funds to put it in repair.

From Nuwara Eliya to Badulla can only be kept up as a bridle road. From Peradeniya to Nuwara Eliya may be kept up for £2,000 per annum, and from Nuwara Eliya to Badulla for £500.

Badulla to Hambantota, 71 Miles.—I think it of the greatest importance that the whole distance from Hambantota to the foot of the Pass of Ela should be perfectly practicable for carts, the distance would be at least 52 miles. To the present zig-zag Pass, I will never do more than keep it practicable for tavalam and horse It was not the result of a defect of either judgment or zeal in Major Rogers; he traced the proper line, and deferred to the miserable system of opening roads with units where hundreds were needed

Badulla to Batticaloa, 71 Miles.—This is nothing more at present, I regret to say, than a very bad trace, but the use which has been and is made of it shows how great an advantage it would prove to the country if opened for wheels.

Badulla to Ratnapura, 88 Miles.—By the direction of Government nothing has been done to this line for years. The Happootella Pass has become overgrown with brushwood and jungle, and is at this moment I believe unpassable for horses. I do not think an expenditure should be allowed for it until the other lines in Ouwah are in a more advanced state.

From Colombo through Avisawella and Ambegamowa to Kandy, 88 Miles.—From Colombo to Avisawella, 30 miles, is common to this line and the Ratnapura one It has never been put into the state it deserves, and I recommend that as fast as possible drains should be built and the road gravelled. The eleven miles from Avisawella to Pallelgama has never been opened to anything beyond a bridle path. As regards the line from Yattiantotte to Ambegamowe and thence to Gampola clear instructions have been laid down for our

guidance by the Legislative Council, and we have nothing to do but to follow them as well as we can consistently with the reduction of £2,800 which has been made from the vote of this year.

Avisawella to Ratnapura, 30 Miles.—This is the only line by which Ratnapura can be approached. It is a good trace, and ought to be easily completed to a useful condition, but at present it is next to unpassable from the decayed state of bridges and drains. I cannot too strongly urge that it be permanently bridged and drained.

From Bellapany to Ruanwella and Yattiantota, 22 Miles.—I regret leaving the 17 miles from Ruanwella to Bellapany in the unfinished state it is in. I have tried but in vain from year to year to obtain funds for its improvement. Its importance has never been sufficiently recognized.

Avisawella to Ruanwella, 9 Miles.—An old and an impracticable piece of road, to which nothing can be done.

Calutara to Agglewatte, 17 Miles.—We need not concern ourselves about this as there are so many more important lines craving notice.

Peradeniya through Deltotte.—We should be very cautious how we incur any great expense on this line, and under no circumstances should Government go beyond the Deltotte Saddle. I cannot but admit that I committed an error in judgment on recommending Government to identify itself so much with it as it has done. If parties interested are willing to contribute towards the construction of permanent bridges, &c., I think that then Government should give an equivalent sum.

Mannar to Tallimannar, 18 Miles.—This is nothing more than a deep sandy track, with no materials on the Island of Mannar with which to improve it.

Cross Roads in Ouwah, 60 Miles.—These are only bridle roads through an open country.

From Ratnapura to Rakwana, 28 Miles.—Opened at the joint and equal expense of Messrs. Shand and the Government. In the present state of the planting interests, there is no great need for the Government going to any further expense with this road.

Pantura through Bolgoda to Horeenne.—This road leads to some important sugar estates near the Maha Wak-oya. So long as they last, the road should be kept up at as small a cost as possible.

From Galle to Baddegama and to Heikgodde, 18 Miles.—This line may be kept in sufficient repair at a small cost. The traffic cannot be great, the Gindurah river running past Baddegama to Galle.

From Mannar to the Great Central Line, 45 Miles.—This trace is intended as the high road from Ceylon to India. It is to supersede the present road from Anuradhapura to Aripo, and I hope that Government will on no account withhold from us the £750 or half the estimate which has been withdrawn till wanted. As regards the trace, I have left it to Mr. Dyke to decide the villages which he desires to make points of direction. Mr. Quinton (Assistant Commissioner of Roads) will do the rest.

Such were the main roads in the Island in 1848, and, with exception to the Kandy road, they would appear to have been no better, if so good as many of the minor roads of the present day.

In 1850 the Civil Engineer's Department fell into disorder, and 1850. Major Skinner states in "Fifty Years in Ceylon": "I received a very brief peremptory order to 'take it over and incorporate it with my own.' From that time up to my resigning the service in 1867 I conducted the entire public works of the Colony."

1851. The following is a return of buildings in the Central, Northern, Eastern, and North-Western Provinces, and the Revenue Districts of Matara and Hambantota in the year 1851. Unfortunately the returns for the Western and Southern Provinces have been lost.

CENTRAL PROVINCE.

Residences.

Denomination of Building.	How or by whom occupied.	Built. When.	Of what Materials.	Original Cost if known or Present Value.
<i>Kandy.</i>				
Pavilion	H. E. the Governor	—	Brick and mortar	Present value £6,000
Colonial Secretary and Judges' quarters	Colonial Secretary and the Supreme Court Judges on circuit	1832	do.	£800
Old Palace or residence	Agent's C. R. Buller, Esq., Government Agent	During the Kandyan Government	Partly of brick and mortar and partly of clay and stone	Present value £1,500
Botanical Superintendent's residence	Garden J. H. K. Thwaites, Esq.	1846	Brick and mortar	Original cost £799. 11s. 9d.
Assistant Commissioner of Roads' residence	Commis- J. A. Caley, Esq. sioner of Roads'	1846	Bricks, stone, and mortar	£456. 19s. 8½d.
Civil Engineer and Commissioner of Roads' residence	and T. Skinner, Esq. of	—	do.	Present value £300
Aide-de-Camp's quarters	quar- Lieut. Crofton .. ters	—	Partly brick and mortar and partly mud	£200
Private Secretary's quarters	Secretary's Capt. Romer ..	—	Brick and mortar	£300
Deputy Postmaster's residence	H. Ford, Esq. ..	1850	do.	Original cost including office, £160 £70
Medical Sub-Assis- tant's residence	Sub-Assis- F. A. Pieres, Esq. tant's residence	1849	do.	£70
Botanical Clerk's residence	Clerk's J. C. de Alwis, Mohandiram	—	Brick, mortar, and mud	Present value £50
Timber Storekeeper's residence	Storekeeper's Mr. M. C. Gomes	—	Brick and mortar	£80
Brickfield Superintendent's residence	Superin- Mr. Townsend .. tendent's residence	—	do.	£80
<i>Badulla.</i>				
Asst. Agent's house	Asst. Agent E. R. Power, Esq.	1817	Brick, mud, and sticks	£237
<i>Nuwara Eliya.</i>				
Police Magistrate's house	Assistant Agent and Police Magistrate	1833	Mud and sticks	£200
Clerk's quarters	Revenue Clerk ..	1833	do.	£50
Police Court Clerk's quarters	Clerk of Court ..	1833	do.	£50

Denomination of Building.	How or by whom occupied.	Built. When.	Of what Materials.	Original Cost if known or Present Value.
<i>Matella.</i>				
Asst. Agent's residence	H. Templer, Esq., Assistant Agent	—	.. Bricks	.. £250 <i>a</i>
Sub-Asst.'s Quarters	(Vacant)	..	.. Bricks	.. £100

a The house was partially repaired by Capt. Watson, who put in new doors and windows, which has been destroyed by the rebels. Estimates have been sent in for 1849-50, but no repairs effected, the result of which is that the cost to put the house in order will be now double or more than double to what it would have been when application was first made.

Public Offices.

By what Department occupied.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
<i>Kandy.</i>			
Govt. Agent's Office	.. 1835	.. Brick and mortar	.. Present value £1,500
Fiscal's Office	.. 1835	.. do.	.. £100
Deputy Queen's Advocate's Office	1835	.. do.	.. £80
Post Office	.. 1850	.. do.	.. (See Residence)
Asst. Civil Engineer's Office	1846	.. do.	.. Original cost £340. 10s. 4½ <i>d.</i>
Asst. Commissioner of Roads' Office	of 1846	.. do.	.. £681. 5s. 1½ <i>d.</i>
Police Station	.. 1846	.. do.	.. £687. 6s. 5½ <i>d.</i>
<i>Badulla.</i>			
Asst. Agent's Office	.. 1845 and 1850	Stone, mud, and sticks. Floor bricks	£197 <i>b</i>
Cutcherry Guard Room	.. 1845	.. do.	.. £7. 10s.
Asst. Agent's Record Room	1838	.. do.	.. Present value £15
<i>Nuwara Eliya.</i>			
Asst. Agent's Office	.. 1833	.. Sticks and mud	.. £7. 10s.
Post Office	.. 1846	.. do.	.. Original cost £29. 18s. 4½ <i>d.</i> <i>c</i>
<i>Matella.</i>			
Police Office	.. —	.. Mud	.. Present value £40

Peradenia.

Royal Botanical Garden Superintendent's Office	1847	.. Brick and mortar	.. Original cost £149. 19s. 7 <i>d.</i>
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b The four rooms are occupied as follows: 1 as a Treasury and Shroff's room, 1 by the native watcher and chiefs, 1 by clerks, and 1 by the Assistant Agent.

c Occupied by the Post Office Clerk, who pays a rent of £2 per annum.

Court-houses.

By what Court occupied.	When.	Built. Of what Materials.	Original cost if known or Present Value.
<i>Kandy.</i>			
District Court	.. During the Kandyan Government	Stone and mortar	.. Present value £1,000
Police Court	.. 1834	.. Brick and mortar	.. £300
<i>Madawelletenna.</i>			
Police Court	.. —	.. Mud and sticks	.. £10
<i>Gampolla.</i>			
Police Court	.. —	.. —	.. —

By what Court occupied.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
<i>Badulla. a</i>			
None ..	.. None	.. None	.. None
<i>Nuwara Eliya.</i>			
Police Court and Court of Requests	1833 ..	Mud and sticks	.. Present value £50
<i>Matella.</i>			
Police Court and Court of Requests	— ..	Bricks and mortar	£75

a The United Courts at this station and Fiscal's Office are held in a building rented at £48 per annum.

Jails.

Capacity with reference to Governor, Supt., Gaolers, and Number of Prisoners of various Classes.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
<i>Kandy.</i>			
1 Jailer, 1 overseer, 14 peons, and 250 prisoners civil and criminal. The gaol consists of 24 rooms	During the Kan-dyan Govt.	Partly of brick and mortar and partly of stone and mud	Present value £3,000
<i>Nuwara Eliya.</i>			
No accommodation for a jailer or Superintendent. The gaol consists of 4 rooms, each room capable of containing 10 prisoners	April 1847	Mud and sticks	.. Original cost £92.11s. 0d. <i>b</i>
<i>Badulla.</i>			
20 Prisoners of the three following classes, viz., felons convicted of misdemeanour and debtors	1829 ..	Bricks, mud, and sticks	Present value £110.10s. 0d. <i>c</i>
<i>Matella.</i>			
2 peons, 15 prisoners	.. — ..	Brick and mortar	.. Present value £100

Hospitals.

Capacity with reference to number of Patients Capable of accommodating.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
<i>Kandy.</i>			
Smallpox Hospital 60 Patients	1851 ..	Brick and mortar	.. Original cost £300 <i>d</i>
Cholera Hospital 8 Patients	About 1820	Stone and mud	.. Present value £50
<i>Gampolla.</i>			
Pauper Hospital	.. — ..	do.	.. Original cost £26.19s. 11d.
Kandy-Bogambra Hospital 30 Patients	1846 ..	Brick and mortar	.. Present value £200
<i>Badulla.</i>			
Temporary Hospital for Malabar Coolies	for 1850 ..	Walls mud and sticks	Original cost £10

b This building is very insecure and defective. The ventilation is extremely bad. There is no enclosed courtyard, and consequently no means of allowing the prisoners to breathe fresh air without at the same time allowing them the means of escaping and conversing with passers by. The whole building is very unworthy of the name of a jail.

c In consequence of the loss of the records of the Badulla Cutcherry by fire in 1845. The cost of repair cannot be ascertained.

d In progress.

Resthouses.

Place.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
<i>Kandy.</i>			
Kadugannawe <i>a</i>	.. —	.. Bricks and mortar	—
Ballekadoowe <i>a</i>	.. —	.. do.	—
Pusselawe <i>a</i>	.. —	.. —	—
Gallegedera <i>a</i>	.. —	.. Mud and sticks	.. Present value £75
<i>Badulla.</i>			
Wilson Plain <i>a</i>	.. —	.. —	.. —
Ettampittya <i>a</i>	.. —	.. —	.. —
Elle <i>a</i>	.. —	.. —	.. —
Taldeniya <i>a</i>	.. —	.. —	.. —
Boobool <i>a</i>	.. —	.. —	.. —
Oma Oya <i>a</i>	.. —	.. —	.. —
Newere Ellia <i>b</i>	.. 1835	.. Solid mud wall	.. Present value £700
Matella ..	.. 1847	.. Brick	.. Original cost £782. 13s. 10d.
Nalanda <i>c</i>	.. 1848	.. Mud	.. £25
Dambool <i>d</i>	.. —	.. Mud	.. £50

a These resthouses have been transferred to the Provincial Road Committee.

b The building is leased till the end of the year 1852

c Built during martial law by Mr. Hall.

d Repaired by Mr. Hall during martial law.

Schools.

Capacity with reference to Number of Masters and Scholars capable of accommodating.	When.	Built. Of what Materials.	Original Cost if known of Present Value.
<i>Kandy.</i>			
1 Room 36 by 12½	.. 1843	.. Brick and mortar	.. Present value £80
1 Do. 36 by 23½			
3 Masters and 80 scholars			

Matella.

1 Master, 60 Scholars	.. Unknown	do.	.. Unknown
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Stores.

Place and Capacity with reference to quantity of Stores capable of accommodating.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
<i>Kandy.</i>			
Cutcherry Store—one Store 30 by 12	1821	.. Stone and mortar	Present value £80
Civil Engineer's Store :—			
1 store for tools 40 by 20	1844	.. Brick and mortar	.. Cost £83. 9s. 7½d.
1 Carpenter's Shop and Store 55 by 30	1844	.. Brick and mortar with felt roof	
1 Timber Store 50 by 20	.. 1848	.. Brick and mortar with thatched roof	
3 cellars under the office 24 by 10 each	1846	.. Stone, brick, and mortar	(See Civil Engineer's Office.)
Commissioner of Roads' Store : three rooms and a powder magazine	—	.. —	.. —
Peradenia : two rooms are used as offices and one as a store	1846	.. Brick and mortar	.. —
Badulla : The dimension of the building is 15 by 40	1829	.. Brick pillars, walls, mud, and sticks	Present value £50
Newera Ellia : Two rooms 14½ by 10½	1839	.. Mud and sticks	.. Original cost £38. 9s. 9d. e

e This was the late jail.

HISTORY OF THE
SOUTHERN PROVINCE.

MATARA DISTRICT.

Residences.

Denomination of Building.	How or by whom occupied.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
Assistant Agent's Residence	W.G. Forbes, Esq.	Un-known	The timber is of iron, teak, and jak, and the walls are of coral and chunam	Present value about £300

Public Offices.

By what Department occupied.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
Assistant Agent, Deputy Fiscal, and District Judge	Un-known	Roof teak, obberca, and jak, and walls coral and mortar	Present value about £300 <i>a</i>

a The Assistant Agent's Department, and Fiscal's and District Judge's Departments under one roof.

Court-houses.

By what Court occupied.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
Police Court and Court of Requests	Un-known	Timber, iron, jak, &c., walls coral and mortar	Present value about £50 <i>b</i>

b This building was handed over with other military buildings to the Assistant Government Agent of Matara about nine years ago, and has never been handed over to the Civil Engineer that I am aware of.

Jails.

Capacity with reference to Governor, Supt., Gaolers, and Number of Prisoners of various Classes.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
Sufficient	.. About 35 years ago	The wooden works are of jak, obberca, and ironwood, &c., and the walls coral and chunam	Present value about £300

Hospitals.

Capacity with reference to Number of Patients capable of accommodating.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
Twelve men	.. Un-known	Timber, iron, jak, &c., walls coral and chunam	Present value about £50 <i>c</i>

c This building is occupied by the Medical Sub-Assistant, and was handed over with other Military buildings to the Assistant Government Agent of Matara about nine years ago, and has never been handed over to the Civil Engineer that I am aware of. The building has not been used as an hospital since the Military left Matara.

Resthouses.

Place.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
Matara ..	.. About 50 years ago	Iron, jak, teakwood, and the walls are of coral and chu-	Present value about £300

Place.	Built. When.	Of what Materials.	Original Cost if known or Present Value.
Belligam	.. About the year 1813	Iron, jak, teakwood, and the walls are of coral and chu- nam	Present value about £137. 10s.
Dickwelle	.. About the year 1775	Jakwood, and walls stone and chunam	Present value about £100
Morowake	.. 1834 ..	Hore and jak, mud wall	Present value about £15
Berelepunaterre	.. 1843 ..	Common timber and mud wall	Present value about £3 <i>a</i>
Hackmene	.. About 20 years ago	do.	.. Present value about £7. 10s.

a Not handed over to the Civil Engineer that I am aware of.

Custom-houses and Warehouses.

Place.	Built. When.	Of what Materials.	Original Cost if known or Present Value.
Bellegam	.. Un- known	Stone and chunam.	Present value £75
Do.	.. 1845 ..	do.	.. £10
Gandurah	.. Un- known	Teak, stone and chunam	£100

Schools.

Capacity with reference to Number of Masters and Scholars capable of accommodating.	Built. When.	Of what Materials.	Original Cost if known or Present Value.
Matura : Sufficient	.. Un- known	Ironwood, obberca, &c., and walls coral and chunam	Present value about £60 <i>b</i>

b Never handed over to the Civil Engineer that I am aware of, as the school formed part of the officer's quarters, and was handed over by the Military authority to the Assistant Government Agent nine years ago.

Stores.

Place and Capacity with reference to Quantity of Stores capable of containing.	Built. When.	Of what Materials.	Original Cost if known or Present Value.
Bopegodde in the Matura District : Sufficient	1825 ..	Ironwood and ob- berca, and walls stone and mortar	Present value about £18. 15s. <i>c</i>

c Never handed over to the Civil Engineer that I am aware of.

HAMBANTOTTE DISTRICT.

Residences.

Denomination of Building.	How or by whom occupied.	Built. When.	Of what Materials.	Original Cost if known or Present Value.
Asst. Agent's Resi- dence, Hamban- totte	Assistant Agent	Com- pleted 1847	Stone set in mud	Original cost £456. 4s. 11½ <i>d.</i> Present value £500
District Judge's Resi- dence, Tangalle	District Judge ..	In 1829	Coral stone	—
Queen's Cottage, Tan- galle	The Judges of the Supreme Court, the Govt. Agent, and Asst. Govt. Agent when on circuit	— ..	— ..	—

Offices.

By what Department occupied.	When.	Built. Of what Materials.	Original Cost if known or Present Value
Cutcherry at Hambantotte, Government Agent's Department	1835 .. about	Mud and sticks covered with cadjans	Original cost unknown. Present value about £6 <i>a</i>

a Should the new offices not be furnished in another year or eighteen months, a new shed will have to be put up at a cost of about £30, as the timber in the walls of the present shed shows symptoms of decay, and the repairs effected are only such as will render habitable till the probable time of the completion of the new offices which have been estimated for.

Court-houses.

By what Court occupied.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
Tangalle court-house, the District Judge, Commissioner of Requests, and Police Magistrate of Tangalle	Unknown	Coral stone	.. Unknown. About £200
Hambantotte Court-house. The Commissioner of Requests and Police Magistrate of Hambantotte	1834 or there-about	Mud and sticks covered with cadjans	Original cost unknown. Worth about £4 <i>b</i>

b There are no doors to this shed, nor shutters to the windows, the records therefore are not safe.

Jails.

Capacity with reference to Governor, Supt., Gaolers, and Number of Prisoners of various Classes.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
No Governor, no Superintendent, but there is one Jail, which will admit of 100 prisoners	Unknown	Chunam and stones	Original cost unknown, being a Military building or fortress. Deputy Fiscal is incompetent to attach a value to it
Hambantotte: Capable of containing about 120 criminal prisoners, besides civil prisoners; no accommodation for the Jailer; contains 3 wards for criminal prisoners, one for prisoners for further examination, one hospital ward, 2 rooms for civil prisoners, cook house, and privy	1835 or there-about	Granite set in mud	Original cost unknown. Present value about £500 <i>c</i>

c Has no solitary cell or other convenience for the punishment of refractory prisoners.

Hospitals.

Nil.

Resthouses.

Place.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
Tangalle	.. 1823 ..	Of coral stone	.. Original cost unknown. Present value £300 <i>d</i>
Ranne ..	.. Un-known	Mud and sticks	.. Original cost unknown. Present value £15 <i>d</i>

d The collection is very trifling, and is paid to the Hambantota District Committee.

Custom-houses and Warehouses.

None, but one is much required at Hambantotte.

Schools.

Place and Capacity with reference to Number of Masters and Scholars capable of accommodating.	When.	Built. Of what Materials	Original Cost if known or Present Value.
Tangalle	.. 1822	Stones	.. Present value £15 ^a

^a This building was originally used as a Sitting Magistrate's Court.

Stores.

Place and Capacity with reference to Quantity of Stores capable of containing.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
Tangalle: Capable of containing about 30,000 bushels of salt	1822 ..	Stone	.. Original cost unknown. Present value £100
Salt retailer's boutique at Tangalle	1836 ..	Mud and common wood	Original cost £3. 15s. Present value £7. 10s. ^b
Salt retailer's boutique at Badulla	1836 ..	Coral stone	.. Original cost unknown. Present value £9 ^b
No. 1 Salt Store at Hambantotte: Capable of containing about 50,000 bushels of salt	1850 ..	Mud and sticks and covered with cadjans	Original cost £46. Present value about £75
No. 2 Salt Store at Hambantotte: Capable of containing about 30,000 bushels of salt	About the year 1840	Mud and sticks and covered with cadjans	Original cost unknown. Present value about £50
No. 3 Salt Store at Hambantotte: Capable of containing about 40,000 bushels of salt	1849 ..	do.	.. Original cost about £100. Present value about £50
Tool store: Capable of containing sufficient tools and stores for use at this station	1847 ..	do.	Built by prisoners. Present value about £7. 10s.
Kirinde Salt Store No. 1: Capable of containing about 60,000 bushels of salt	About 1835	do.	.. Present value about £5
Kirinde Salt Store No. 2: Capable of containing about 25,000 bushels of salt	About 1838	do.	.. do.

^b Formerly used in retailing salt on account of Government.

NORTHERN PROVINCE.

Residences.

Denomination of Building.	How or by whom occupied.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
Cutcherry House	.. Government Agent	1797..	Brick	.. —
Government House in the Fort	Judges of the Supreme Court while on circuit	1847..	do.	.. £797
Police Magistrate's House, Mallagam	Commissioner of Requests and Police Magistrate, Mallagam	1826..	do.	.. —

Denomination of Building.	How or by whom occupied.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
Police Magistrate's House, Point Pedro	Commissioner of Requests and Police Magistrate, Point Pedro	—	.. Brick	—
Police Magistrate's House, Savagacherry	Commissioner of Requests and Police Magistrate, Savagacherry	—	.. do. ..	—
Police Magistrate's House, Kaits	Commissioner of Requests and Police Magistrate, Kaits	—	.. do. ..	—
Cutcherry House at Mannar	Asst. Agent and District Judge, Mannar	—	.. Brick and coral stone	—
Sub-Collector's House, Mannar	Sub-Collector, Mannar	1845..	Brick and stone	£182
Cutcherry House at Mulletivo	Commissioner of Requests and Police Magistrate, Mulletivo	—	.. Coral stone	— ^a
Secretary's House, Anoradhapoor	Secretary District Court, Nuwara Kalavia	—	.. — ..	—
Court Interpreter's House, Anoradhapoor	Interpreter, Nuwara Kalavia	—	.. — ..	—
Revenue Clerk's House, Anoradhapoor	Revenue Clerk, Nuwara Kalavia	—	.. — ..	—
Cutcherry Interpreter's House, Anoradhapoor	Interpreter ..	—	.. — ..	—
Medical Sub-Assistant's House, Anoradhapoor	Medical Sub-Assistant, Nuwara Kalavia	—	.. — ..	— ^b

^a Occupied by the Assistant Government Agent (part of a range, including also the Cutcherry Office and Resthouse, a very large building).

^b Unfinished.

Public Offices.

By what Department occupied.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
Cutcherry, Jaffna	.. 1797 ..	Brick	—
Cutcherry, Mannar	.. — ..	Brick and stone	—
Cutcherry, Mulleitivo	.. — ..	Coral stone	— ^c

^c Part of a range.

Court-houses.

By what Court occupied.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
District Court, Jaffna	.. 1817 ..	Brick and coral stone	—
Police Court, Jaffna	.. 1816 ..	do. ..	— ^d
Police Court, Mallagam	.. 1833 ..	Brick ..	—
Police Court, Point Pedro	— ..	Brick and coral stone	—
Police Court, Mulletivo	.. — ..	Coral stone	— ^e
District Court, Anoradhapoor	1834 ..	— ..	— ^f

^d The Deputy Queen's Advocate has an office in the same building.

^e Part of a range.

^f Also used as Cutcherry.

Jails.

Place and Capacity with reference to Governor, Superintendent, Gaolers, and Number of Prisoners of various Classes.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
Jaffna : Criminal	.. — ..	Brick and coral stone	—
Jaffna : Civil	.. — ..	—	— ^a
Mulletivo	.. — ..	Coral stone	—
Mannar ..	.. — ..	—	—^b
Anoradhapoora	.. — ..	—	—

^a Unfinished and unoccupied, being buildings in the Fort given into civil charge for this purpose.

^b Part of a range.

Custom-houses.

Place.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
Jaffna : Pettah	.. — ..	Brick and coral stone	—
Jaffna : Fort	.. — ..	do.	— ^c
Point Pedro	.. 1803 ..	Brick	—
Mannar ..	.. — ..	Coral stone	—

^c Unfinished and unoccupied, being buildings in the Fort given into civil charge for this purpose.

Stores.

Place and Capacity with reference to Quantity of Stores capable of containing.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
Mannar (General)	.. — ..	Coral stone	— ^d
Mannar (Salt)	.. — ..	do.	— ^d
Mantotte	.. — ..	Brick	— ^e
Mulletivo (Salt)	.. — ..	—	— ^f
Mulletivo (General)	.. — ..	—	— ^f
Illepekadave	.. — ..	—	— ^g

^d Part of a range.

^e Part of a range containing also the Resthouse—being the old Church—the store unoccupied for a long time and not required—a very large building.

^f Part of a very large range of buildings.

^g Long unoccupied and not required.

Resthouses.

Place.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
<i>Peninsula and Islands of Jaffna.</i>			
Point Pedro	.. — ..	—	—
Nynativo	.. — ..	—	— ^h
Delft ..	.. — ..	—	—^h

Colombo Road.

Colombogam	.. 1842 ..	Coral stone	.. — ⁱ
Kalmoonai	.. do. ..	do.	.. — ^j
Ponoryn	.. 1805 ..	do.	.. —
Polverayn Kadoo	.. do. ..	do.	.. —
Illepekadave	.. do. ..	do.	.. —
Mantotte	.. do. ..	do.	.. — ^k
Marchicatte	.. — ..	Stone	.. —

^h Occupied by Police Magistrate of Kaits on occasion of annual circuits.

ⁱ A maddam at the ferry.

^j A madam at the ferry on the opposite side.

^k See "Stores" salt. A maddam at the ferry.

Place.	Built. When.	Of what Materials.	Original Cost If known or Present Value.
<i>Trincomalie Road.</i>			
Klaly ..	.. 1826 ..	Brick ..	— <i>a</i>
Valatolong Kollai or Be-shuter	1816 ..	Coral stone ..	—
Sundicolom	.. 1832 ..	do. ..	—
Mulletivo	.. — ..	— ..	— <i>b</i>

Central Road.

Elephant Pass	.. — ..	Coral stone ..	—
Kandavale	} 1846-7..	Unburnt bricks ..	— <i>c</i>
Vattakatchy			
Ambamum			
Kanagarayen Colom			
Iramba Colom			
Vavomavolan Colom			

Pullam to Anoradhapooru Road.

Anoradhapooru	.. — ..	— ..	— <i>d</i>
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Aripo to Anoradhapooru Road.

Kerettenevelly	.. — ..	— ..	— <i>e</i>
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a On the old seabeach road.

b Part of a range. See "Residence," Cutcherry House, Mulletivo.

c All more or less unfinished and all now recommended to be converted into "maddams."

d Occupied as a residence by the Assistant Agent.

e Very small.

Post Houses.

Place.	Built. When.	Of what Materials.	Original Cost If known or Present Value.
<i>Colombo Road.</i>			
Vavattoongy	} — ..	Unburnt bricks ..	— <i>f</i>
Molongavil			
Paliaar ..			

Aripo and Anoradhapooru Road.

Herettenevelly	.. — ..	— ..	—
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f For the accommodation of the tappal runners, there being no villages at these places.

Churches.

Place.	Built. When.	Of what Materials.	Original Cost If known or Present Value.
Mannar ..	.. — ..	— ..	—<i>g</i>

g In the Fort and considered a Government building.

Wharfs.

Place.	Built. When.	Of what Materials.	Original Cost if known or Present Value.
Mannar ..	.. — ..	Coral stone ..	— <i>h</i>

h It needs attention, and should therefore be thus distinctly specified.

Cisterns.

Place.	Built. When.	Of what Materials.	Original Cost if known or Present Value.
Mannar ..	.. — ..	— ..	—<i>i</i>

i In the Fort. This is a provision of great importance to the comfort of the public officers of the place.

Pearl Fishery Buildings.

Denomination of Building.	When.	Built. Of what Materials.	Original Cost if known or Present Value
Doric at Aripo	.. — ..	—	— <i>a</i>
Supervisor's House at Aripo	at — ..	—	— <i>b</i>
Officer's quarters, panjeodai	Pule. — ..	—	— <i>c</i>
Commissariat Store at panjeodai	Pule. — ..	—	—
European barracks and Malay barracks at panjeodai	.. — ..	—	—
Custom-house at Selavatorre	— ..	—	— <i>d</i>

a Occupied by the Governor if present at a fishery or inspection of the Pearl Banks; otherwise by the officers superintending the fishery, *i.e.*, (latterly) the Government Agent.

b Made use of at present as a resthouse for passing immigrants.

c Occupied at fisheries by the European officers of the several Department of Troops; part at present used as a resthouse.

d There is no use for it as a Custom-house, except at fisheries, and it is at present used as a resthouse for passing immigrants.

EASTERN PROVINCE.

Residences.

Denomination of Building.	How or by whom occupied	When.	Built. Of what Materials.	Original Cost if known or Present Value.
<i>Trincomalie.</i>				
Residence	.. Government Agent	Not known	Stone and mud, also brick and chunam, with a masonry flat roof	£850 <i>e</i>
Do.	.. District Judge	Not able to get any authentic information	Rubble stone, red earth, and lime, palmirah rafters and reepers. Hal: beams, and cloth ceiling, Mortar and brick pillars, covered with Colombo tiles	Estimated value £300
Do.	.. Master Attendant	do.	Rubblestone, red earth, and lime. Hal: the beams, rafters, reepers, and covered with tiles	£600
<i>Batticaloa.</i>				
House	.. Asst. Government Agent	1812	.. Stone and mortar	—

e From the nature of the roof it is absolutely necessary that a small sum should be always at hand to effect repair. Every change of weather affects the roof.

Public Offices.

By what Department occupied.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
Trincomalie Cutcherry, Govt. Agent's Office, Fiscal's and Post Office	No authentic information	Mud and stone ..	Not known <i>a</i>
Treasury vault	.. 1840 ..	Coral stone and chunam	£311. 14s. 11d.
Batticaloa: Asst. Agent, Post Office and Deputy Fiscal	1812 ..	Brick and mortar .	—

a It is proposed to raze these buildings and to erect a new range of offices in the compound, which is well suited for the purpose.

Court-houses.

By what Court occupied.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
Trincomalie: District Court, Court of Requests, and Police Magistrate	No information to be depended upon has been obtained	Rubble stone and mortar, brick pillars. Rubble stone and earth. Hal: pillar plates, the beams, and king posts. Palmirah rafters and reepers. Tiled roof	£300 <i>b</i>
Batticaloa: District, Police and Request	1827 ..	Stone and mortar	— <i>c</i>

b There is a railing round the premises, which is constantly requiring repairs.

c Built for a paddy store.

Jails.

Capacity with reference to Governor, Supt., Goalers, and Number of Prisoners of various Classes.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
Trincomalie: Civil and Criminal Gaol. Accommodation equal to all purposes required	Can find no record	Rubble stone, red earth and chunam. Palmirah rafters and reepers covered with tiles	Estimated value £120 £200
Batticaloa: 74 Prisoners	.. 1823 ..	Stone and mortar	— <i>d</i>
6 Prisoners	.. 1833 ..	—	— <i>c</i>

d Criminal jail.

e Civil jail.

Custom-houses and Warehouses.

Place.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
Trincomalie: Inner Harbour rooms, Warehouse Gateway ground	— ..	Rubble stone, red earth, and lime, covered with tiles	Estimated value £237. 10s. <i>f</i>
Back Bay rooms, Warehouse, Grain shed	— ..	Rubble stone, red earth, and lime, covered with tiles	£225 <i>g</i>
Batticaloa: Poeliantivo	.. 1827 ..	Stone and mortar	— <i>h</i>

f A privy requires to be built.

g A privy is necessary, and one or two doors and windows required to be opened.

h Built for a paddy store.

Schools.

Place and Capacity with reference to Number of Masters and Scholars capable of accommodating.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
Trincomalie Government School : 100 boys and 2 masters	—	.. Rubble stone, red earth, lime, Satinwood pillars. Hal: tie beams, palmirah reepers and rafters, covered with tiles	£37. 10s.

Salt Stores.

Place and Capacity with reference to Quantity of Stores capable of containing.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
Trincomalie : 8,000 bushels	No information	Iron and Satinwood pillars, and Ironwood plank. Hal: tie beams and pillar plates, and palmirah and hal rafters. Palmirah reepers, and covered with tiles	£200
Nillavally : 22,000 bushels	—	—	—
Batticaloa : Poeliantivoe, 20,000 bushels	1827	.. Stone and mortar	— ^a
Batticaloa : Fort, 15,000 bushels	1682	.. do.	— ^b

^a Built for a paddy store.

^b An old store plastered and tiled.

Jetties.

Place and Denomination of Building.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
Trincomalie : Jetty at Inner Harbour	—	.. Causeway. Rubble stone, mortar, pitch tar, and gravel. Gave end piles, and hal and Satinwood planks	Estimated value £75

NORTH-WESTERN PROVINCE.

Residences.

Denomination of Building.	How or by whom occupied.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
Putlam : Govt. Agent's House	W. Morris, Esq.	1818	.. Wattle clay, and roof tiled	Unknown ^c
Chilaw : District Judge's House	S. Cassichitty, Esq.	Portion 1813 and part in 1832	Part of brick and mortar and part of wattle and clay, roof tiled	Unknown
Govt. House	.. By the Judge of the Supreme Court and Govt. Agent on circuit	1833	.. Brick and mortar	do.

^c The accommodation is very deficient, consisting only of a sitting room, two bed rooms, and two bathrooms.

Denomination of Building.	How or by whom occupied.	Built. When.	Of what Materials.	Original Cost if known or Present Value.
Calpentyn: Govt. House	By the Judge of the Supreme Court and Govt. Agent on circuit	Dutch time	Coral stone and mortar	Unknown
Kurunegalle : Malegawe	P. W. Bray-brooke, Esq.	1819 and 1822	Walls of rubble stones and masonry and timber principally of Halmille and roof tiled	do.

Public Offices.

By what Department occupied.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
Putlam : Government Agent and Fiscal's	Part in 1838 and part in 1848	Coral stone and mortar and roof tiled	Unknown
Treasury Vault	.. 1835	.. Coral stone and mortar and roof vaulted	do. <i>a</i>
Chilaw : Treasury Vault	.. 1840	.. Coral stone and mortar roof vaulted	do.
Calpentyn : Treasury Vault	Unknown ..	do. ..	do.
Fiscal Office	.. do.	.. Coral stone and mortar tiled roof	do.
Kurunegalle : Asst. Government Agent	1830	.. Brick and mortar and tiled roof	Original cost unknown, and present value is matter of opinion

a The accommodation is insufficient. There is only a vault and verandah, and that the former is necessarily kept open during office hours for the use of the shroff.

Court-houses.

By what Court occupied.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
Chilaw: District Court	.. 1832	.. Brick and mortar. Roof tiled	Unknown <i>b</i>
Calpentyn: Police Court	.. 1846	.. Wattle and clay. Roof cadjaned	£48. 13s. 8 $\frac{1}{2}$ d. <i>c</i>
Kurunegalle: District Court	1828	.. Brick and mortar. Roof tiled	Cost unknown and present value would be best known to a person qualified to form an opinion

b One room is used as the Fiscal's Office.

c Occupied by the Tamil School at present.

Jails.

Capacity with reference to Governor, Supt., Gaolers, and Number of Prisoners of various Classes.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
Putlam—The Gaol contains 3 rooms, one capable of holding 12 men and 2 of holding 3 men each and not adopted for classification. The gaoler does not live within the Gaol for want of accommodation. Superintended by the Fiscal	1834	.. Brick and mortar and roof tiled	Unknown

Capacity with reference to Governor, Supt., Goalers, and Number of Prisoners of various Classes.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
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<i>Chilaw</i> —The Gaol consists of one room capable of holding 10 men, no classification. Superintended by the Deputy Fiscal	Not known	Brick and mortar and roof tiled	Unknown <i>a</i>
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<i>Calpentyn</i> —The Gaol consists of 2 rooms, 1 for female prisoners and the other for prisoners of all description. Capable of holding about 12 persons. Superintended by the Deputy Fiscal	do. ..	Coral stone and mortar and roof tiled	do.
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a Accommodation both insufficient and insecure.

Hospitals.

Place and Capacity with reference to Number of Patients capable of accommodating.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
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Kurunegalle: 30	.. 1843 or 1844	Mud walls, cadjan roof	—
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Resthouses.

Place.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
Putlam ..	.. 1816 ..	Brick and mortar and tiled roof	Unknown <i>d</i>
Chilaw ..	.. Un-known	do.	.. Unknown. It having been the commandant's quarters and only transferred to the Civil Authorities in 1848
Natandy	.. 1831 ..	do.	.. —
Battle Oya	.. 1834 ..	Wattle and clay and tiled roof	—
Madrancooly	.. 1830 ..	Brick and mortar and tiled roof	—
Pomparippoo	.. 1808 ..	Wattle and clay. Roof tiled	—
Anamadoo	.. 1848 ..	Wattle and clay and thatched roof	—
Kurnagalle	.. 1847 ..	Brick and mortar and tiled roof	£500

b Part of the front verandah and a room occupied by the Police Court.

Custom-houses and Warehouses.

Place and Capacity with reference to accommodation for general trade or place.	When.	Built. Of what Materials.	Original Cost if known or Present Value.
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<i>Calpentyn</i> —Warehouse : No. 1, 2,856 cubic feet } No. 2, 1,683 cubic feet }	Un-known	Coral stone and mortar. Roof tiled	—
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Schools.

Place and Capacity with reference to Number of Masters and Scholars capable of accommodating.	When.	Built. Of what Materials.	Original Cost if known or Present Value
Putlam: One master and about 30 scholars	1847 ..	Stick and cadjan	Built by private contribution. Cost unknown
Calpentyn: One master and about 35 scholars	Not known	Coral stone and mortar, and tiled roof	Not known <i>c</i>

c This was originally a room in the Fort, and was used as a salt store, altered into a school in 1846 at a cost of about £10.

Place and Capacity with reference to Quantity of Stores capable of containing.	When.	Stores.		Original Cost if known or Present Value.
		Built. Of what Materials.		
Chilaw (one): 30,000 bushels of salt	1821	..	Brick and mortar	Unknown
Putlam Fort (two): 3,500 bushels of salt	Dutch time		do.	.. do.
Putlam salt pans (one): 15,000 bushels of salt	1832	..	Wood and tiled	.. do. <i>a</i>
Do.	.. 1848	..	do.	.. £180
Putlam salt pans (one): 10,000 bushels of salt	1839	..	do.	.. Unknown <i>b</i>
Calpentyne Fort (one): 38,800 bushels of salt	Dutch time		Coral stone and mortar	do.
Calpentyne Fort (No. 7 to 10): 11,700 bushels of salt	do.	..	do.	.. do.
Calpentyne Fort (No. 14): 2,100 bushels of salt	do.	..	do.	.. do.
Calpentyne Fort (No. 15): 7,600 bushels of salt	do.	..	do.	.. do.
Calpentyne Fort (No. 4 and 5): 5,000 bushels of salt	do.	..	do.	.. do.
Calpentyne Fort (No. 11): 7,500 bushels of salt	do.	..	do.	.. do.
Calpentyne Fort (No. 16 and 17): 8,000 bushels of salt	do.	..	do.	.. do.

a Rebuilt in 1847.

b Removed from Odepen-care and rebuilt at Putlam in 1847.

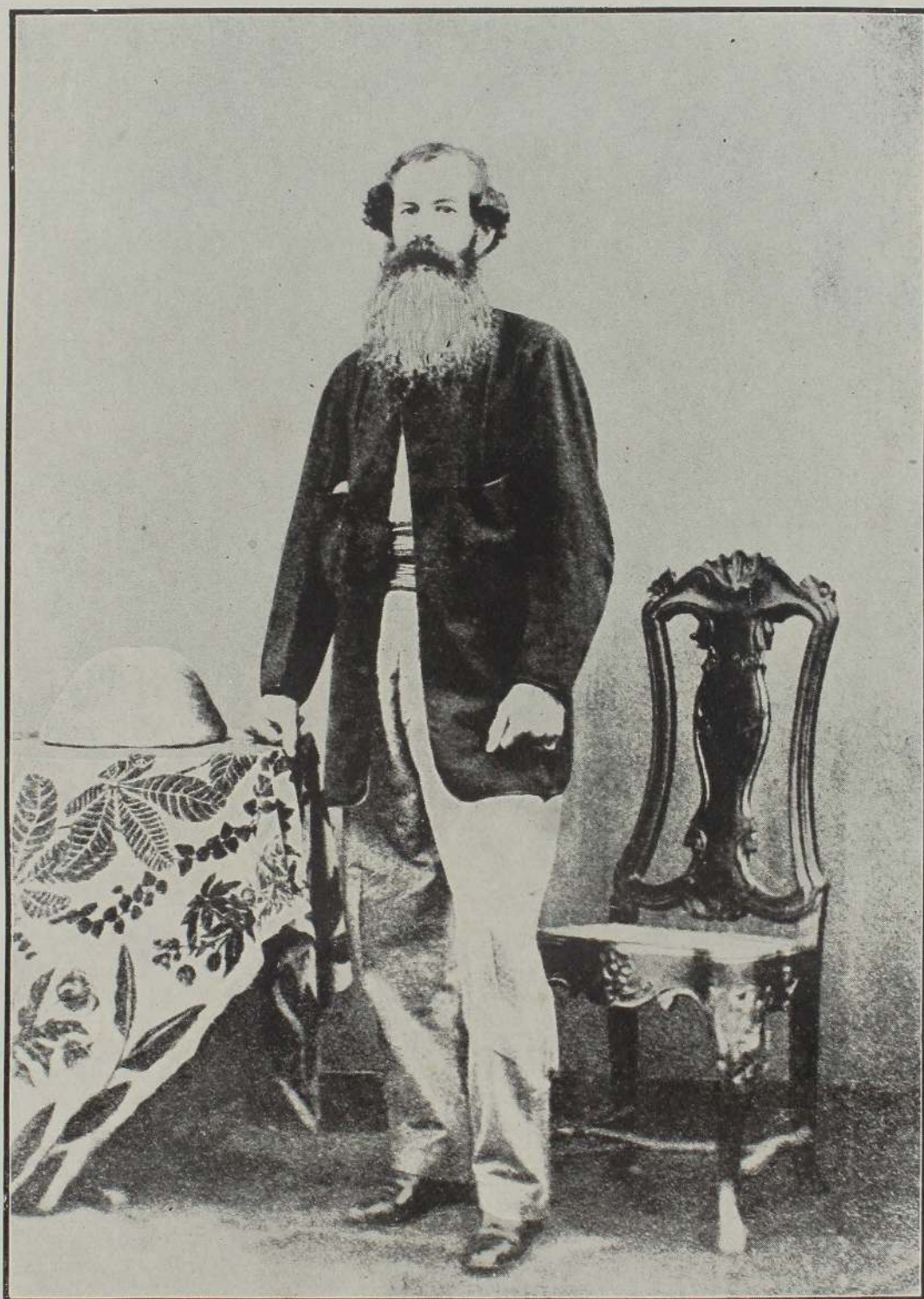
1853. In 1853 the six Provinces of the Island were divided into districts and the following civilian officers appointed:—

Saffragam	.. R. Craig	Kurunegalle	.. Captain Fisher
Badulla	.. P. Cummins	Ambegamowe	.. R. Tatham
Batticaloa	.. J. D. Young	Caltura	.. M. de Fonseka
Trincomalie	.. W. G. Hall	Negombo	.. A. Campbell
Puttalam	.. J. A. Ker		

Messrs. D. Kershaw, H. Byrne, R. Francis, J. A. Caley, H. A. Evatt, and Captain J. A. Cole being Assistant Engineers.

1854. In 1854 Major Skinner went on leave, and Mr. H. A. Evatt acted as Civil Engineer and Commissioner of Roads. The following account of Major Skinner's work in the Colony up to this time is taken from the "Colombo Observer" of August 12, 1854:

"Amongst the passengers who go home by the present steamer is Major Skinner, the Commissioner of Roads. We cannot allow the departure without a word of notice of one who has worked hard in and for the Colony for the best years of his life—from 14 to 50—the sole survivor of the band who, under the directing and contagious energy of Sir Edward Barnes, opened the magnificent Kandy road, and whose name is closely associated with every line of communication opened in the Colony from 1819 to 1854, the result being a net work of roads which, however we may consider them insufficient for the growing wants of an advancing commerce, render us the envy of the neighbouring continent with its teeming population and immense revenues. Very interesting must the reminiscences of this able and untiring active officer be. He could tell of his patron, General Barnes, with mamoty in hand, pioneering the operations on the Kandy road with the same zeal and earnestness with which he fought his country's battles in the peninsula and at Waterloo. He could also tell of a time when the forests of the interior, which now teem with the results of European industry, were unpenetrated and unknown until he and his co-labourers in the great survey of the Island traversed them in the course of triangulations



CAPTAIN DONALD DUNCAN GRAHAM
Ceylon Rifle Regiment
Architect of the Gampola Suspension Bridge

S. G. O.

extending from Colombo to Batticaloa, and from Hambantotte to Trincomalie. The difficulties of such a work, in the times in which most of it was performed, can be but slightly appreciated in these days of comparative civilization. The mode in which it was performed, resulting in a vast fund of topographical information at a slight expense, secured for those engaged in it the gratitude of the Government they served, Major Skinner especially receiving the highest possible testimonials from all the authorities, civil and military, under whom he served. Whenever the survey or road-making operations of the Colony went at all wrong, Major Skinner was invariably called in to extricate the tangled skein; and, at length, when the interests of the Island, which he had seen advance from a mere garrison to a great commercial emporium, required the creation of a special department, Major Skinner was at once fixed on as the fittest man to be its head, the allowances in his case being raised from £800 to £1,000, as a special token of approval by Government and the Secretary of State for his long, arduous, and beneficial public services. The able document which we recently published shows how earnestly Major Skinner advocates the formation of railways, and what large views he takes of the improvements, material and moral, that might result to the Colony from energetic action in this direction; while of all those who advocate attention to the capabilities of Ceylon to grow the staple article of food, none has felt or spoken more strongly on the restoration of old irrigation works, and the formation of new ones, than Major Skinner to survive his exertion in, and on behalf of, the Colony. Believing that, with all allowances for matters of detail, there is not a man in Ceylon to whom the Colony owes so much in the way of material improvement, on which moral advancement so closely depends, we feel bound to yield him this parting tribute of gratitude, which he has so well earned."

In 1856 Major Skinner returned from leave, and immediately waited on Sir Henry Ward, the Governor: "I took with me plans of iron bridges, of which the Colony was in desperate need, and urged him to have a dozen out at once, telling him I had ordered out one of 100 feet span on my own private account, hoping that he would take it off my hands, which he said he would do, and then laughingly observed: 'This is a pleasant prospect, when the first day of my acquaintance with my Commissioner of Public Works he coolly commits me to an expenditure of £12,000 or £15,000 for bridges with about as much more to pay for their erection.' " These plans were evidently the original plans of the famous Brotherhood girder bridges, which were afterwards extensively used in bridging numerous rivers on main roads, a number of which were erected by Mudaliyar Wellopilly. The first were erected over the Kospotu-oya, Tiripitchena-ela, and the Magam-oya on the Kandy-Puttalam road, 1857-58, followed by the Katugastota bridge, 1858-60, and the Kalu-ganga bridge, Ratnapura, 1866-68, these being some of the largest, the spans varying from 50 to 150 feet. It is a curious fact that among the very few bridges of this type that remain at the present time should be the Kospotu-oya bridge on the Kandy-Puttalam road, as it was one of the first erected, and further, that it should have retained its diagonal-planked decking, which was originally adopted on all the Brotherhood girder bridges for the purpose of lateral strength, but afterwards discontinued owing to difficulty in producing the requisite length of planking.

In this year (1856) the Gampola suspension bridge (the ironwork of which had lain in the Commissariat Stores for thirty years) was commenced under the direction of Captain Graham, and completed on January 1, 1859.

Writing in this year (1856) on the Badulla road question, Sir H. Ward states :—

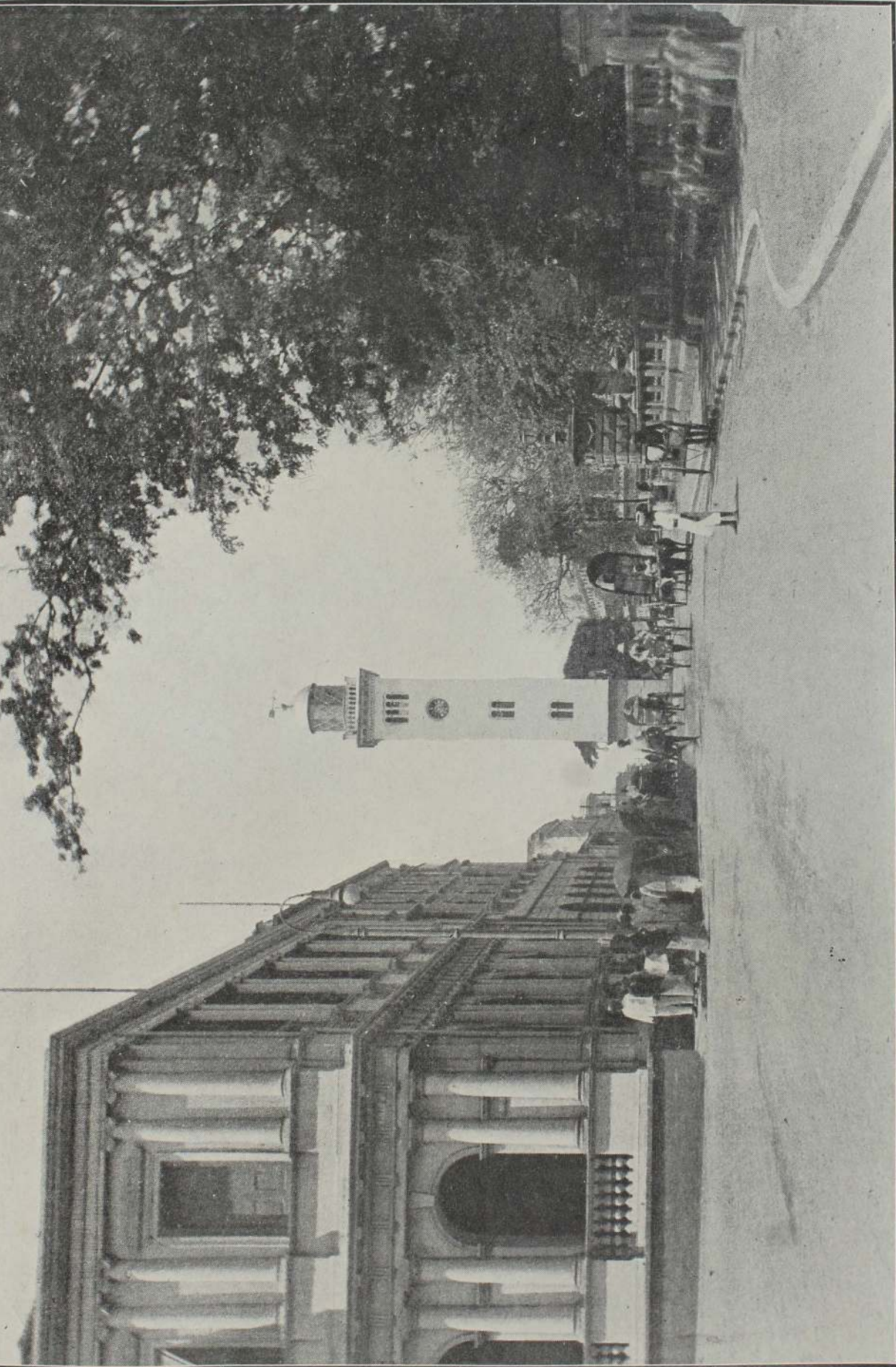
There is no doubt that there was a time when the Badulla planters suffered very severely from the difficulty of communicating with Colombo. The roads throughout the Central Province were in a bad state, and particularly that between Pusilawa and Nuwera Ellia. Coffee sent by that route cost 14 shillings per cwt., and being often six weeks upon the road, was subjected to deterioration from long exposure to weather. If sent to Hambantotte (76 miles) or Batticaloa (72 miles) by tavalam, the carriage was less, but the loss of time greater. Indeed, it frequently happened that no vessel visited those ports, in which a valuable cargo could be risked, until the shipping season was over on the western coast; when the charges for warehousing, and the loss of a whole season in the London market, were more than equivalent to the exorbitant bandy hire by Nuwera Ellia.

In many respects this state of things has altered for the better. The complete restoration of the road over the Rambodde Pass, and the good state of the Pusilawa and Gampola road generally, have placed larger and cheaper means of conveyance at the disposal of the Badulla planters; and, for the first time, as I am informed, since the district was opened, the whole produce of the estates on the Badulla side was safely lodged in Colombo by the first week in May.

1857. In Sir H. Ward's Address to the Legislative Council, July 30, 1857, he states :—

“Upon the Government devolves the responsibility of executing with vigour the plans agreed upon in the Council; and when you look at the progress already made in the Public Works during the last two years, you will, I think, feel with me that much credit is due to the Heads of those Departments which have been charged with their execution.

The Natande canal has been completed within the estimate of £3,000, and the navigation from Colombo to Putlam is now open. The Survey of the Alookoor Korle, upon which a large amount of native land claims depends, has been commenced. The Clock Tower is finished. The Government Offices and the District Courts are advancing rapidly. The new Factory is at work, and ready to receive the machinery ordered. The Custom-house, with a new jetty, a new grain shed, and export shed, and large additions to its warehouses, is beginning to look like a place of business, suited to the growing trade of the port. The Pioneer Divisions have been raised from 1,200 to 2,000 men; 118 miles of road from Colombo to Nuwera Ellia are in perfect order. The repairs of the Peradeniya bridge are completed. The bridge at Gampolle will, I hope, be opened for general use, on the Queen's Birthday next year, though the progress of the work has been retarded, and its cost considerably increased, by the failure of stone in the vicinity of the river. Large improvements have been effected upon the road between Badulla and Nuwera Ellia. The road from Ratnapoora to Palmadulla is nearly completed, and will be extended 12 miles into the interior, by a branch road, for which Mr. Shand has taken a contract. The works upon the Calabooke Valley Road will be closed next week, when the Pioneers may be transferred to the Rattotta road. The abutments for the seven iron bridges, now on their way out, are building so that the bridges may be put up immediately after their arrival. The survey of Galle Harbour is advancing satisfactorily. The preparations for the electric telegraph are going on from Galle to Mannar; and I was assured by Lieutenant Stewart in May that he foresaw no difficulty in opening the whole line before the end of December. The steamer has been ordered by Her Majesty's Government, upon a plan which was communicated to the Directors of the Cooly Transport Company, who may eventually become its owners. Four miles of causeway will be added before the close of the year to the road between the Elephant



S. G. O.

THE COLOMBO CLOCK TOWER

BUILT BY

Mr. J. F. CHURCHILL

1857.

Pass and Jaffna ; and Captain Oldfield has undertaken to complete, in the same time, a solid bandy road across the dangerous ground that interrupts the communication between Putlam and the interior. The metalling of the road between Kurnegalle and the Maha-oya has been commenced. Large improvements are carrying on between Galle and Colombo. And the total expenditure of the Department of Public Works in the year 1856, including Ordinance labour, amounted to £115,908 15s. 9d. or nearly one-fourth of the revenue."

The Colombo Clock Tower was built after a design by Lady Ward, and Sir H. Ward writes in his minutes :—

The Clock Tower has given to the inhabitants of Colombo an advantage, which they ought to have enjoyed forty-two years ago, that being the time during which a clock, that cost originally £1,200, was allowed to remain in the Commissariat Stores, to avoid the expense of putting it up. It is highly creditable to those who had charge of it that the works have not been injured during this long period, though they have cost £280 for cleaning and oil. The Clock Tower, which is 96 feet high, was completed by Mr. Churchill, and the clock is now both a convenience and an ornament to the town.

Writing in this year on the road from Kurunegalle to Puttalam, Sir H. Ward states :—

With regard to bridges, the most pressing wants of the district can be provided for, without any extraordinary outlay, by placing two of the iron bridges recently ordered in England at the Tirrepitchany Ella, which forms the outlet of the tank of Nicaravetia, and at the Maggroo-oya, 6 miles from Kurnegalle, the banks of which are so precipitous, that the place is noted for highway robberies, no less than five instances having occurred within the last year of carts being plundered while attempting the passage. The first of these requires a bridge of 50 feet span, the second of 100. There must also be a timber bridge of 30 feet at Tallacallaheina, which is often a formidable stream, though kept at so low a level in order not to interfere with the traffic upon the road, that it is rendered unserviceable for the purposes of irrigation. With a bridge and a temporary dam the Headmen state that 200 acres of excellent paddy land may be brought again into cultivation.

The cost of this bridge will not exceed £120 ; and the Commissioner of Public Works proposes to proceed at once with the abutments, both for that and the two iron bridges, so as to be prepared for their immediate erection upon their arrival from England. This must also be provided for by a supplementary vote, when I know the amount required as the bridges may then be forwarded direct to their intended site, without being placed in store at Colombo.

Major Skinner also recommends that a third iron bridge of 50 feet span should be appropriated to the Kispotta-oya, between Kurnegalle and Kandy. The abutments were commenced thirty years ago, and the growing importance of the district, where coffee planting is rapidly increasing, renders it highly desirable that the work should be completed.

When these proposals are carried out, there will be a continuous line of bandy road open for 80 miles, from Putlam to Kandy, and through Kandy to all the most important parts of the interior, the only river not bridged over being the Dedra-oya, between Nicaravetia and Warriapolle, a deep and dangerous stream, which must be dealt with ultimately, but which cannot be so at present without an outlay disproportioned to the actual state of the communications, which I do not propose to perfect, but to make available for practical purposes, and more especially for the easy and regular transmission of salt to those parts of the Island where the consumption is largest, and the demand susceptible of the greatest extension.

The road from Kurnegalle to Kandy (26 miles) is in very fair order and may be kept so by Ordinance labour.

Writing on the Kandy-Trincomalee road he states :—

The questions connected with this road are many, and not easy of solution. In its present state it may be regarded as nearly useless for the purposes of communication. If much be done before it is wanted, the road cannot be kept in repair without a large annual outlay. If nothing be done until wanted, it will take three years to effect the repairs that will be required to make it of use.

At the present moment there are 16 miles of excellent road (to Matelle) and 14 (from Palampoota to Trincomalie) that are passable for wheel carriages. The £1,500 voted last Session will improve the worst parts of the road between Matelle, Nalande, and Dambool; but from Dambool to Palampoota, the trace alone is preserved. The waters have worn deep gullies across the road, and in many parts follow it, as the most convenient bed, for miles together.

All the larger streams want bridging; and at Palampoota, Aloom-oya, Gal-oya, Dambool-oya, and Nalande-oya the communication is often stopped for several days together in the rainy season.

The state of the resthouses is also most disgraceful, and bears evident marks of that neglect which has characterized every branch of the Public Service in the Eastern Province. The whole of these useful and necessary buildings between Kandelly and Dambool are in ruins, from a miserable economy in thatch, the want of which has let the water soak into the walls, which being of earth, have fallen in bodily, so that it forms an exception to the rule to find a resthouse with two walls out of the four standing.

That at Aloom-oya, 12 miles from Kandelly, was built by contract eighteen months ago, and taken over, apparently, without proper examination, for the timbers are nothing but jungle sticks, not even squared, the walls are a shapeless mass of earth, and not one particle of the materials will be available. At Gal-oya, where the resthouse is without a roof, the work was better done originally; much of the timber is still sound, and might be used for the new building.

At Habborene, where £10 spent in thatch two years ago would have saved the building, the state of things is nearly as bad, and it was impossible to find shelter of any kind from the heavy rain that came on soon after our arrival.

It is obvious that there is no remedy for this state of things, so long as the resthouses are left in the hands of the Provincial Committee in a district where there are neither funds, labour, nor population.

The Ordinance money must be expended within 20 miles of the place where it is collected, and there are not half as many families within that distance of the three places that I have indicated. Yet the accommodation to the public is indispensable; and travellers upon the Trincomalie road, though few and far between, have a right to hope that their interests will not be entirely overlooked by the Government.

I have, therefore, sanctioned an outlay of £313 10s. 0d. for the repair of the resthouses at Habborene and Aloom-oya, and I propose, if the Council should think proper to comply with a similar request made by the Government Agent of the Central Province for the repair of the resthouse at Dambool, which is also in a bad state, to place the whole of those buildings under the care of the Department of Public Works, with orders to provide for their maintenance by making repairs when required. On the other hand, I recommend the establishment of a tariff for the resthouses, bearing some proportion to the value of the accommodation given, and the abolition of all those privileges which are now claimed by Official and Military travellers. Let every man who uses a resthouse pay, from the Governor downwards; and no man who knows what it is to find shelter in the jungle, at fixed distances, for himself and his horse and his servants, especially in rainy weather, will grudge a reasonable return for so great a blessing.

I have directed the Government Agents for the Central and Eastern Provinces to recommend a proper scale of charges; and though, until the traffic increases, it would only lead to disappointment to promise supplies of food other than of the commonest description, yet the resthouse-keepers should be directed to make arrangements for providing rice and fowls, when wanted, as these may be found in the poorest localities.

In Sir H. Ward's Address to the Legislative Council, July 28, 1858, 1858. he states :—

I am happy to be able to report to you my satisfaction with the progress of those public works, for which you provided so liberally by the Ordinary and Extraordinary Supply Ordinances of 1856 and 1857. I include under this head the Surplus Fund Ordinances of both years, under the first of which there is a considerable balance still in the hands of the Treasurer. An Ordinance will be brought in to legalize the expenditure of this balance during the present year, the operation of the Bill having been limited to 1857.

The electric telegraph is open as far as Kandy, and will reach Mannar by the end of October. The cable, which is to connect Ceylon with India, and to make Galle the port of call for vessels engaged in the Indian trade, is already deposited at the Paumben Straits, and ready to be carried across them so soon as the weather will permit. The survey of Galle Harbour is rapidly advancing, and I hope to be able to communicate to you the results in the course of the Session.

The completion of the Government Offices, and the progress made with the Courts at Hulfsdorf, the Industrial School, the Officers' quarters at Colombo and Galle, for which £8,000 were voted, the Factory, where the new machinery will shortly be in full operation, the erection of the iron bridges sent out from England, the repair of the Nuwera Ellia and Badulla road, which will complete the carriage communication across the Island for 226 miles from Colombo to the Ella Pass, the arrival of the "Pearl" steamer, which will bring the Northern and Eastern Provinces into easy and regular communication with the Capital, and the actual commencement of the Railway Works, which I am to have the pleasure of witnessing in your company on Tuesday next, are all matters of just congratulation to Ceylon, and must exercise a happy influence upon its future destinies. The lattice bridges, two of which I have seen completed upon the Ratotte road, are admirably adapted to the requirements of the Colony. A third bridge has been opened over the Cospitty-oya, between Kandy and Kurnegalle, and two more are in progress between Kurnegalle and Putlam, which have been delayed by an outbreak of fever amongst the Pioneers.

At Kattugastotte, a little above the present ferry, Nature herself has made provision for the erection of a bridge by a reef of rocks, presenting every facility for the piers, and an abundant supply of stone for the abutments. It is proposed to construct here an iron lattice bridge, 420 feet in span, in three lengths of 140 feet each. The plans and estimates will be laid before your Committee by the Department of Public Works; and, having had the advantage very recently of examining both the site of the bridge and nearly the whole of the district that will benefit by it, I do not hesitate to express my belief that a more useful and comprehensive scheme has seldom been submitted to a Colonial Legislature. The cost of the three bridges and of the roads that unite them will not exceed £35,000.

In Sir H. Ward's Message to the Legislative Council of 1859. December 10, 1859, he states with regard to the lighthouses at Trincomalee :—

A sum of £1,100 was voted two years ago for a lighthouse at Trincomalee, the want of which was much felt by vessels approaching the eastern coast of the Island. Finding that there were differences of

opinion amongst the Naval authorities respecting the site originally selected, I took the responsibility of suspending the work until the question could be referred for decision to the Board of Admiralty, at whose request the design was originally entertained. The annexed correspondence shows the prudence of this precaution, as both the Board of Admiralty and the Board of Trade prefer Foul Point to Chapel Hill as the site of the new lighthouse, with a smaller light on Elephant Island for the guidance of vessels entering the inner harbour.

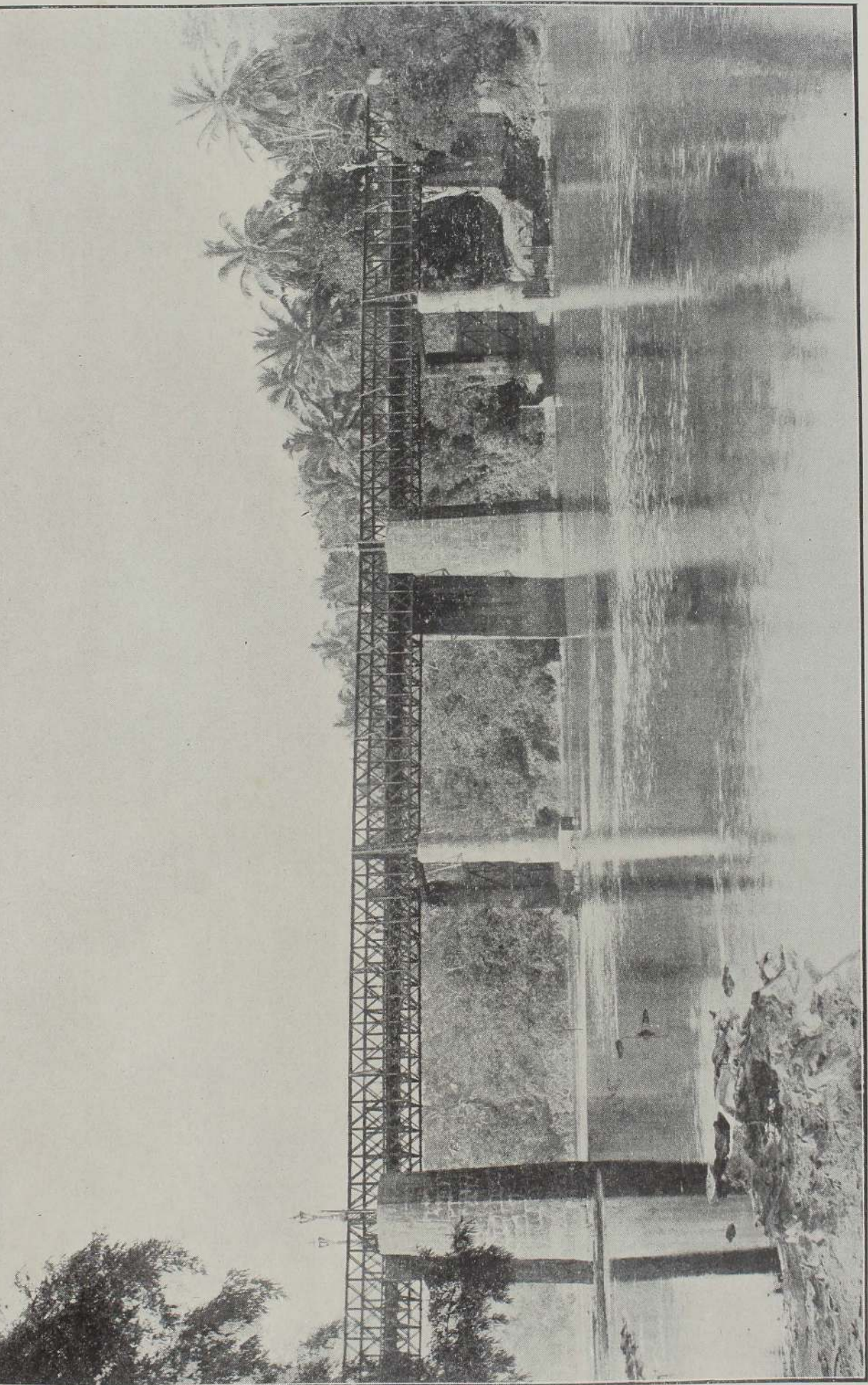
This plan will be complete but costly. The lighting apparatus alone, which has been ordered in England by the Secretary of State, will cost £2,600, and the Commissioner of Public Works informs me that, even with the aid of a Division of Pioneers, which is to be moved to Trincomalee for the purpose, the two Towers, the largest of which will be 100 feet high, the light being visible at a distance of 18 miles, cannot be completed under £3,000; so that the total vote must be £6,000, of which, however, it is not probable that more than £5,000 can be spent in 1860.

As a compensation for this outlay, Her Majesty's Government has undertaken to provide, at its own expense, for the lighting of the Great and Little Basses; and a surveying vessel has been put under orders to complete the survey of the eastern coast between Hambantotte and Point Pedro so that within a given time the dangerous navigation between Galle and Madras will be rendered safe and easy. As a harbour Trincomalee can have no rival in the Bay of Bengal; and, with improved system of lighting, there can be little doubt that it will again become a great Naval Station, thereby contributing largely to the security of this Colony, while it provides for that of Her Majesty's Indian Empire.

1860. Sir H. Ward in his minutes of inspections writes:—

On March 1 I had the pleasure of opening the Kattoogastotte bridge, in the presence of the largest concourse of Europeans and natives, that was ever brought together in the Central Province by any similar event. The magnitude of the work, and the promptitude with which it has been executed, are equally creditable to the Colony. But the details are so fresh in the recollection of the public, and my opinion upon the merits of all concerned has been so recently expressed, that it is unnecessary for me to dwell upon either here. The undertaking is one that no changes in the internal communications of the Island can affect, short of the transfer of its entire trade to Trincomalee; and even then the communication between Kandy and Matelle would not be less valuable than is the communication between Matelle and Kandy now,—when Colombo is the port of shipment for the whole Central Province.

I diverged from the direct road to Kandy at Gonawatte ferry to visit the Teldenia bridge. It is a singularly beautiful structure; and both from the quality of the stone and the excellence of the workmanship it has been completed with a "finish" both as regards the bridge itself and the approaches to it, which does the greatest credit to Mr. Mason and the Third Division of Pioneers who were employed upon this work for twelve months. I regret not having been present at the opening of the bridge, which was celebrated almost upon as large a scale as that of Kattoogastotte, and not less marked by the strongest expression of native feeling. It now only remains to bridge over the Meddemahanewere river, in order to complete that chain of communications which is to bring the whole of Upper Doombera into contact with Kandy by the Kattoogastotte bridge, relieving the planters of that important district from the delays and losses which the best regulated ferries are certain to cause during crop time from the impossibility of providing for the large additional traffic thrown upon them.



S. G. O.

KATUGASTOTA BRIDGE
Built by Mr. J. A. CALEY 1860
3 Spans of 124 feet
Intermediate Piers added
1905

Iron-work supplied by
R. BROTHERHOOD
Railway Works
Chippenham
Wiltshire

The Bridge at Nawellepittia of 140 feet span, with its very striking approach on the Kotmalie side by an embankment 12 feet high and 1,100 feet in length across some low, swampy ground, presents a striking contrast to the steep and difficult descent, by which the ferry boat was approached when I saw it in September, 1855. The work has been well and quickly done by Mr. Mathias and the 7th Division of Pioneers, who are now at work upon the lighthouse at Trincomalie, with the exception of the planking of the bridge, with which I was not satisfied. The Kittool Galle bridge was built in four months by Mr. Reyne and seventy men of the 8th Division of Pioneers, and was only opened to the public on the day of my visit (May 15). The rejoicing seemed to be general throughout the district at the removal of this common nuisance, the sudden increase of the river being a perpetual risk and never to be foreseen, because dependent upon a fall of rain in the hills 20 or 30 miles distant. The work is executed with great solidity and care; and so large a space has been allowed for the waterway that the bridge is, I hope, secured against casualties of any kind; but the state of the approaches must be carefully watched after every flood.

From Colombo I went to Galle, where I had an opportunity of inspecting the intended works at Deweture, the details, costs, and probable results of which are so fully given in the reports of Mr. Forbes, Mr. Harrison, and Mr. Churchill, whose opinions are corroborated by those of the Surveyor-General, that I cannot too strongly recommend the immediate prosecution of the undertaking, under the same system of contract which has been tried so successfully at Oroobokke and Kirime, under the responsibility of Messrs. Harrison and Leake. These gentlemen have the more claim upon the consideration of the Government, because they have devoted much time to the preliminary surveys, and have been informed by me that I was ready to sign the contract as soon as it could be prepared.

It is a matter of great regret to me that I should not have been able to inspect the dams at Oroobokke and Kirime before my departure. From all who have done so I learn that the works have been executed with great skill and solidity; and that, without Oroobokke, the inhabitants of the Tangalle district would, literally, not have had water to drink during the late unprecedented drought.

In 1860 Sir Charles MacCarthy arrived in Ceylon and assumed the Government, and Major Skinner writes:—

The enterprise of coffee planters could not be checked, and the demand for roads was excessively urgent in order to prevent the loss of much of the capital they had invested. During Sir Henry Ward's Government he exercised a will of his own, and it required no great persuasion to convince him of these wants; but now the expenditure was not considered with reference to the increased facilities given to the planters, but to the additional charge likely to be entailed upon the revenue for additional annual expenses. The Happootella district, a group of probably the finest estates in the Colony, furnished a painfully striking example of the need of roads. I had long foreseen the strait to which the proprietors were inevitably drifting. Their rice and other provisions could be carried to the estates by manual labour, but directly the coffee tree was old enough to yield a crop, the consequences were palpable. I had long been struggling to open a road for wheel traffic from the highest navigable port of the Caltura river to the port of Colombo at Ratnapura through Saffragam to Ouvah, and had got as far as Pallamadula, 12 miles above Ratnapura. There still remained at least 38 miles of the most execrable native mountain path ever traversed and intercepted by rapid torrents only fordable in dry weather. Over this path the planters sent down their maiden crops, which were always small and light, on men's shoulders.

I urged upon the Government that it had a far greater stake in the success of a whole district than any planter had in the prosperity of his individual estate, and pointed out that, unless the Happootella district were at once supplied with a road access, the planters would grow coffee only to rot in their stores, and at last I induced the Government to sanction my submitting an estimate for continuing the carriage road from Pallamadula to Ballangodde, a distance of 15 miles.

Anticipating that Government could not much longer withhold this boon, I had had two estimates furnished for the work. One of them amounted to £30,000, which, of course, I rejected at once and sent another officer pointing out to him the absurdity of framing so unreasonable a document, and requiring him to reduce the charge. He professed to have taken a great deal of pains, and claimed credit for reducing the amount to £25,000.

This estimate was still so excessive that I could not subject it to Government. I, therefore, sent one of the most experienced officers in the Department, warning him against the extravagance of his two predecessors. I cautioned him that if he made too low an estimate, I should send him up to direct the execution of the work himself; if I thought it too high, that I should carry it out under my own directions, and make it a test of accuracy. The only officer of my Department whose testimony was called for, who supported me in my view of the cost of work, was Mr. Evatt, who by his systematic arrangement and strict adherence to principles of economy must have saved the Colony an enormous sum of money. He had been a subaltern in the 90th Light Infantry, never was a Civil Engineer, and yet was of more value to me than many highly scientific men.

I feel assured the officer to whom I finally entrusted the framing of this third estimate was painstaking and conscientious, and I know he was an able man; but he, like many of my assistants, held an exaggerated view of what the cost of work should be, and his estimate was between £18,000 and £19,000. Feeling convinced that the 15 miles of road could be opened for less money, I submitted the estimate to Government, but placed two divisions of pioneers on it, under two good native officers, who reported to, and corresponded with, me direct. Instead of the work costing between £18,000 and £19,000, the amount of the sanctioned estimate, the expenditure was only £9,163.

Directly the road was opened, I drove Sir Charles MacCarthy up to Ballangodde. He was enchanted with the work, and I showed him that we had saved 57 per cent. of the estimate, and volunteered to complete another section of equal distance for the surplus money if he would authorize the expenditure. I pointed out to him what poor encouragement it would be to the Department if money thus saved should go back to the Treasury. To this assertion he agreed, and I had the satisfaction of making my way up to Happootella, and of saving that district from almost total ruin.

1863. In 1863 a Commission was appointed to inquire into and report upon the system under which the votes for public works were expended (a copy of which will be found in Chapter V. of Volume II.). It was found that the expenditure of the Department had risen from £54,919 in 1850 to £207,203 in 1863, and the extent of roads in charge of the Department had increased by 250 miles, but the number of officers had remained the same, and that the Pioneer Force had decreased to the extent of one-fourth its original strength.

Recommendations were made to increase the number of officers, and that the Pioneer Force should be brought up to full strength, also that three more divisions should be added.

In this year the total length of main roads in the Island by Provinces was :—

			Miles.
Western Province	..	..	404 $\frac{1}{2}$
North-Western Province	..	..	211 $\frac{3}{4}$
Southern Province	..	..	153
Eastern Province	..	..	380
Northern Province	..	..	520 $\frac{3}{4}$
Central Province	..	..	426 $\frac{1}{4}$
Total			2,096 $\frac{1}{4}$

			Miles.
Metalled	..	..	564
Gravelled	..	..	456
Ungravelled	..	..	1,076
Total			2,096

In addition to 268 miles of bridle road, making a total of 2,364.

The cost of upkeep of roads in the Central Province under the charge of Mr. H. Byrne was :—

Estimated Cost of Road Repair per Mile.

For Year 1864.		Upkeep.
		£
Pangwelle road ..	..	64
Rangalle road ..	..	56
Rattotte road ..	..	48
Matella road ..	..	98
Dambool road ..	..	52
Gampola road ..	..	126
Rajawella road ..	..	58
Knuckles road ..	..	46
Town of Kandy ..	..	200
Kornegalle road ..	..	97
Haregame road ..	..	72
Peradenia road ..	..	250
Maturatte road ..	..	65
Road from Dambool to Kornegalle	..	17
Total		1,249

Average per mile £89. 4s. 3 $\frac{1}{2}$ d. The upkeep of the Kandy road was £264 per mile.

The cost of the Fixed and Unfixed Establishment of the Department in 1850 and 1864 was :—

	In 1850.		A Year.
	£	s.	d.
Fixed Establishment, 7 Officers	..	—	3,600 0 0
Unfixed :—			
1 Financial Assistant, £1 a day	..	365 0 0	
2 Tracing Officers, 15s. a day	..	547 10 0	
2 Officers at £200 a year	..	400 0 0	
6 Do. 10s. a day	..	1,095 0 0	
9 Do. 7s. 6d. a day	..	1,231 17 6	
2 Do. 5s. 6d. a day	..	200 15 0	
1 Do. £90 a year	..	90 0 0	
5 Do. 4s. a day	..	365 0 0	
1 Do. 2s. 6d. a day	..	45 12 6	
			4,340 15 0
			7,940 15 0

Besides this should be added the Military pay and allowances of 1 Captain and 5 Subalterns who were employed in the above unfixed list.

In 1864.

	£	s.	d.	£	s.	d.
12 Officers, Fixed Establishment ..	—			6,750	0	0
Unfixed :—						
2 Officers at £400 a year ..	800	0	0			
3 Do. £300 a year ..	900	0	0			
9 Do. £236 a year, Pioneer } ..	2,224	0	0			
1 Do. £100 a year, Divisions }						
3 Do. £200 a year ..	600	0	0			
1 Do. £274. 10s. a year ..	274	10	0			
2 Do. £137. 5s. a year ..	274	10	0			
1 Do. £120 a year ..	120	0	0			
1 Do. £118. 19s. a year ..	118	19	0			
2 Do. £100 a year ..	200	0	0			
	<hr/>			5,511	19	0
Factory Engineer ..	£400					
Assistant Engineer ..	£73					
	<hr/>			473	0	0
				<hr/>		
				5,984	19	0
				<hr/>		
				12,734	19	0
				<hr/>		

1866. In 1866 Major Skinner writes :—

I had made my preparations for a final visit to all the districts and works in the interior of the Island. This involved the laying in of supplies of every description for myself and officers while travelling, corn for my horses, oilmanstores, wines, groceries, together with clothes and books, for several months' use. I had started off two railway trucks full of luggage of every conceivable description to the value of £300 ; but on the evening of the day they left Colombo, I had the annoyance of receiving a telegram to the effect that the railway trucks had caught fire, and that the whole of my property had been destroyed. Having only just spent £600 on my voyage and expenses to and from England, this proved a most untoward loss. I was advised to apply to Government for reimbursement, as it was argued " Government was responsible for the safety of the goods it took charge of, as ordinary carriers ;" besides which I was travelling on duty. But my appeal met with a decided rejection, and I thought it inadvisable, at the closing scene of my long service to the Government, to enter an action for damages against it.

My last few months in Ceylon were spent in travelling through the districts with Sir Hercules Robinson. I felt very sad when reflecting that it was to be my last visit to places in which I had spent so many years of hard work.

1867.

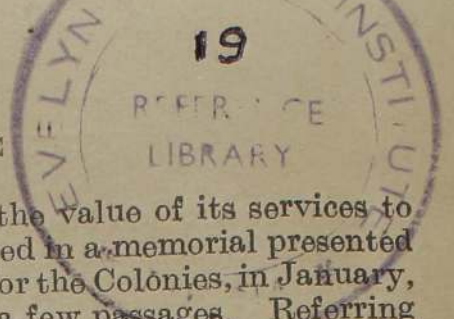
RETIREMENT OF MAJOR SKINNER.

(From the "Colombo Observer," June 29, 1867.)

The absorbing topic to which we have to address ourselves on this occasion is the final departure from the Colony of the oldest, and we may safely say the most useful, member of the Public Service. Whatever general objections may be offered to the practice of presenting addresses to public servants on their retirement, we feel that a case so exceptional as Major Skinner's calls for an exceptional expression of opinion on the part of those whom his lifelong labours have benefited so largely. We are, therefore, glad to learn that the natives have in this manner shown their appreciation of Major Skinner's character and services. From the Seven Korles; from Kandy and the Ouvah Districts; Saffragam, the Southern and from other districts within reach, the people of the land came forward to say a kind parting word to the man who has done so much for them and their country.

We are equally glad to learn that the European merchants, planters, and others have made a fitting demonstration in the shape of a memorial to the Secretary of State, praying that an enhanced pension may be granted to the veteran roadmaker. As taxpayers, and most of them extensively interested in the commercial and agricultural enterprise of Ceylon, those who join in the memorial assure the Secretary of State that it would be grateful to their feelings to learn that the Government Major Skinner has so long and so faithfully served had consented to reward his special services with a special pension of £1,000 per annum. A case so remarkable as his has never come before the Government of Ceylon, and no similar case is likely to recur. From the time when as a young officer of fifteen "Tom Skinner" was chosen by Governor Sir Edward Barnes to aid in opening the Kandian Provinces for military operations and general intercourse by the great road up the Kaduganava Pass, until now that the grey hairs of three score and four warn him to seek repose in the bosom of his family for the evening of life, he has been incessantly employed in the construction of those means of communication to which Ceylon owes most of whatever material progress she has made, with much of the intellectual and moral improvement, which here as elsewhere ever follow increased facilities of intercourse. The latest portion of his career has not been the least creditable to him or the least useful to the Colony. Incited by the encouragement afforded him by an appreciative ruler, he put forth all the energy for which his youth and manhood were distinguished in efforts (largely successful, we are happy to know) to bring his Department into such a position as regards numbers and efficiency as will render comparatively easy the task which remains for his successor to continue that comprehensive scheme of communications, which, many years ago, Major Skinner planned, and which, when finally completed, will make this Island the best roaded Colony in the British Empire.

Without a trained body of workmen to rely upon for good, steady, and continuous work, such results would never have been attained as Major Skinner has lived to accomplish, and the point in respect of which his determination of purpose—or, as some have called it, his obstinacy—has beyond all calculation served the public is the pioneer question. We well remember that about 1854 there was a very strong desire on the part of Sir George Anderson's Government, including Messrs. Macarthy and Gibson, to reduce the Pioneer Force. Indeed, long before then it had at times been proposed, and nothing but Major Skinner's persevering and strenuous opposition to so suicidal a measure prevented its being carried out. When he proposed, or rather insisted on, the establishment of a Pension Fund for the Pioneer Force, he met with nothing but discouragement on all sides. Happily he persevered, and to the existence of that fund, which has now, without the cost of one shilling to the public, a capital of about £22,000, and an income of upwards of £3,000 a year, we owe it that during the progress of the Railway, and when the demand for skilled labour has been so great that a pensioned Pioneer can earn from 3s. to 4s. a day, the Public Works Department was enabled to keep its force together, and from it to form the nucleus of the present force of nearly 4,000 men. What would Ceylon have been without this force? As roadless as many parts of the Continent of India still are. The Pioneer Force is now in a high state of discipline and efficiency, and is equal to any things the Colony can require of it. Major Skinner has been in the habit of inspecting and recording in his inspection rolls the characters of every man in the force, at least once a year, but every half-year when he could devote the time to it. The result has been most happy in imbuing the men with an *esprit de corps* which leads them to be proud of their position and anxious to earn the good opinion of their officers, and those substantial records in the shape of higher rank and better pay which the semi-military character of the organization secures.



The character of the Pioneer Force and the value of its services to the Colony were so well and forcibly described in a memorial presented to Sir George Grey, when Secretary of State for the Colonies, in January, 1855, that we cannot do better than quote a few passages. Referring to the recommendations of the Committee of Council on the Establishment of the Colony, the memorialists wrote :—

“By one of their resolutions the Committee propose to strike off from the fixed expenditure of the Colony the Pioneer Establishment of the Department of Public Works, a measure which would infallibly break up the Pioneer Corps, perhaps the best organized civil force to be found in our Eastern Empire, and without which it would have been impossible to have carried out the great works which have been executed in Ceylon during the last ten or twelve years; and is much to be feared that the Department of Public Works would thus be so crippled that it would be found impossible to keep up the roads in an efficient state.

“The subject involves so many considerations that we could not venture, in a letter, to take up your time with all the details requisite to lay it fairly before you; but we may call to your attention the fact that in 1833 the same measure was adopted, from economical views, with regard to the then equally efficient Corps of Pioneers, and an attempt was made to carry out public works with occasional hired labour; but the results were so unsatisfactory that it was soon found necessary, with great trouble and expense, to organize the present Pioneer Force, under the former system, placing it on the fixed expenditure; and at the same time, Major Skinner adopted such measures to form a Pension Fund as made the service a highly desirable one, and placed at the command of the Roads Department the very best class of Malabar labour that can be obtained.

“During the disturbances of 1848 the Pioneers were, to a certain extent, armed and drilled, and were found a most valuable and efficient body of men, quite capable of affording important aid to the Military, and far superior to the native police.

“The climate of Ceylon, the nature of the country, the apathetic character of the Cingalese labourers, and the difficulty of getting public works performed efficiently and with good faith by contract are amongst the causes inherent in the Colony which render a force of skilled and experienced labourers absolutely essential to the making and upkeep of roads. But it is not to be expected that the fine body of men now permanently settled in the Colony under the Roads Department will remain there if deprived of regular wages and of the Pension Fund, which are to them strong inducements to good conduct; and upon neither of them could they depend for the future if their employment is to be contingent only on the carrying out of such estimates as may be, from Session to Session, sanctioned by the Governor and Legislative Council.

“We consider that the proposed alteration would be found extremely prejudicial to the effective working of the Department of Public Works, and most detrimental to our interests as proprietors of land in Ceylon; and we beg to reiterate the request we have so recently made to you to examine Major Skinner himself (who is now in England) on this most important topic, and we cannot doubt that his evidence will bear out our belief that the measure proposed would be a most imprudent one, and would in the end lead to a great increase of expenditure.

“We are the more disposed respectfully to press our views on this matter, as we have had for several years unusual opportunities of watching the working of the present system in the Kandian Province; while the members of the Legislative Council, though doubtless individually anxious for the welfare of the Colony, have, with one or two exceptions, been for many years placed in such circumstances as have unavoidably debarred them from the advantage of personal experience on the subject.

We only trust no future attempt will be made to reduce or dispense with the Pioneer Force, until that distant period when it can be said that Ceylon needs no more roads, bridges, or canals. The last word reminds us of a system of communication to which the British Government in Ceylon has as yet paid but too little attention, and in regard to which Major Skinner has had to fight almost as many battles for the interests of the Colony as in the case of the Pioneers.

One of the greatest difficulties he had to contend with was the opposition of the present Colonial Secretary and others to all his propositions and efforts to restore the efficiency of the inland navigation. In 1851 it was destroyed at Natande and Negombo, and other parts of it impeded, so that it cost the boatmen from £4 to £5 to cart their salt and other produce past these obstructions, boats only plying between them. Major Skinner was constantly told that any attempt to restore the navigation would result in the total waste of the money expended on it. He was obliged, in 1851, after (with Mr. Norris' Department) the canals were handed over to him, to commence the work of restoration "on the sly," in places where he could not be observed: at Periamulle, north of Negombo, where he built his first revetment walls, after clearing out the canal which had filled in with sand 4 or 5 feet above the level of what should have been high water. The effect of that work has been that not a spoonful of stuff has been taken out of the canal since, its depth having for upwards of fifteen years been preserved by the scour of the water. The system has been extended; the Natande *impossibility* has never once been obstructed since reopened by Mr. Campbell, and the tolls have risen in proportion. If, however, Major Skinner had realized the predictions of his opponents by failure, they would have infallibly crushed him for his obstinacy. Sir H. Ward took much interest in this work. Sir H. Robinson came down the line from Putlam to Mutwall in April of this year, and was, we hear, so pleased with it that he is prepared to carry out Major Skinner's suggestions for its further improvement for, as it is hoped at no distant date, steam navigation.

In Major Skinner's Ceylon career of not far short of half a century the Island has changed from a purely Military possession into one of much commercial importance. When he arrived in 1819 it was to find the flames of a great rebellion scarcely yet quenched in the recently acquired Kandian Provinces; the British Forces having suffered far more from the absolute want of roads than from any resistance offered by the mountaineers. Indeed, in the Maritime Provinces, which had been in British occupation since the closing years of the last century, there were practically no made roads beyond the limits of the principal towns, while permanent bridges were absolutely unknown. The first work in which Major, then Ensign, Skinner took part was one which rendered further resistance on the part of the Kandians impossible by the facilities afforded to the movements of British troops; and impossible in the higher and better sense of converting enemies into loyal and attached friends by the protection to life and property which became possible to the British Government, and by the benefits which European enterprise brought in its train. He has lived to see the ancient inhabitants, the European planters, and the immigrant labourers from the coast of Coromandel all living and labouring peacefully side by side. He has survived to see a magnificent network of roads spread over the country from the sea level to the passes of our highest mountain ranges; and instead of dangerous fords and ferries, where property often suffered, and life was too frequently sacrificed, he has lived to see every principal stream in the Island substantially bridged and about to be spanned by structures of stone or iron. A few years before he came to the Island a writer on Ceylon was compelled, in the interests of truth, to state that, "strictly speaking, there are no roads in the Island."

He has lived and laboured to see this reproach wiped away, and a contrast so great established that Ceylon, with an area of 25,000 miles, can now count nearly 3,000 miles of made roads, one-fifth of which consists of first class metalled roads, and another fifth of excellent gravelled highways. What a favourable contrast this state of things presents to the following picture of one of the richest and most important portions of the Empire of Hindustan, including, as the tract adverted to does, the valley of the Indus. The passage occurs in an able minute by Sir Bartle Frere, lately Governor of Bombay, and now Member of the Council of the Secretary of State for India, advocating the formation of a railway to run from the Punjab through Scinde to Kurrachee:—

“Let us consider how far the great quadrilateral formed by lines joining Lahore, Allahabad, Bombay, and Kurrachee is provided with means of communication. The sides of the quadrilateral are given in the annexed diagram,* in round numbers and in direct distance, and the included area cannot be less than 400,000 square miles. Perhaps a better idea of its magnitude may be obtained from the other sketch map marked B,* on which France and Germany, Great Britain and Ireland are projected to scale within the space of North-Western India, of which I am speaking. Let us consider this vast space, compared with which Germany and France seem so small and compact. How is it furnished with means of transit and inter-communication? Throughout this space a line drawn north and south, from Jumna, north of Agra, to the sea, say, 600 or 700 miles, or about twice the distance from London to Edinburgh, will, till it reaches the Baroda Railway, close to the sea coast, touch no railway nor navigable river nor canal, nor even a common cart road 100 miles in length. A line drawn east and west, say, from Kurrachee to the Allahabad and Jubbulpoor road, will, in like manner, in a course of more than 900 miles, or about as far as from London to Rome, cross neither railway nor navigable canal, and only one cart road, that from Agra to Mhow. Even that is still unbridged and unmetalled, incomplete, and not available for continuous cart traffic, though it has been more or less under construction for at least thirty years. The whole of this vast space, so full of large cities, fertile districts, and promising wastes, is in fact furnished with no better appliances for facilitating transit than the natural surface of the country affords and has afforded for centuries past. Here and there, no doubt, a few short lines of made road may be found, but I believe I speak within compass when I say that in no part of this immense territory could a cart find (except on the incomplete Agra and Mhow line above noticed) 100 miles of ordinary bridged and metalled road traversable by wheeled carriages for the whole year round, nor 200 continuous miles of made road, however imperfect, in any part of the area.”

With the advent of Railway travelling, we shall be too apt to forget the great change for the better introduced when a fully-bridged and well-metalled road *first* connected Colombo with Kandy. A writer on Ceylon, whose book was published so lately as 1841, is amusing from the enthusiasm with which he contrasts the ease and comfort of coach and carriage travelling in Ceylon with the primitive Indian mode of conveyance by palanquins, in which the traveller was carried over hot and trackless wastes on the shoulders of o'er-wearied men.

So different is the case with Ceylon that a map in which all the roads are prominently filled in looks as chequered as a draught board; and although more roads are still wanted, yet the difference between Ceylon and India is that, while she has yet to make the feeders for her great railway lines, our system of feeders to a large extent is ready to our hands; thanks to the race of roadmakers which commenced with Barnes as its chief, and whose last representative is leaving us just as

the great Kandy road is about to be superseded by the railway. On that road, let us never forget, ran the first mail coach ever started in Asia; while we may here recall to our readers' recollection the figures representing tolls and cart traffic which Major Skinner framed a few months ago.

As Major Skinner took part in the formation of the great Kandy road, so he has lived to see it about to be all but entirely superseded by a railway. On the eve of this event the Commissioner of Roads has opportunely put together the figures which constitute the history of the main artery of the Colony's commerce for the quarter of a century, commencing with 1842 and ending with 1866. In the five and twenty years the toll revenue of the road has been £572,362, while the expenditure was only £422,915. The nett profit, therefore, has been £149,447. For the whole period £264 were expended per mile per annum, against £341 collected.

From a note we learn that there was established on the line of road in June, 1865, 2,300 dwelling houses, occupied by 9,114 inhabitants, and 707 halting stations for the accommodation of carts and bullocks traversing the road.

So that the halting places were ten to each mile. In a second table Major Skinner adds 16 per cent. for expenses of collections, and brings the whole yield in tolls of the Kandy road up to £663,940. The carts equivalent to these tolls Major Skinner puts down at—

Loaded	2,140,920
Unloaded	237,870

So that at least $2\frac{1}{4}$ millions of carts traversed the great Kandy road in the quarter century. (By the time the railway is opened, we may make the number 2,400,000 at the very least.)

With the formation of nearly every mile of road, and the erection of every bridge in the country, Major Skinner has been more or less intimately connected either as subordinate or chief of the Public Works Department; while we cannot forget that simultaneously he laboured, amidst exposure and privation, of which present explorers of the Kandian Provinces can have but the faintest idea, in surveying and fixing the topographical features of the country he was opening up, the result being seen in the beautiful and useful map of the Colony, and especially that of the mountain zone, with which his name, in conjunction with those of Fraser and Gallwey, will be ever honourably associated.

As the result to a great extent of the improved communications, especially by their affording easy access on the part of coffee planters to the forests of the hill country, the commerce of Ceylon has increased from a few hundreds of thousands per annum to an aggregate of ten million sterling, the export of coffee alone having risen from a value of about £10,000 to close on three millions. The revenue has increased in proportion until we have seen half a million sterling voted for the Public Works Department in one year.

Any record of Major Skinner's public services would be incomplete which did not include honourable mention of his efforts to secure for the Colony, by his knowledge of work and prices, a contract at a moderate rate for the construction of a railway—an undertaking which no one in the Colony has been more anxious to see completed than himself; from the feeling he so readily avowed, that the advancing commerce of the Colony rendered the iron highway absolutely necessary as the supplement and superseder of the great road on which his first efforts were put forth under the eye of the eminent Governor who had genius enough to anticipate, and energy to provide for, that future of Ceylon which the worthiest and most devoted of his disciples has lived

to see. Finally, we cannot forget Major Skinner's recent services to the Colony as President of the Commission appointed to report on the proportion of Military expenditure fairly chargeable to this Island in time of peace.

Having thus expressed our sense of Major Skinner's valuable public services (not at greater length and not more warmly than we conscientiously feel the case demands), and having indicated our hope that services so unparalleled may be especially rewarded, it remains that we should testify our respect for the rectitude of this great worker's private life, and wish him, as we cordially do (speaking, we believe, in the name of the great majority of the people of Ceylon), all possible happiness in the calm of the closing years of a career so honourably laborious, and to this Colony so useful. Though once in the early part of his career, at the point of death from fever contracted in the valley of the Maha-oya—so fatal to many of his brother officers and multitudes of the labourers they directed—Major Skinner at the age of sixty-three seems so hale and hearty that we cannot look at him without thinking of the description of another great worker of whom it was said in his old age that "his eye was not dim, nor his natural force abated." But sixty-three is only seven years short of the term allotted to man, and if, as we hope, Major Skinner is destined long to outlive that period in vigour of intellect and strength of body, we feel sure that never will the lengthened enjoyment be grudged to him of the largest rewards which a just Government at the voice of a grateful country can confer.

On the eve of Major Skinner's retirement on June 30, 1867, he wrote the following farewell letter to his officers. He had served in the Department for forty-seven years, from 1820 to 1867, and retired at the age of sixty-three. As Sir Emerson Tennent justly wrote: "To him more than to any living man the Colony was indebted for its great prosperity," the revenue having risen from £460,000 in 1821 to close on £1,000,000 in 1867. He lived to draw his pension for ten years, and died on July 24, 1877, at the age of 73:—

MEMORANDUM.

With the close of this day my official connection with the Department of Public Works in Ceylon will cease.

It has been with the deepest regret I have felt that, with due regard to the public interests, the time had arrived when it is my painful duty to take leave of a body of officers for whom I entertain the greatest regard and esteem.

In the administration of so large a Department as that of the Public Works of this Colony, it would have been scarcely possible altogether to have avoided occasionally causing disappointment to the expectations of some when it has occurred, the pain it has caused me has, I apprehend, been far greater than that experienced by the individual who supposed he had just cause for complaint in this particular.

I tender my grateful thanks to those officers who have for many years worked with me, and who have afforded me much valuable support in the execution of my duty, prominently amongst these are Mr. Tatham, whose counsel and untiring application to business have been beyond measure valuable. To Messrs. Byrne, and Evatt, Campbell, Young, and P. Cummins I am deeply indebted for the years of hard and arduous service which they have respectively performed, nor ought I to exclude from this list the names of Messrs. Wellapoole and Sherman. To Mr. Folkard, although his service has not been of the same duration as the above, I am much indebted for his ever willing and efficient aid.

To officers generally and to the non-commissioned officers and men of the Pioneer Divisions I give my best thanks, the Pioneers will long live in my recollection, there are many for whom individually I shall feel a great interest, and of whose progress I shall seek to hear from Captain Wilkinson, to whose immediate charge I leave them with great confidence.

To Mr. Misso, the Head Clerk, and Mr. Franciscus, the Head Draughtsman, and their fellow clerks and draughtsmen I tender my best thanks for their uniform good conduct; to hear of their success in life will always afford me great pleasure.

It mitigates much the pain of this severance from so many friends and brother officers to feel the perfect confidence I experience in leaving them in the hands of Mr. Molesworth as my successor. I trust and believe the change will be greatly to the advantage of the Department, and I trust he will never have cause to feel any want of the most zealous support of men who can carry him through any undertaking.

To all I bid a sincere and hearty farewell, and pray that God's blessing may at all times attend them.

Galle, June 30, 1867.

(Sgd.) T. SKINNER.

Major Skinner's salary at the time of retirement was £1,500; his pension was £875 per annum.

An Epitome of the Principal Works executed and in progress from 1855 to 1860.

Sums voted for Public Works by Supply, Supplementary Supply, and Surplus Fund Ordinances from 1855-60.

	Under Road Ordinance.			Supply Ordinance.			Supplementary Supply Ordinance.			Surplus Fund Ordinance.			Total.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
For 1855 ..	15,929	5	9½	66,087	12	1	9,308	19	9½	—	—	—	91,325	17	7½
For 1856 ..	17,334	10	0½	74,819	15	6½	25,778	8	7	25,000	0	0	142,932	14	2
For 1857 ..	17,662	7	5¼	107,180	4	6	44,123	14	1½	41,000	0	0	209,966	6	0½
For 1858 ..	17,471	11	7½	129,026	0	3	36,203	5	4¾	80,000	0	0	262,700	17	3½
For 1859 ..	18,781	19	9¾	134,606	11	11	36,062	1	7¾	33,000	0	0	222,450	13	4½
For 1860 ..	19,305	6	9	108,064	2	8	23,549	16	2½	—	—	—	150,919	5	7½
Total ..	106,485	1	5¼	619,784	6	11½	175,026	5	9	179,000	0	0	1,080,295	14	1½

Total Miles of Road in Ceylon (exclusive of minor roads) ..	1,800
In good repair ..	1,000
Unmetalled and ungravelled ..	800
Expenditure upon Roads from 1855 to 1860 ..	£544,344 0s. 9½d.

Note.—Particulars of expenditure on the following roads from 1855 to 1860 :—

	£	s.	d.
Road from Colombo to Kandy ..	118,004	16	6½
Do. Galle and Hambantotte ..	53,021	18	9¼
Do. Kandy by Yatteantotte and Gampolla ..	22,585	14	9½
Road from Ambepusse to Kornegalle and Kandy ..	24,675	4	5½
The Kallobokke road ..	10,451	11	5
Road from Gampolla to Nuwera Ellia and Badulla ..	44,090	16	1½
Do. Kandy to Maha-oya ..	6,602	5	1½
Do. Matelle to Rattotte ..	1,408	7	10¼
Do. Nawellepittia to Kotmalie ..	4,777	1	3¾

Return of Bridges, 1855 to 1860.

Span in Feet.	Where erected.	Iron Bridges.		Cost.		
		When commenced.	When completed.	£	s.	d.
205	For the erection of the suspension bridge at Gampolla	..Feb., 1856	..Jan. 31, 1859	12,083	11	5
50	Kospottoo-oya on the Kornegalle and Kandy road ..	..Oct., 1857	..April 30, 1858			
50	Tripitchena-ela on the Kornegalle and Putlam road ..	..do.	..Dec. 31, 1858	3,358	3	3
100	Magroo-oya on the Kornegalle and Putlam road.	..do.	..June 30, 1858			
100	Pondool-oya on road leading from Rambodde into the Pondool-oya valley	Mar., 1858	..April 30, 1859	1,999	17	8
80	Pattellegedera on the road from Negombo to Veangoda ..	..do.	..Dec. 31, 1858	1,437	12	6½
40	Tallacolahena, Putlam and Kornegalle road ..	..do.	..do.	332	9	11½
80	Soodoo-ganga, Rattotte road ..	..April, 1858	..Jan. 31, 1859	3,767	17	3
50	Koorooawa-ganga, Rattotte road ..	..do.	..do.			
420	Kattoogastotte, near Kandy	..Aug., 1858	} April 30, 1860	20,721	11	6¾
120	Pinga-oya, near Kandy	..do.				
50	Pussel-oya, near Kandy	Jan., 1860				
140	Nawellepittia	..Jan., 1859	..Dec. 31, 1859	3,860	14	5½
140	Teldenia	..Dec., 1858	..Mar. 31, 1860	5,209	18	8
40	Hooloo-ganga on road to the Knuckles	..July, 1859	..Sept. 30, 1859	398	13	5¾
70	Ratnapoora	..May, 1859	..Aug. 1859	812	1	6
110	Maha-oya, Maturatte (in course of construction)	Sept., 1859	.. —	2,251	0	0
120	Kittoolgalle	..do.	..May, 1860	3,307	0	0
125	Moiety towards the construction of a suspension footbridge across the Mahawille-ganga on the line of road from Kotmalie to Dimboola ..	.. —	.. —	200	0	0
108	Bibila-oya (in course of construction)	..June, 1860	.. —	600	0	0
40	Rambodda on Nuwera Ellia road	..June, 1858	..Sept. 30, 1859	513	15	2
				60,854	6	11
2,238						
Value of twelve iron bridges in store				..	6,966	0 0
				Total	..	67,820 6 11

£ s. d.

These twenty-one iron bridges were erected within the last three years at a cost of .. 60,854 6 11
 There remain in store at the Factory ready to be put up twelve iron bridges, which cost .. 6,966 0 0

Wooden Bridges.

Years.		£	s.	d.
1855.	Peradenia bridge	4,012	15	9½
	Bridge-of-Boats, Grandpass	400	0	0
	Badulla-oya bridge	400	0	0
1856.	Powakpittia bridge	260	1	8
	Kope-ella bridge	413	15	6¾
	Bridge-of-Boats, Grandpass	400	0	0
	Drawbridge, Grandpass	600	0	0
	Gindurah bridge	215	12	5
	Madampe bridge	277	0	0
	Bridges on the Nuwera Ellia and Badulla road	485	0	0
	Poowakwettiya bridge on the Awisawella road	304	0	0
	Mahamodera bridge on the Galle road	214	0	0
1857.	Bridge-of-Boats, Grandpass	500	0	0
	Ouroogoddawatte bridge	300	0	0
	Kottugodda bridge	225	0	0
	Loono-oya bridge	205	0	0
1858.	Bridge-of-Boats, Grandpass	500	0	0
	Galle Esplanade bridge	450	0	0
	Caltura bridge	3,227	0	0
	Kopay bridge	290	0	0
1859.	Pol-oya, Polwatte, and Goyapane bridges, in Southern Province	2,460	0	0
	Dandugam bridge	314	0	0
	Bridge-of-Boats	558	0	0
1860.	Diggorella bridge	200	0	0
	Bazaar Bridge, Negombo	186	0	0
	Large and small bridges, Matura	400	0	0
	Bridge-of-Boats, Grandpass	500	0	0
	Total	18,297	5	5½

Total for bridges :—

	£	s.	d.
Iron	67,820	6	11
Wooden	18,297	5	5½
	86,117	12	4½

Return of Canals and Irrigation Works executed and in Progress,
1855 to 1860.*Canals.*

	£	s.	d.
Deepening and improving the Putlam canal, 90 miles	20,613	13	4½
Deepening and improving the Caltura canal, 37 miles	4,858	6	6¾
Proposed extension of the Putlam canal to the Colombo Custom-house	5,000	0	0
Rebuilding bridge over the Caltura canal to exclude salt water from the paddy fields	399	15	0
Deepening canal for drainage of the Pattia paddy fields	115	0	0
Embankment of Kalany-ganga	265	10	8

Irrigation.

Ericamaam irrigation works	17,398	9	0½
Kireme dam	9,150	0	0
Ooroobokke dam	8,600	0	0
Irrigation works executed by Government Agents	8,899	18	11
Kelaar dam, Batticaloa	1,462	0	0
Karatchy irrigation survey	242	13	7½
Kaloondewe tank	947	0	0
Ooma-ela dam	406	6	8¾
Sluices under the Kandy road for the irrigation of the Pallia-godde paddy fields	234	0	0
Total	78,592	13	10½

Return of some of the Principal Public Works and Buildings,
undertaken or in progress, 1855 to 1860.

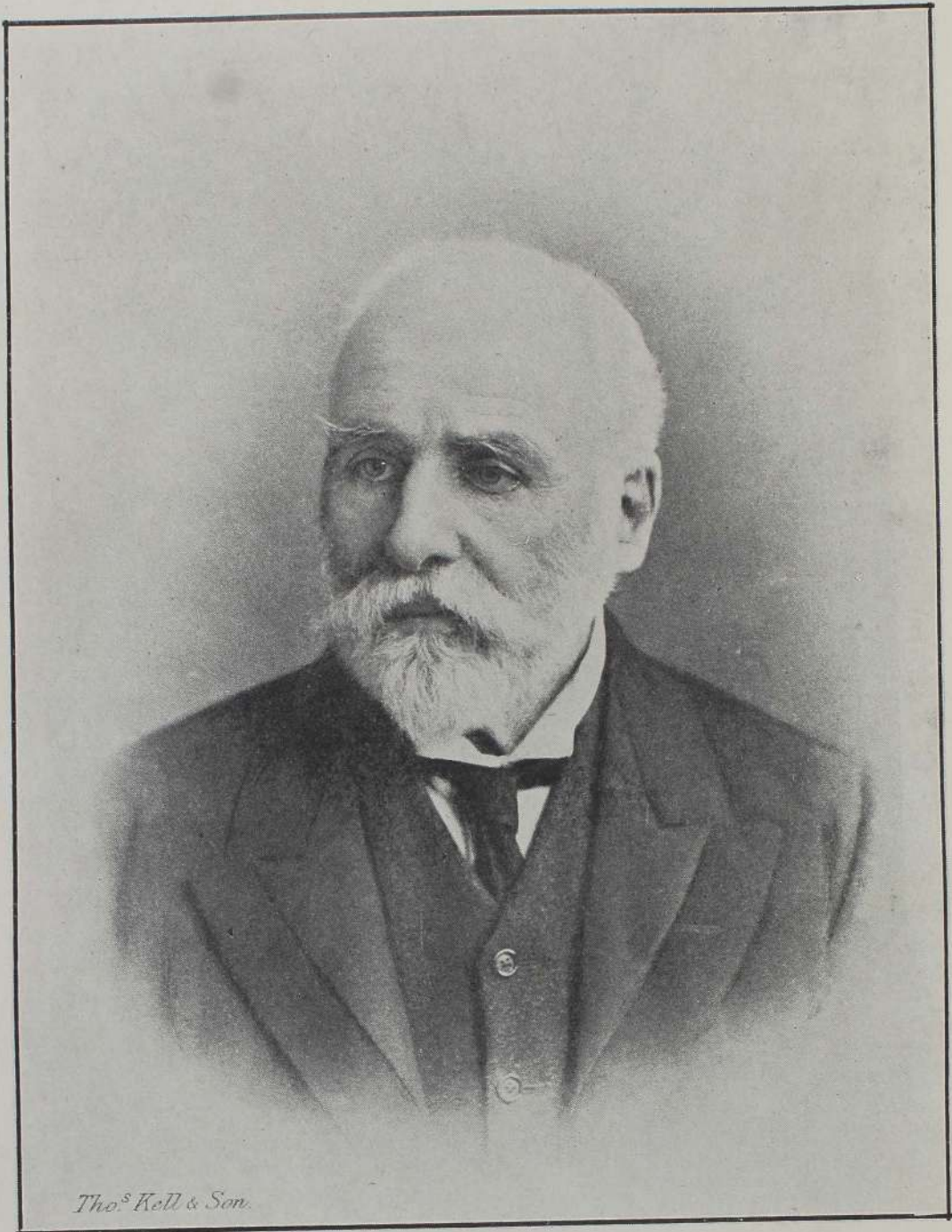
	£.	s.	d.
Electric telegraph	18,295	16	6
Supreme Court, District Court, Police Court, and Court of Requests, Colombo	15,612	0	0
Officers' Quarters, Colombo	16,696	5	9
Do. Galle	2,500	0	0
Drainage of the Pettah	7,841	18	1
Civil Engineer's Factory	7,590	0	0
Salt Stores, Putlam	6,591	0	0
Lighthouse, Trincomalee	6,000	0	0
Public offices, Colombo	5,344	1	6
Post Office and Electric Telegraph Office	3,335	10	9
Upper story, &c., for the Colombo Cutcherry	2,304	0	0
Pearl Fishery Buildings	2,032	0	0
Industrial School	1,700	0	0
Queen's College, Colombo	1,694	0	0
Cooly hospitals between Dambool and Mannar	1,638	12	7½
Resthouses	1,609	0	0
Clock Tower, Colombo	1,100	0	0
Brick works, Panabakery	841	10	7
Commissariat Stores, Galle	769	0	0
Residence for Police Magistrate, Madawellette	745	16	3
Do. Dambool	710	11	4
Sinking wells in Kandy	418	10	7
Cutcherry, Batticaloa	427	0	0
Cooly sheds, Kandy	314	0	7
Courthouse, Navelepitiya	193	0	0
Total	104,285	14	6½

Return of Sums devoted to the erection and repair of
Churches, &c., 1855 to 1860.

	£.	s.	d.
Church for the Singhalese Congregation, Colombo	1,625	0	0
Church, Chundicooly, Jaffna	1,075	0	0
Do. Galkisse	445	0	0
Do. Matelle	300	0	0
Do. Deltotte	168	0	0
Do. Rangala	150	0	0
Do. Putlam	125	0	0
Do. Pusselawa	100	0	0
Repairs, St. Thomas', Colombo	213	0	0
Do. St. Peter's	368	17	6
Do. St. Paul's	55	15	9½
Contribution to St. Philip Neri's	1,000	0	0
Do. Roman Catholic Church, Nuwera Ellia	60	0	0
Parsonage at Pusselawa	150	0	0
Total	5,835	13	3½

Return of Hospitals built, repaired, and in progress, 1855-60.

	£.	s.	d.
For new Civil Hospital, Colombo	3,000	0	0
For Bogambra Civil Hospital, Kandy	1,998	4	10
For Jaffna Civil Hospital	400	0	0
For Gampola Civil Hospital	278	0	0
For Trincomalie Civil Hospital	300	0	0
For Galle Civil Hospital	170	4	9
For Colombo Civil Hospital	162	10	11
For Matelle Civil Hospital	280	0	0
For Leper Hospital, Colombo	280	0	0
Total	6,869	0	6



S. G. O.

SIR GUILFORD LINDSAY MOLESWORTH K.C.I.E.
DIRECTOR OF PUBLIC WORKS
AND
DIRECTOR GENERAL OF CEYLON RAILWAY
1867 - 1870
PRESIDENT OF THE INSTITUTION OF CIVIL ENGINEERS
1904

Living (1917) Aged 89

CHAPTER III.

PUBLIC WORKS UNDER THE ADMINISTRATION OF MR. GUILFORD LINDSAY MOLESWORTH, M.Inst.C.E., 1867-1870.

ON July 1, 1867, Mr. Guilford Lindsay Molesworth, M.Inst.C.E., 1867. afterwards Sir Guilford Molesworth, K.C.I.E., was appointed Director of Public Works, in addition to his duties as Director-General of the Ceylon Railway, to which post he had been appointed on June 5, 1865, the designation "Commissioner of Roads" as head of the Public Works Department being discontinued on the retirement of Major Skinner.

In this year the expenditure of the Department was £322,960; the average expenditure for the preceding five years, or from 1861 to 1866 inclusive, was £205,534; from 1851-60 £120,963; from 1841-50 £43,864; from 1837-40 £22,581.

The cost of establishment during the year was £27,030 approximately, represented as follows:—

1 Director	£1,500
1 Financial Assistant	£750
1 Second Financial Assistant	£400
1 Engineer Office Assistant	£750
1 Architect do.	£750
6 Provincial Assistants from	£600 to £1,000
6 Estimators and Draughtsmen from	£400 to £500
20 Superintending Officers from	£200 to £400
20 Pioneer Officers	£236
1 Officer in charge of Kandy road	£600
1 Inspector of Pioneers	£600
1 Factory Engineer	£400
3 Tracing Officers from	£100 to £300

in addition to Clerks and Overseers.

The Senior Officers of the Department were:—

- Mr. A. C. Folkard, Office Assistant (Acting).
- Mr. R. Tatham, Financial Assistant.
- Mr. R. G. Burne, Second Financial Assistant.
- Mr. J. G. Smither, Architectural Assistant.

Provincial Assistants.

- Mr. H. Byrne, Western Province.
- Mr. J. F. Churchill, Central Province North.
- Mr. A. Campbell, Central Province South.
- Mr. J. D. Young, Southern Province.
- Mr. J. A. Sperling, North-Western Province.
- Mr. P. Cummins, Northern and Eastern Provinces.
- Mr. W. Hall in charge of Kandy road.

Draughtsmen and Framers of Estimates.

- Mr. W. Bryan, Western Province.
- Mr. J. Wormald, Central Province North.
- Mr. G. Plaice, Central Province South.
- Mr. T. Ashton, Southern Province.
- Mr. G. Prime, North-Western Province.
- Mr. F. Vine, Northern and Eastern Provinces.

In this year the Pioneer Force reached its maximum strength of nineteen Divisions.

Number on roll at commencement of year	4,059
Recruited	534
	Total .. 4,593
Strength at end of the year	3,152
Loss of men during the year	1,440
From death	416
Desertions	976
Pensioned	48
	1,440

The total length of principal roads in charge of the Department was 2,246½ miles, exclusive of minor roads. Mr. Molesworth in his Administration Report does not give much detail with regard to road construction during the year, but states in conclusion: "I feel that I have to acknowledge a legacy of much that is valuable and needs no change; and to recognize the fact that my predecessor has handed over to me a network of roads, which will bear favourable comparison when contrasted with those of any other country in the world."

The amounts voted out of general revenue for maintenance of roads in the Western Province were:—

	£	s.	d.
Road from Avisawella and Pelmadulla	4,214	18	0
Road from Grandpass to Sitawaka	1,015	0	0
Canal from Negombo to Kammala	1,203	11	0
Canal from Colombo to Kalutara	526	0	0
Road from Utuwankanda to Dolosbage	729	16	8
Kotte road	300	0	0
Road from Pelmadulla and Rakwana	1,300	0	0
Road from Avisawella and Karama-ela	700	0	0
Branch roads of Negombo	250	0	0
Road from Negombo to Veyangoda and Minuwangoda to Ja-ela	1,742	0	0
Road from Negombo to Giriulla	1,471	17	0
Road from Grandpass to Toppu ferry	1,826	0	0
Galle road	1,305	13	2
Kandy road	6,919	0	0
Road from Balangoda to Haputale	2,140	0	0
Road from Pelmadulla to Balangoda	1,293	0	0
Road from Ruwanwella to Ginigathena Gap	3,670	0	0
Total	30,606	15	10

Mr. F. R. Saunders, Assistant Government Agent, Ratnapura, writes in his Administration Report for the year:—

The principal roads have been in fair order during the latter part of the year, and 1867 should ever be memorable in the annals of Ratnapura as having seen the completion of the cart road to Badulla, the opening of the two bridges of Kahawatta and Kuruwiti, and the partial construction of the fine bridge over the Kalu-ganga at Ratnapura, this latter bridge will, however, not be open until May or June, 1868. All that is now urgently desired in the interests of traffic is that the road should be metalled to Badulla, and the river communication to Kalutara and Colombo improved, as much as circumstances and available funds will permit.

Mr. W. E. Sharpe, Government Agent, Badulla, writes :—

The long-vexed Batticaloa road question was solved by the Governor's visit in May. His Excellency, after inspecting the whole line of country from Batticaloa to Badulla, and conferring with the representatives of the several interests involved, and the advocates of the rival routes proposed, decided that steps should be at once taken to trace and open out the portion of the road between Badulla and Madulsima, so as to give that important district an outlet as soon as possible, allowing the other and more complicated question of the route beyond to be decided after inspection by the Director of Public Works and Surveyor-General, who were ordered up for the purpose. These officers soon inspected and reported, I believe, in favour of carrying the line from Bibile across the old Batticaloa road to Eraur, and so to the coast. Meanwhile the work on the nearer portion of the road was pushed vigorously on, six Divisions of Pioneers were ordered up, and have been since located at intervals of 4 miles between Badulla and Lunugala; and there is every reason to hope that by the close of the year 25 miles of cart road will be completed through the Passara and Pattipola korales, so as to admit of the Hewa Eliya and Madulsima planters despatching their crop, in most instances the maiden crop, *via* Badulla and Ratnapura to Colombo.

In this year the Matara and Dikwella bridges were carried away by flood, and Mr. E. Elliott in his report on the Matara District writes :—

As already observed, the Matara and Dikwella bridges were carried away early in the year; there is no doubt they ought to have been replaced long ago, the only wonder being they stood so long. A new one is being now built at Dikwella, apparently intended, from the extreme strength and solidity which is being secured, to defy all natural forces, save, perhaps, earthquakes and lightning, if not to withstand time itself.

Regarding irrigation, Mr. Molesworth writes :—

Although there was a vote for irrigation last year, scarcely any portion of it was expended, as no action was taken pending the issue of the report of the Irrigation Committee. But the system by which irrigation schemes are to be executed, having now been determined, and the Irrigation Assistant* having been appointed, no time will be lost in carrying out the works; and I have every reason to believe that the Government scheme for irrigation will be entirely successful.

The irrigation works at Irakkamam, though costly, have proved to be eminently successful, and have wrought a striking change in the Batticaloa District. The inhabitants are eager for further improvements, and I do not doubt that a few more successful undertakings will be sufficient to make the irrigation scheme a most popular measure with the cultivators.

Annexed will be found a map showing the re-arrangement of boundaries of the charges to be allotted to the several Provincial Assistants as arranged by Mr. Molesworth; also a map showing the revenue boundaries of the six Provinces.

THE CEYLON RAILWAY (COLOMBO TO KANDY),
COMMENCED 1863, COMPLETED 1867.

A Description of the Line by Messrs. A. M. & J. Ferguson.

Friday, April 5, 1867, will be long remembered, not only as a red-letter day in the annals of Ceylon, but as a bright spot in the existence of each of the large party who then made the trip by rail from Colombo

* Capt. C. Woodward, R.E., appointed January 1, 1868.

to Peradenia and back. Although the opening of the Colombo and Kandy Railway has yet to be inaugurated, and although great care was taken by the contractor that nothing in the proceedings connected with the trip, *improvized* for his friends, should be construed into a forestalment of the festive occasion to come, yet to the public of Ceylon, and particularly to the many representatives of its varied classes and interests, who travelled up and down the line, the trip of Friday over the incline, and to the very verge of our central capital, indicates the complete and successful accomplishment of the great work so long meditated, opposed, disbelieved in, and finally engaged in by one who, we always felt sure, would thoroughly finish what he had heartily begun. The work constitutes one more triumph of mind over matter, is another monument of the wonderful skill and indomitable energy and perseverance of the present generation of British Railway Engineers and Contractors : it forms the great achievement with which the name of Molesworth will henceforth be honourably connected, and it adds another gem to the mural coronet of the Contractor, Mr. Faviell, who previously constructed the first section of railway opened in Continental India ;* while it is a work with which all who have taken any part in it may be proud to have their names associated. The day on which the first run is made over the Incline of the Ceylon Railway, by an individual, is one long to be remembered in his experience ; and it is then only that the labour of the men connected with the work can be fully understood.

It is nearly a quarter of a century since the idea of a railway was started in Ceylon ; twenty-one years since Mr. Drane made the survey which has been the basis to a considerable extent of all that followed ; nine years since, in August, 1858, Sir Henry Ward cut the first sod of the line, under the Company's *régime* ; six years since, in view of Mr. Molesworth's careful and successful survey of the Deckande route up the side of Allagalla, and the deviation on the northern side of the Maha-oya, Government determined to call for contracts for the completion of the work ; and four years since, in March, 1863, Mr. Faviell and the first portion of his staff arrived to carry out by contract this improved line, as finally decided on. †

On March 5, 1863, Mr. Faviell and the first portion of his staff arrived at Galle by the " Nubia " on the 23rd, Mr. Molesworth (returning to Ceylon) and the Government engineering staff arrived by the " Orissa." Writing to the editor of the " Observer " from Guildford, Surrey, on January 25 previous, the contractor mentions that he was to " start for Ceylon by the mail of February 4, with about twenty engineers, agents, and superintendents for the immediate commencement of active operations. You can make known the fact that at last the Ceylon Railway will be commenced in good earnest," and well has the promise been fulfilled, and the energetic prosecution of the work continued, as our experience, and the experience of every man in the Colony, who has watched Mr. Faviell's proceedings during the last four years, can testify.

We now proceed to give some account of Friday's trip, which was in every respect a perfect success, not the slightest contretemps having occurred to mar the enjoyment of a day most delightful to Mr. Faviell's guests ; most gratifying, we feel certain, to himself, and most important in its issues to Ceylon.

* The section from Bombay to Tanna opened on November 16, 1853.

† It is a curious coincidence that the headings in the great Moragalla tunnel met on March 22, 1866, the first train with materials attaining the top of the incline on the corresponding date in 1867. Platelaying was commenced at the foot of the incline on January 1, 1867, and the rails were closed in on March 21 following. (We may now add that the first engine reached Kandy on April 26, and that the line was finally opened for traffic in August, 1867.)

The names of the gentlemen who assembled on Friday morning at the station by Mr. Faviell's invitation will be found in the list which we give of those present at the tiffin at Peradenia. They formed a numerous and merry company, intent on, and prepared for, a day of pleasure, with here and there a grave countenance meditating the dangers by the way. Cordial were the greetings and congratulations extended to the contractor on making his appearance, as well as to Mr. Molesworth and the different engineers and agents. A train of three light third class carriages (provided specially with a view to the outlook afforded through their open sides), break van, engine, and tender, was in readiness to convey the party. The carriages were provided with cushions and other comforts for the occasion, the engine was gaily decorated with flags, evergreens, and flowers, contrasting very prettily with the green, red, and black sides of the smoking monster, which, under the energetic management of Engine Driver Fisher, was being got ready for the start. The train had been placed by the contractor under the supervision of his agent, Mr. J. A. Kendrew, who, along with the Locomotive Engineer, Mr. Strong, accompanied the engine.

Colombo Station is familiar to all, and there is neither space nor time for reflection on the marvellous change effected within the four years around the quiet waters of the Marandahn inlet of the lake, between the tree-embowered Hindu temple on the one side, Trinity Church on the other, and the imposing Moorish Mosque with its scattered grounds to the eastward, through which the line was at one time proposed to be run. The traveller arriving from Kandy has here one of the prettiest views obtained in or around Colombo. The lake, the Fort nearly embowered in foliage, the glimpses of the Pettah Cathedral and Racket Court, viewed especially in the moderated light of the setting sun, form a most charming *coup d'œil*.

Of the terminus buildings at Colombo, Messrs. Slinn have taken a series of large size views of first-rate character, especially of the handsome exterior and the light and airy interior of the passenger station, the material and architecture of which are so well suited to the country and climate. Without being imposing, the twin booking offices which constitute the front are really striking, and the great traceried verandahs which extend backwards from them affording perfect shelter to the passenger platforms and the lines by which trains enter and depart, show how much beauty can be combined with utility in structures composed of iron and wood. Even the great square two-storied building on the top of the adjacent cabook (laterite) mound is redeemed in the picture by being brought into focus with the station buildings. As a picture, however, the palm must be given to the view from the hill above, in which the lake, the little islet opposite the Government Factory, the Pettah, and the Fort of Colombo form the really beautiful background; a massive group of palms to the left of the foreground fulfilling the exigency of all truly oriental scenes. By way of violent contrast, we suppose, and to commemorate the primitive modes of conveyance which the railway was framed to supersede, a bullock bandy and a cooly, with a load on his head, are prominent in the foreground of this picture. A very striking view, too, is that in which an engine and train are photographed in the foreground, with contrasted masses of cocoanut and other foliage rising over and beyond these triumphs of man's art.

To the Kalany River.—But we must move on with the train under the neat Marandahn bridge, in the erection of which the contractor first learned to his surprise that the Ceylon "Tambies," or Moormen, are as good masons as can be found in the East. Running along we pass by the spot, in a portion of the Cinnamon Gardens, where the great banquet of August, 1858, in commemoration of cutting the first sod of the railway, took place; a day surrounded by the brightest hopes, doomed, alas, never to be realized in the experience of the chief

men present:—Sir Henry Ward, Sir Carpenter Rowe, Sir Charles Macarthy, whose speeches on the occasion were of such a stamp as we are seldom favoured with in the Colonies. Passing out from Colombo behind the range of the mills and manufactories extending round towards Mutwall, we can get an idea of the direction in which Captain Moorsom proposed to run his line, crossing the Kalany below the bridge-of-boats, and passing back through Matakooly and Mutwall to its terminus near St. Thomas's Church. Mr. Doyne's line as here adopted, there can be no doubt, is far more convenient, Marandahn being on the lake round which the coffee stores cluster, and affording ample room for station buildings. The new road leading from the station round to Mutwall is also seen. Iron screw pile bridges crossing several of the Cotta canals along the line here are scarcely noticed now, but we well remember the worry they and several embankments in these almost bottomless paddy fields gave the contractor in 1863. Thousands of cubic feet of earth were thrown in time after time, but at night was sufficient to dispel all trace of their existence; brushwood, we believe, was added at last to the earth, and had some effect in settling it. Further on we pass over the new Ooroogodde road, from Grandpass to the Hewagam Corle (which serves the double purpose of avoiding the flood on the Hangwella road, and opening up one of the most fertile parts of the country round Colombo, and the Hangwella and Ratnapoora road, just before we get on

The Kalany Bridge, a most substantial, but, as the engineers say, a very ugly iron structure, of a total length of 800 feet, viz., 8 spans of $62\frac{1}{2}$ feet each, on screw piles, and 12 of 25 feet each on brick piers, and which is twenty feet above the ordinary level of the Kalany, next to the Mahavelle-ganga, the largest river in Ceylon. The cost was about £16,000. The glory of Sir Edward Barnes's famous bridge-of-boats, which has done such good service in its day, has almost departed, although it will have an increasing local traffic rolled over it.

Kalany Station, 3 miles on our way, is convenient for pilgrims to the Buddhist temple close by, and will no doubt be largely resorted to at festival times; while it is always extensively used by the surrounding villagers and the inhabitants of Grandpass.

The Kandy Road is crossed farther on by its great successor, the latter viewed with no friendly eye by the monopolizing cartmen. Some heavy cuttings are encountered, and we pass on to

Gongetotte (7 miles from Colombo), where we come to the scene of the dreadful accident (the first, and may it be the last, on the Ceylon Railway) on January 14, 1865, when, from the carelessness of a native clerk (who has never been heard of since), a trolley was left on the line leading to a collision and the death of one European employé and thirty-six native labourers. Here are several sharp curves and heavy embankments; but the road is in capital order; indeed, up to Ambepusse we hear it is now equal to the condition of the easiest English lines. We next reach

Mahara Station (9 miles from Colombo, 10 feet above the sea, or 3 feet lower than the Marandahn Station, which is 13). Minor roads are springing up around here, converging on the railway line. Lengthened vistas of paddy fields may be seen all along, in some places reminding us of English park scenery; the growing paddy especially, surrounded by the orchard-like trees.

Heneratgodde Station ($16\frac{1}{2}$ miles, 33 feet above sea level) comes next, and in the neighbourhood are several nice bungalows, some of them suburban retreats of members of the Ceylon Bar, where they retire to rest their jaded brains during the Supreme Court recess. Some more of these villas are still farther on at Veangodde, and, doubtless, this quarter will become a favourite resort, by and by, of Colomboites, who cannot get away to the hills.

The first stoppage on Friday, however, was at 9.3 A.M. at Veangodde (22½ miles), where we were still only 59 feet above the sea wave which washes Colombo; while the Kandy road (at 25 miles) had attained an altitude of 104 feet. The road from Negombo, by which large supplies of fish, cocoanuts, plantains, &c., may be expected to arrive for despatch to the hill country, joins in here. The country around is pleasingly diversified by hillocks surmounted by cocoanut palms, some nice bungalows, including a new structure belonging to the Queen's Advocate, and one belonging to Bandarnaike Modliar, with the retired houses of the natives, each under its group of trees, so different from the custom in India (Western India, at least), where the natives always choose open ground for their dwellings. In this neighbourhood, at 28½ miles, is a spring, said by the natives to be connected with the sea at Negombo.

Meeregamme Tunnel, No. 1 on the line, about 32 miles from Colombo, claims attention next. Its length is 137 yards, and here we first approach the gneiss rock in mass; but before entering it we pass through a cutting in which is seen the disintegrated gneiss, cabook (laterite), passing into kaolin, kiremitti, or pipe clay. Low ranges of hills, the advanced guards of the "Mountain Zone," are now first seen as we run up to

Ambepusse (34½ miles, 180 feet above the sea), behind which the mountain of Engodde rises to a height of 1,006 feet. Quite a village of stores and houses has sprung up around the station. We lose sight of the Ambegama and Adam's Peak range in turning toward the

Maha-oya River, 1¼ mile off, before reaching which we pass through a rock cutting, at first intended for a tunnel. The river had scarcely any water, looking a most insignificant streamlet, although its wide bed indicated a different character during the wet season, when it rises 22 feet above summer level. The bridge over this river, one of the most trying works on the line, consisting of 5 spans of 60 feet, and 2 of 20 feet each, is 352½ feet long altogether, about 25 feet above water, and cost £10,000. The girders are supported on stone piers, the construction of which involved formidable difficulties and considerable danger, the deadliness of the climate adding to the risks run by Europeans and natives. This golden Maha-oya (old Australian diggers on the line feel certain of gold existing in considerable quantity at several points along this river's banks, particularly at the junction with the Rambukan, beyond Polgahawella), flowing through the richest soil in Ceylon, and overtopped by the finest vegetation, proved truly a "valley of death" to labourers, overseers, agents, and engineers from this point to the foot of the incline. The dire story is not likely to be told in its dreadful details, but all honour to the men who have faced the difficulties successfully. The names of Hime, McBean, and Foot (Government staff), Reynolds, Maxfield, and Forrest (contractors' agents), have to be mentioned in conjunction with this point; but their superiors came in for their own share of suffering, and here the contractor, we believe, got his first attack of fever, after fifteen years' exposure in the East. In crossing the Maha-oya, we leave Mr. Doyne's trace, which runs parallel on the opposite side of the river until we approach Polgahawella, when Doyne's diverges away with the Maha-oya, and on to Gordon's bridge, whence it was to climb the hills by three lifts; while Captain Moorsom's line ran still farther south into the Gampolla range, and turned back by a reversing station through Kaduganava. Happily these routes have been avoided by Mr. Molesworth's fortunate survey of the adopted route on the north side of the Maha-oya. The road to Kornegalle, the river, and the railway run parallel through the richest possible vegetation (on this occasion alive with myriads of small white butterflies) for several miles after leaving Allowe, until at length we detour and reach (at 9.50 A.M.)

Polgahawella (the cocoanut tree plain), 54½ miles, 241 feet, while near Kaigalle, at the 45th mile, the Kandy road is 513 feet above the sea, where the mountain barrier is plainly visible with Allagalla's

summit in the distance, but the gap at which an entrance is to be effected is still hid from ken. Allagalla's gloomy beetling brow attracted the attention of the passengers, towering as it did 3,000 feet higher, and a grave look came over the company as we remembered we had to pass along its side. This is the point where the coffee of Kornegalle and Matallé West will pour in, and also that from Dolosbagie and Kaigalle, about 12 miles off by a minor road, according to the Government programme, although the planters want a road to the foot of the incline.

Hence also it has been proposed to start a prolongation of the railway to Kornegalle—for a description of which see the account of the elephant kraal—which in the far future may possibly be extended to Trincomalie.

At the 49th mile we are opposite to Marokwatura, the "Englishman's Grave," so called from the number of superintendents who fell victims on an estate here. We pass through Yattegamma district, with its rich soil but deadly climate, to the junction at right angles of the Rambukan and Maha-oya, crossing the former by an iron girder bridge on stone piers.

A little beyond Yattegamma, on the right-hand side of the line, is a truly magnificent bo-tree (*Ficus religiosa*), one of the grandest specimens, we should say, in Ceylon. It doubtless marks the site of a very ancient Buddhist temple, founded, perhaps, at a period when the climate on the banks of the Maha-oya permitted the protracted and healthy residence of human beings. This ancient giant of the forest has a trunk 75 feet in circumference, while the overshadowing branches cover an immense area of minor forest. Messrs. Slim's large-sized photograph of this glorious tree is a great success, and will be highly prized by botanists, as well as all interested in the railway. The bursts of light through the dense foliage have a striking effect; and the human figures, stalwart Europeans and lithe natives, are so placed as fully to exhibit the vast proportions of the tree. The close contiguity of a section of the railway—the great agent of modern progress—to this emblem of the most widely prevalent faith of the human race, a faith which, with its "Nirwana" of torpid bliss, the railway, the work of those who find their bliss in useful activity, is sure to destroy, is calculated to awaken deeply interesting reflections. Amongst the guests at Peradenia was Bottawantodawe, the ablest and most active advocate of Buddhism *versus* Christianity. We told him what we anticipated as the effect of railways on the faith he championed. He was too polite an Oriental to contradict us, but he had a characteristic theory of his own. Out of regard, he said, to the feelings of the lower animals, Buddho forbade his priests to ride in carriages drawn by horses or cattle. The "ascetics" have drolly interpreted this limited prohibition as sanctioning the use of human beings as beasts of burden, and so Buddhist priests may often be seen in carriages pulled by men. But Bottawantodawe's opinion is that Buddho was so far-seeing as to anticipate the era of railways, and now his yellow-robed followers can all sit in carriages, drawn not by sentient beings, but by the agency of steam.

On to the foot of the incline we dash, which is reached between the 52nd and 53rd mile; but before this we come to Allagalla, now called Rambukan station (52 miles, 313 feet above the sea; on the Kandy road, at the 53rd mile, the height is 397 feet above sea level), where traffic will be sure to abound if a proper road is made to Kaigalle.

Shortly after Rambukan station is passed (about 10.33 A.M.) the cry is raised, "The incline!" "Not yet," a calm, steady voice replies; and again, "Now we are on the Incline!" There is a hush, and the greater pull on the engine is clearly indicated by the heavier panting, and the seemingly closer hold of the rails, as we are drawn steadily and slowly up towards the mountains. We begin to climb

the great incline of 1 in 45 (an average gradient only excelled on the Giovi Incline, where it is 1 in 36—the average on the Bhore Ghaut and Semmering lines being 1 in 48 and 1 in 47, although there are parts as steep as 1 in 37 on the former). The sensation is delightfully exhilarating of running up the hillsides after the long journey of 50 miles almost on the level. The country begins to open out to the left, for the road here clings to that side of a detached ridge at the foot of Allagalla mountain. The Kornegalle hills are in the distance, with fine glimpses of Kandian homesteads and paddy fields below. At 53½ miles we pass over a big bank of 50,000 cubic yards of earth, and almost grazing an enormous gneiss boulder (probably not under 100,000 cubic yards of stone), we enter No. 1 tunnel on the incline, 100 yards long, almost all lined.

Heavy embankments—No. 2 tunnel (40 yards)—rock cuttings 40 feet deep; No. 3 tunnel, 137 yards (same size as Meeregamme tunnel) follow, and we reach Kadigomowa, the headquarters of Mr. Stewart, the contractor's agent (almost the only one left of the original staff), and of Mr. Gallott, Government Engineer, who also has been connected with the work from the beginning. Here (whence a cart road runs up the Dekande Valley to Gordon's bridge, and a path crosses the hills on the northward to Kornegalle), we are beyond the 55th mile,* and we cross from the left to the right side of the hills by a bank containing 40,000 cubic yards of earth. We are now in close proximity to coffee, on a young estate named Illookgalla, the property of Mr. H. S. Saunders, in which the prominence of rock boulders will amaze the newcomer and uninitiated, being immediately above the line. This is a spot where one would like to stroll about for some time; the adjoining forest hides many magnificent talipot palms, and the vegetation is very rich. The line is here about 700 feet above the sea level (exactly the height of the Kandy road at the 55th mile from Colombo), and the Allagalla range, along which we have to run, rises frowning before us. There was very little chattering throughout our carriages now; eager expectation marked every countenance as we passed through cuttings and tunnels and along embankment after embankment, gradually but steadily rising, and already sniffing the pure breeze off the hills. A tunnel and other heavy works were avoided beyond this by keeping the roadway farther back towards the mountain, and passing through heavy cuttings instead, one of them (the largest on the line) "Deviation cutting," involving the removal of 36,000 yards of rock sand, and giving considerable trouble. Out of this we emerged to catch the first glimpse of the amphitheatrical Deckande Valley, which at an airy height we had to skirt, until the bold face of "Sensation Rock" (seen in the front distance) was passed. A low murmur marked the surprise of the company at the first great view of the hill country extending along to the Kaduganava, Gampolla, Dolosbagie, and Kaigalle ranges with all the quiet lovely green valleys, rugged ravines, and bubbling streams between. The route and the view were relatively new to most of those present, for the outlook on the old coach road bears not the slightest comparison to that from the railway line.

Whilst the railway is on the right-hand ridge of hills at Kodigamoa, and before crossing on to the tail of Allagalla, there is a lovely view to the northwards of mingled rice fields and forests, shut in by a background of the Handrokande hills, which look down on Kornegalle. While spending a couple of pleasant days here, the Editor of the "Observer" so frequently gazed upon, and so warmly expressed his admiration of, the scene, that Mr. Allan Stewart named it, "Ferguson's View," a name which, at the risk of any possible imputation of egotism, we have no hesitation in saying we hope it will retain. There are grander scenes, but no more beautiful view on the incline. Messrs. Slinn & Co. have very successfully reproduced it, the effect of the range

* At the 55th mile there is a piece of horizontal road for 20 yards.

of detached hills shown in dim outline beyond the rich rice valleys and the glorious vegetation (amidst which, on one of the closing days of 1866, we counted a full dozen of talipot trees in blossom) being exceedingly fine. Messrs. Slinn's views of the tunnels on this the lower section of the incline, taken from above and below, are very faithful and very effective. No. 1, showing the face of the scarped rock above, and the handsome masonry lining of the entrance, with the engine just curving in, forms a very pretty picture. The huge boulder which is passed under immediately before reaching this tunnel in ascending is also seen in this view. No. 2, in its ruggedness, is still more striking, a magnifying glass bringing out the features of the rock in wonderful minuteness, while what seems to be a mass of rock projecting into the tunnel turns out to be the reflection of light from the opposite end. No. 3, with the railway curving in the foreground, and losing itself in what is really a formidable mass of densely wooded hill, is a capital picture.

Before entering **Meeangalla** division, from the 56th to the 59 $\frac{1}{4}$ th mile, on which Mr. Smith is the contractor's agent, we pass the spot where the railway pioneers found a rock temple, and, buried under its stone floor, some fifty small gold coins, preserved as curiosities by the contractor we believe. Beyond the 57th mile we come on No. 5 tunnel (the second largest on the line), 242 lineal yards, which goes in with a 10-chain curve; a short length of straight line in the centre, and goes out on the Kandy side with a 12-chain curve; but before entering it, we pass over an embankment of over 26,000 cubic yards, formed largely of the rock blasted out of the tunnel. A curious perforated rock is next dashed through before we reach the agent's headquarters, where the line is now over 1,000 feet above sea level, at about the 58th mile. All along this drive, under the shadow of the Allagalla range, we still have the grand effect of rising gradually one foot in every 45, with new aspects of the most exquisite hill scenery in the world opening out at every curve and every ravine. In the far distance opposite, the Dolosbagie peaks blend in harmonious blue with the sky above. Prominent in the landscape from its strange, quadrangular shape, as if formed by nature for a fortress, is (what by some has been confounded with Fort King), "the Bible Rock" of the English, the Battegalla (Sweet Potato Rock) of the Singhalese, with the ridge of Orakande (Hog-rock), stretching away from it; while closer by the eye will be arrested by the singularly pyramidal and apparently castellated peak of Utuankande (1,392 feet above the sea), the whilsome home of the bandit Sardiel and his gang, one of whose resorts, a rock cave on the face of Allagalla, has been converted into a useful blacksmith's shop on the Meeangalla division.

The **Meeangalle Gallery**, or half tunnel, a truly grand work, comes next on the line, nearly 300 yards long by 18 feet broad, blasted out of the very face of the solid rock, a work which the Canarese labourers became most expert at, though it cost trouble and even life to teach them and inspire confidence. No English sailors were employed, however, if we except a lad of twenty-two (who had made a couple of voyages at sea before being engaged here). This brave young fellow, when one day suspended over the face of the rock by a rope round his waist, held by coolies above, sustained an injury to his spine (owing to 6 feet of the rope being let go with a jerk) from which he never recovered, dying a few months ago in Scotland. Mr. Alexander Smith, the agent in charge, had a very narrow escape on another occasion, when suspended much in the same way. After the day's work was over, Mr. Smith went alone to examine the progress made. He hauled himself up a blasted portion of the rock by a rope attached to a steel drill, but the rope swaying suddenly, he was in a moment swung over a precipice of 40 feet sheer, being turned round and round against the jagged edges of the rock, so that his clothing was all torn to pieces. Life now depended not only on his own endurance in holding on, but on the

strength of the strands of rope exposed to so severe a trial. But the rope stood the strain, Mr. Smith was able to haul himself up again, and his useful life was saved to see a smooth path and steadfast passing round the face of that great and terrible rock, over which when he hung there was "but a step between him and death." Still narrower was the escape of a native labourer near the same spot. While a Canarese driller was working up the face of the rock on his ladder, a loosened boulder struck the ladder, and knocked it and him right over the precipice. He was picked up with scarcely a whole piece of flesh of the size of a crown about him, with his clothes in rags, and the ladder dashed to atoms, but yet with life intact, recovering in three months, and still surviving as one of the best workmen on the spot. The explanation of his escape seems to be that the ladder went down perpendicularly, he holding by the top. The shattering of the ladder under him on a ledge 40 feet below so far broke his fall, and he then rolled down some 150 feet of not quite perpendicular descent. We may safely conclude that a European, with his higher nervous temperament, could never have survived the shock. It was on Mr. Smith's section, too, that six coolies were killed by an explosion of gunpowder, which they were carrying along for blasting purposes. One of the poor wretches to hide his carelessness in spilling some of the powder set fire to it; the train communicated with the powder casks, and all the coolies were instantly killed.

Other portions of the line have, doubtless, witnessed "hair-breadth 'scapes" and fatal accidents, but we can only notice those of which we have received details. It is not on the rugged incline, however, but in the quiet and beautiful "Valley of Death" at its base that he

Who with a coffin for a boat
Rows daily o'er the Stygian moat,

found his most numerous victims.

The first shot was fired at Meeangalla in May, 1863, 400 shots per day formed the average during work; and a ton of powder usually lasted but a week. Visitors here and elsewhere along the line were received with reverberating salutes which rather astonished them; and we believe the artillery which greeted Sir Hercules Robinson's visit to "the Battery Rock" at Kaduganava was the loudest and most prolonged welcome His Excellency ever received. There is a great waterway cut in the Meeangalla rock, 60 feet deep, 12 by 12 of water area, down which, from the sides of Allagalla mountain, a bright and copious stream is precipitated to the inside of the line passing under the roadway.

The photographic view by Messrs. Slinn & Co., of the Meeangalla rock, with the first engine on the gallery, is a great success, doing equal justice to the precipice below the line and the mountain mass above, proportion being well preserved by the introduction of human figures, four in front of the engine, and two seated on the verge of the giddy precipice. To persons at a distance, this picture will speak more eloquently and describe more graphically than any form of words which could be used. The nature of the country through which the railway incline had to be formed, and the tremendous difficulties encountered by those engaged in the work, will be apprehended at once by persons looking on this representation of a solid railway line quarried into the very face of the almost perpendicular rock. The overshadowing mountain; the rifted precipice; the massive engine on the well-defined line, and the heaps of blasted débris far down are all most faithfully portrayed. The puzzle to those who see only the picture of this wonderful scene will be how the engine is ever to round the rock, or make its escape from what seems an impenetrable cul-de-sac. But nothing is impossible to science and skill, when combined with industry and perseverance.

A second and smaller picture gives a capital idea of the effects of the blasting out of the rock gallery in the masses of broken and jagged rock "confusedly hurled" in the valley below. The rapid growth of vegetation will soon hide these masses, and so will exceedingly modify the spectator's idea of the difficulties here faced and surmounted. A tropical sun and tropical rains, if they create physical asperities when they act on some species of rock, are wonderfully potent in most cases in smoothing roughnesses by producing dense robes of vegetation.

Travellers a few years hence, therefore, must not characterize our descriptions as exaggerated, when instead of jagged masses and splintered rocks, they see climbers and vines forcing their way upward and rich festoons of exuberant foliage hanging down in graceful profusion, causing the terrible and the sublime to shade away into the merely beautiful.

This very exuberance of vegetation was the great difficulty in the survey by Mr. Molesworth and his assistants on the incline, 12 miles occupying them ten months. Not only was the view impeded, but progress was sometimes almost altogether arrested by the difficulties the coolies experienced in cutting through tangled masses of an acacia-leaved creeper, with fearful thorns, termed popularly "wait-a-bit," botanically, we believe, *Acacia concinna*.

Amongst Messrs. Slinn's photographs is a characteristic view of the bungalow occupied by the contractor's agent, whose name will ever be associated with the Meeangalla Gallery, Mr. Alexander Smith. The picture gives but a faint idea of the vast mountain, which towers more than 2,000 feet above; and photography has not attempted what only the landscape painter could adequately picture, the magnificent view in front of rich terraced valleys and far receding ranges of mountains and hills, over which the rising sun is seen shining in silver, and beyond which he sets in glories of purple and gold. We endeavoured early one morning, while gazing in admiration on a scene of hill-tops, resembling islets rising out of a sea-like expanse of fleecy fog, to persuade our railway friend that he ought to calculate the enjoyment of such views as a substantial addition to his emoluments. But he had witnessed the scene too frequently to admit the force of our argument, and he sighed, "Oh! for a sight of the sea." The completed railway will satisfy such longings, and double the enjoyment of a residence in Ceylon; hill and sea scenery being rapidly and easily exchanged.

We may here notice the view from the top of Allagalla. The ascent of this mountain is attended with some difficulty, especially when the steep rocky summit is reached, and the explorers have to creep through a chimney-like orifice to gain the highest point. But this attained in clear weather, the views on all sides are such as to atone for any sense of fatigue, or even apprehension of danger which may have been experienced. On one side the spectator looks down on the grand Deckande Valley, and all the mountain scenery beyond it which we have already described as in sight from the railway. But in addition to this, the view from the top of Allagalla includes all which its mass shuts in from the traveller who is carried along its southern side. To the north the eye ranges over the whole magnificent expanse of the Kandian portion of the North-Western Province; the coffee of the Handrokande and Madawellette hills, and of the Ettapolla and Amboka mountains shading away into the apparently interminable rice valleys which lie around and beyond Kornegalle, once a royal Kandian city. Where rice culture ends, the dense jungle commences, in which the elephant kraals have for years back been held, the latest in 1866, having taken place within a few miles of the ruins of Yapahoo, also a royal city in its day. From its isolated position, more than from its altitude, Allagalla commands a view, which is only exceeded, perhaps, by that from the top of Adam's Peak, Gongalla, or "One Tree Hill," at Newera Elia, Kaduganava, and if not Kandy, certainly

Hantanne and the other mountains which encompass that mountain-city; Ettapolla and Matella, Hunasgiriya Peak and the Knuckles are all distinctly visible. We are not aware that Allagalla was ever the scene of pilgrimages in Kandian times, but we feel certain that when traffic along the railway is once established, pilgrimages by those who find happiness in viewing the glories of Nature will be common to this and other points of vantage amongst some of the finest hill and mountain scenery of the world. We have no doubt that in time zig-zag paths will be cut, by which even the gentler sex will be enabled to join the rougher in the elevated and refining pleasures to be derived from the ascent of this and other mountains along the line, and from the outlook on Nature's glories which they afford.

As the train moved slowly and majestically on under the Meeangalla Gallery of rock, varied were the emotions expressed by the countenances and positions of the spectators, who for the first time were being carried along rails placed amidst such wonderful works of Nature and art. On the one side and close to the carriage windows, the wall of rock with all the ruggedness of blasting and splintering rose boldly up far overhead, except at one point, where a deep channel carried the waterfall down under the railway. On the other side, and towards it all whose nerves permitted them were leaning, the precipitous sides of the rock lay below for hundreds of feet, succeeded by ravines and gullies, until the cultivated ground was reached far beneath. What added to the "sensation" at this point was the incline of the carriages to the outside precipice in consequence of the nature of the curve, so that the whole train seemed leaning over the abyss at a considerable angle for about 80 yards. Confidence in our guardians, and in the steady guidance of Fisher, however, we suppose, suppressed any utterance of the dread inspired, and in a few seconds we were past the seeming (though only seeming) danger.

But we must hurry on to the Allagalla viaduct at $59\frac{1}{2}$ miles, and about 1,120 feet above sea level, the viaduct, almost the only work of the kind on the line, being about 300 feet long, and consisting of five arches, each 40 feet span by 45 in height. It is a well-finished, picturesque piece of work, with its incline and 10-chain curve. Here we are almost at the head of the Deckande Valley; the expanse of rice cultivation running away for miles from our feet, terrace after terrace, and going still higher behind the railway line up towards Allagalla, all carefully kept and irrigated—a beautiful specimen of Kandian industry—the terraces rising 800 to 1,000 feet from the bottom of the valley. Old Allagalla stands 3,389 feet above the sea, so that its summit is 2,267 feet higher than the handsome viaduct of solid granite which spans the stream below. A beautiful, and, in wet weather, a grand waterfall, comes rushing down from almost the top of the mountain here. Before reaching the viaduct, we come on a sliding (with a rise of 1 in 93 at $59\frac{1}{4}$ miles), where the engine will stop to take in water.

Messrs. Slinn's view of Allagalla is faithful as a representation of the mass, but as a picture we feel that it somewhat wants a relieving foreground. It is all mountain, except a tree in the near foreground, the effect of which is beautiful, branches and leaves, the very stamens of the flowers apparently coming out in exquisite relief against the mountain side and the break of sky above. We hope yet to see a really perfect picture of Allagalla as viewed from the lovely valley it overlooks, and which its streams fertilise. But for this, an instrument of very large focus will be necessary, or the brush of the regular painter. True portraits of the near, with equally true details of the far, can scarcely be combined in a photograph, but to the eye the grandest view of the incline and of the iron road which curves along its contour is to be obtained from the bridge which crosses the Deckande river less than halfway from Kodigamoa to Gordon's bridge.

The name "Allagalla" signifies "Yam Rock." It is rather a celebrated mountain in Kandian history, as from its summit State prisoners condemned to death were thrown over its precipitous side to be dashed to pieces ere reaching the valley far below.

The **Deckande Bank** next claims attention, the largest piece of earthwork on the line, containing over 90,000 cubic yards of earth, thrown in almost entirely by baskets-full. It is over 90 feet in height and 180 yards long. Mr. Harrison, of the Government staff, had the oversight here, his residence crowning the adjoining Ballany Hill.*

The enormous Deckande bank covers a large masonry culvert (20 feet to the top of the arch), which diverts the Deckande stream and carries it under the line.

Shortly beyond the Deckande embankment, and while curving to the right, round "the Conical Hill," the extremity of which forms "Sensation Rock," the tourist will pass through Tunnels No. 6 and No. 6a of 40 yards each. They are shown by Messrs. Slinn & Co. in one wonderfully rugged view, the reflected light bringing into equal prominence the sleepers and rails of the iron way, and the facets of the blasted and perpendicular rocks which rise on each side. While approaching them (almost at right angles to the line already passed up the profile of Allagalla), the view backwards of the great Deckande Valley, and the mountain looking down on it, was very grand. As the half circle of 10-chain curves, by which "Sensation Rock" is rounded, was approached, the conviction seemed inevitable that the engine *must* leap into space a 1,000 feet down, further progress on *terra firma* seeming impossible. For some time the company had been anxiously looking out and preparing themselves for the great sight, and they were not disappointed in the result. Meeangalla Gallery has its peculiar features, but the "giddy height" is not to be compared with that now attained. Down almost beyond the discernment of the eye lay the flat fields, with cattle grazing, but looking like so many toys.

It is no disparagement to Messrs. Slinn & Co. to say that their picture of "Sensation Rock" conveys but an inadequate idea of the terrors of the spot and scene. The scarped face of hard gneiss rock above is well shown, but we are left with a vague conception of the depth beneath the fall of nearly a 1,000 feet into the fields of the Deckande Valley, in which human figures appear like those of the tiniest pigmies. The river, which is a stream of some consequence, looks like a silver thread. The height and sheerness of the precipice, and the sharpness of the curve round "Sensation Rock," will always render it difficult to get a successful photograph of the scene, such as we have in the case of the really greater work at Meeangalla. The singular complaint of one of our fellow-passengers on Friday was that his terrors did not come up to his expectations. The explanation probably is to be found in the excitement of the company and the short period of time occupied in the transit. For ourselves we confess that after having rounded this precipice at every stage in the formation of the railway, from that of creeping by a narrow ledge of rock to gliding over apparently empty space in the airy railway carriage, we have never got rid of that element of terror which so largely enters into the sublime.

We are now about 1,300 feet above sea level.† The view from the rock itself must be felt; it cannot be described. At no point on the Bore Ghaut line, we believe, is there so great a precipice in sheer depth,

* See the very beautiful engraving from Lieut. Stewart's photographs of the glorious view from Ballany, a place famous in the history of Ceylon as the scene of the destruction of two Portuguese armies by the Kandian, whose then secluded country they attempted to enter by this the leading Pass.

† Between the 61st and 62nd mile the Kandy road rises from 1,277 feet to 1,656 feet above sea level, while the railway line goes on at the uniform rate of 1 in 45, or 116 feet per mile.

but our luxuriant vegetation detracts from the fearful appearance. A 10-chain curve over this, the greatest precipice on the line, is, of course, no more dangerous than in less formidable looking portions of the route ; but he must have strong nerves, indeed, who passes the steep projecting point without a creeping sensation of dread as to what might happen were the engine really to go forward, instead of round. If, instead of looking at the gulf below, the traveller can divert his attention to the precipice above, he will see that the hard and beautifully veined and stratified gneiss has been scarped down fully 50 feet. The length of the rock cutting here is 400 yards, with the usual width of 18 feet. By rounding this precipice an immense tunnel through the hill was saved, and so by a succeeding sweep to the left from the Balany or Ballawatte hill into the Moragalla mountains the construction of a viaduct is obviated, which, to connect the heights across the wide and deep valley, must have been one of the largest in the world. In taking this sweep we pass through No. 7 tunnel, which is about 100 yards long. Passing through a series of heavy cuttings, from which slip after slip has been cleared away, as the rains of successive monsoons loosened superincumbent masses of earth and boulders, we come to the Wyrley Grove bank, which has swallowed up some 75,000 yards of stone and earth. The views in front of the Kaduganava mountains, and to the right of the great coach road, with paddy fields and villages lining it and creeping up the sides of the ranges which form the background, will be found most beautiful and interesting.*

Suddenly hills, valleys, villages, streams, forests, and fields, the very railway itself, all disappear as the train enters the heart of Moragalla (about 1,500 feet above sea level), and goes roaring and screaming through the great tunnel of 350 yards long, with its incline and double curve so well conceived and so beautifully finished.

On this great tunnel, which runs through rock approaching trap in hardness, three shifts of men, working night and day, were kept employed while the work was in course of construction. The progress varied from 6 to 8 yards from each end per month, and the result was that the work was completed in a much shorter period than was originally anticipated by any person.†

We may here quote a record of the impressions we received when visiting the Kaduganava end of the tunnel before the headings had met :—

“It was hot outside when we visited the great tunnel ; but what shall we say to the interior ? ‘Dark as Erebus,’ and as for the heat, where the as nearly as possible nude drillers were at work, the streams of perspiration pouring down their bodies, and our own sensations indicated at least 130° Fahrenheit. The Bombay drillers were described to us as equal to any European workmen, and they were superintended at Moragalla by an English miner of the first class of intelligence, Mr. Symonds. It was something awful when thus shut up in the bowels of the earth to hear crashes as of reverberated blastings, when masses of detached stone were thrown on the lorry, to be conveyed to the regions of pure air and bright sunlight ; while the dimly burning lamps shining faintly through the dense steam gave the whole scene a weird aspect, as if we had entered the cave of some mountain elf or troll, whose element is darkness. This tunnel is difficult to work, not merely because the stone is hard (an ultimate advantage, as water

* At 63½ miles (a mile from the top of the incline), there is a piece of 100 yards of the railway line nearly level.

† Since the above was written, we have received the dates as follows :—Heading commenced—Colombo end, last week in September, 1863 ; Kandy end, first week in June, 1863. Headings met—March 22, 1866. Bottoming commenced—Colombo end, first week in May, 1864 ; Kandy end, first week in March, 1865. Bottoming completed—in second week of July, 1866. Quantity of rock taken out—10,325 cubic yards.

cannot percolate through, and no lining will be wanted), but also because a steep gradient and a double curve, and 'super-elevation' for that curve has to be provided for."

Being anxious to ascertain if any special appliances of science and skill had been here put in requisition, we were characteristically told that the incline had been conquered mainly just by "hard work and keeping at it." A rigid system of task work was enforced, which drove numbers of the lazy dissatisfied off the line; but the drillers soon became so skilful, and made such excellent wages (in many cases almost up to the English mark), that the difficulty ultimately was to obtain not skilled labour, but unskilled. Drillers, who were making their two or three shillings a day by rock work, were naturally dissatisfied when turned to cooly work. Wheelbarrows, &c., were occasionally used on the railway works, but the vast proportion of the earthwork was removed and deposited by the primitive native mode of little baskets filled and hoisted on the heads of men, women, boys, and girls. Deposited with a thud such earthwork got settled almost as soon as formed. The comparison as to work and wages between English workmen and natives on the Ceylon railway, we are told, was this;—The coolies move 2 cubic yards per day at 7½d., while an English navvy will move 13 at 3d.; 4 yards for 1s. 3d. in the one case, 13 yards for 3s. 3d. in the other.

Emerging again into daylight, we see before us "The Battery Rock," on the side of the Kaduganava mountain, up which we have still to go, while around us there is quite a settlement of bungalows and stores connected with the contractor's operations. Perched on one eminence is Mr. Faviell's own bungalow, and on a hill opposite that of Mr. Thompson, his hospitable and genial chief manager for the incline.

Of Moragalla and its neighbourhood, Messrs. Slinn have taken a profusion of views from various and widely distant points. (When this account was written, we had not seen Mr. Lawton's photographs of the incline, many of which are large-sized and excellent. Indeed, the photographs of Ceylon scenery generally excite much admiration in England.)

Of the great tunnel, at least of all that is grand and striking in its extent and profundity, no photograph can, unfortunately, be taken. The sun is a great limner, but he cannot portray what his light cannot reach. Of the tunnel's surroundings, however, we get most interesting details. We have, combined in one picture, a great sweep of the line with the stores and bungalows on the neighbouring knolls. There is a very striking "view of Moragalla, from the Kandy road," with the three "dark arches" (arches built against the face of a rock) up the mountain side. Not so successful in detail, in consequence of overpowering vegetation in the foreground, is a view of the Kandy road from Moragalla bridge. It is singularly difficult to distinguish bits of road from glimpses of river in photographs, unless objects are reflected vividly in the water in the latter case. "The lion's mouth" at Moragalla, as we begin the final ascent of the Kaduganava mountain, is a very striking object, appearing as if the great open jaw would swallow up the train; and the picture by Messrs. Slinn is exceedingly good and characteristic. It is a portrait as well as a scene.

Passengers along the ordinary road, up the Kaduganava pass, on which road and railway converge, have been long familiar with the tremendous blasting operations which went on in this place, while tons of gunpowder were incessantly displacing tons of rock, the débris of which will be seen scattered far down amongst the coffee bushes. Passing "Battery Rock," and rising up the side of the Kaduganava mountain, while the road zig-zags on the opposite side of the defile up the side of the twin guardian of the pass, Bellongalla (summit 2,543 feet above the level of the sea), we come to a point (just before passing through the small tunnel No. 9, 30 yards) from which the view, though not so dreadful as that from "Sensation Rock," is unsurpassed in

grandeur and beauty, the windings of the bright roads through the green rice fields and up the darker foliaged hills being prominent and pleasing features in the scene. No regret will be felt that speedily the occupation will be gone of the bullock bandies which may be seen in long strings toiling up the zig-zags of the Pass with rice and cloth, and downwards with the precious coffee, some of which will probably be "appropriated" by the honest cartmen before it reaches the merchants' stores in Colombo.

The photograph of tunnel No. 9 is not only striking as a picture of rock scenery, but for the wonderfully accurate portraiture of the open mouth, head, and forepart of a black bear, represented in shade on the face of the overhanging precipice.

As we rush up through the Bellongalla coffee, the cry is raised "There are the zig-zag of the Kaduganava Pass, and the perforated rock," and we look down with admiration on the familiar trace; but a few seconds more and we are at the top of the incline (at 11.45 A.M.), and with hearty and continued cheers we run into Kaduganava station.

The sight of Dawson's monument (should not one be erected opposite to the memory of Newton and Horn, and in commemoration of the completion of the railway?), where the road and railway unite at the top of the Pass ($64\frac{1}{2}$ miles from Colombo, and 1,700 feet above the sea level), will remind the travellers of the gratitude due to those who in ante-railway days planned and executed the great mountain road, but for which, and the results it produced, a railway could never have been called for in Ceylon. Hence roads diverge to Gadadessa Valley on the one side, and to the estates at the back of Allagalla on the other.

We are before our time considerably, and so go slowly along the rest of our way (downwards now) watched by the astonished natives, many of whom run for great distances along the Kandy road keeping us in view. Crossing the road at the level the line runs through a heavy cutting to the Gampolla side, and we are carried down to the Peradenia station, which suddenly bursts on our view, at 12.10 (so that our journey of 71 miles was performed in $3\frac{3}{4}$ hours, including the numerous stoppages, and the intentionally slow running up the incline and down to Peradenia). Here a large crowd of all classes is gathered, with numerous carriages and wagons from Kandy and Gampolla, and a brass band which welcomes the arrival of our train and party.

We pass on, however, to the **Bridge over the Mahawelli-ganga at Peradenia**, a fine structure, but not more beautiful than the celebrated satinwood bridge, which stands farther down the stream, and from which a glimpse can be got of the lovely Botanic Gardens, which well deserve the title of "The Royal," and which will doubtless become a favourite place of resort when excursion trains begin to run. Ganga-rooa, the coffee estate opened in 1825 by Sir Edward Barnes, is close by, the windings of the river dividing it from the Gardens.

The Hantanne and Nilambe mountains, covered with coffee, are now in full view with the Pusilava "Peacock" in the distance, seen through the valley of the Mahawelli-ganga up beyond Gampolla, but we cannot get a sight of the great Hunasgeria Peak, over and through the valley in which Kandy is situated until the rails are laid *all* the way. Before or after tiffin we can possibly have a look at a portion of the proposed railway route to Gampolla *and beyond*. For, short of the base of the Nuwera Ellia range, it is not likely that the line on which we have come so far and so pleasantly is likely to stop. At the stopping point, on this occasion, Peradenia, we are 71 miles, and on the Deltotte road, the limit of our trip, we are $71\frac{1}{4}$ miles by rail from Colombo, and $2\frac{3}{4}$ from Kandy, with the height above sea level of 1,562 feet. The fine iron bridge railway spanning the Mahawelli-ganga is 347 feet long, with three solid stone piers, the height above water about 40 feet, having two spans each 109 feet, and two of 60 feet each, and the cost approximating to £12,000.

Messrs. Slinn's photograph of the Peradenia bridge is faithful, and the effect of the reflected piers in the waters of the great river very striking. But of all the exquisitely artistic pictures we ever scanned, one of the finest is the landscape (for such it is in the highest sense) in which the fine proportions of the satinwood bridge are seen, between ranges of hills and masses of foliage, with the waters of the river passing from deepest shade to gleaming light in the foreground.

Mr. Lawton, of Kandy, has executed a photograph, exhibiting in good proportion the Peradenia railway bridge, with the first train on it; a large-sized picture, and giving a very excellent idea of the work, the river it spans, and the scenery around.

There was no time to visit the Botanic Gardens, even if the period of the day had been favourable; but we were glad to see the Director at the entertainment receiving the greetings of his numerous friends. One of the glories of the Gardens—a group of palms with the magnificent talipot as the central object, has just been excellently photographed by Lawton. If “a thing of beauty is a joy for ever,” then this picture will carry joy to all who have a keen sense of the beautiful.

The photographs of Parting, Slinn & Co., Herbert, Davidson, Taylor, Lawton, and others, with the water-colour drawings of Nicholl, and the double-tinted lithographs of O'Brien, have made the beauties of Kandy so familiar to our readers that we need not again attempt to describe what is really indescribable. Once in the town there are scores of points on the amphitheatre of hills around, from which grand, beautiful, and varied views can be obtained, not only of the town itself, but of mountains stretching in long succession from Ettapolla and Asgiria to Hunasgeria Peak; thence by Doombera, Kalibokka and “the Knuckles” to Medemahanuwera Peak; and nearer still, Ooragalla, Mattana Patana, and Hantane. But we must reserve more extended notices of Kandy until the swift approaching day, when we hope to join a larger and still more enthusiastic company in celebrating the final completion and opening for traffic of the **Colombo and Kandy Railway**. (The actual opening of the railway for traffic was unaccompanied by any Government or public ceremonial!)

From the account of the return journey we add a few passages.

At 3.5 P.M. the return journey was commenced, amidst cheers of those who remained and the answering cheers of those who occupied the train returning. The scenery from Peradenia up the side of the Nanoo-oya, a stream which the railway thrice crosses, is very pretty, and whole route to Kaduganava animated and interesting. The return train reached Kaduganava Station at 3.30, and started again at 3.42. To the top of the Pass the course had been upwards; but now, passing between the sentinel rocks of Kaduganava and Bellongalla, the really hazardous portion of the journey commenced down the incline of 1 in 45, and as we swept through high hills, across the faces of precipitous rocks, and over the very edges of yawning chasms and deep valleys, it is no reflection on the courage of any present, if we say that—

“The boldest held his breath,—

For a time!”

The speed, carefully checked as it was by the mango wood breaks (soft wood is the best for the purpose), was much greater than we had anticipated, and there was a short interval of nervousness. But soon we came to feel that, besides the careful Driver Fisher and Mr. Kendrew, Mr. Molesworth himself was on the engine. All felt more than reassured, and rapturous attention was absorbed in the magnificent panorama before and around us. The pleasure of the downward journey was intensified from the fast diminishing fervour of the sun, and the cooling effect of the mountain breezes. To quote ourselves on a previous occasion:—

“The evening sun, rich and glowing, was setting in the direction of Colombo, as we emerged from the mysterious cave of Moragalla, and

beautiful was the view spread out before us, of mountains receding into hills, and hills sinking into plains, with rivers wandering between ; while farther off still, spread out in almost limitless expanse, lay the sea of verdure-clad hills and knolls which surround Kaigalle and Ambepusse, Engodde, and Attampittia ; shading down to where the ocean line is fringed with cocoanut topes and cinnamon groves."

Rambukan Station, at the foot of the incline, we reached at 4.35, when there was still plenty of daylight. After looking back with admiration and regret at the grand mountains down whose sides we had so safely and so enjoyably glided, and with a parting glance at the rich vegetation around where talipot palms and pink-blossomed *imbool* trees towered over rich rice fields, with silver-leaved *kakunas* and purple-bloomed *murutus* interspersed through the valleys and beside the streams, we started for Polgahawella at 4.40, and reached this, the utmost limit to which the railway is as yet open for traffic, at 5.05. We started at 5.20, the clouds gathering on old Allagalla, giving promise of rain, which fell heavily for some minutes on the lower portion of our journey, but not so as to cause any real inconvenience to the occupants of the carriages. Now that we were on the finished portion of the line the speed was heightened, and, at times, the rapidity with which the fencing and banks of the line seemed to fly backwards enabled the passengers to judge of the express speed at which they were urged forward. Reaching Ambepusse (properly Keenadenia) at 5.38, and starting again at 5.48, we had still daylight, which, indeed, did not entirely desert us till close on Colombo. We reached Veangodde at 6.5, and finally started for Colombo at 6.10. At 6.50 we entered Colombo Station (which we had left at 8.30 A.M.), the steam whistle having previously warned the horsekeepers to have the carriages ready, and so we were back all safe and well from one of the most enjoyable, well-managed, and remarkable expeditions ever undertaken in Ceylon. When excursion trains are common, not merely to Peradenia and Kandy, but to Dimboola and Newera Ellia, and, perhaps, to Kornegalle, Matella, and Trincomalie (!), this first one may seem a small matter ; but the record of it can never fail to be interesting, as marking the beginning of greater, brighter, and, we feel confident, more prosperous times for Ceylon. Three hearty cheers were given for Mr. Faviell before the party separated.

Mr. Molesworth in his Administration Report writes :—

1868.

The expenditure of the Public Works Department in 1868 was approximately £326,000, or £3,000 in excess of the expenditure of 1867.

The expenditure in each Province, including the cost of Establishment, &c., divided proportionally over the Province, is, on a rough approximation, as follows :—

Province.	1868. £	1867. £	Decrease. £	Increase. £
Central ..	104,000	133,000	29,000	—
Western ..	128,000	125,000	—	3,000
North-Western ..	25,500	25,000	—	500
Northern ..	17,000	18,000	1,000	—
Southern ..	36,500	15,000	—	21,500
Eastern ..	15,000	7,000	—	8,000
Total ..	326,000	323,000	—	3,000

The establishment, though slightly increased by the addition of an Irrigation Assistant, still bears a small proportion to the expenditure, and is insufficient for proper supervision. In 1862, before the proposed increase to the Department, the establishment, which was avowedly too small, was 10·2 per cent. of the total expenditure. It is now only 8·9 per cent., and there is not only a deficiency in the total number of officers, but the salaries of the lower appointments are insufficient to induce educated men to enter the Department.

The total expenditure on the upkeep and improvement of roads in 1866 was £152,337; in 1867 it amounted to £132,036; whilst in 1868 it only amounted to £116,643, or a decrease of £35,694 since 1866, although there has been an addition of 100 miles to the length of roads maintained requiring an average of £100 per mile for their maintenance and representing an equivalent of £10,000 per annum, and the opening of the road throughout from Badulla to Ratnapura has thrown a very heavy additional strain on the upkeep of that road. On the other hand, however, the cost of maintaining the Kandy road has been considerably diminished by the relief afforded to it in consequence of the opening of the Railway throughout in 1867, whereas only 46 miles of the Railway were open in 1866.

About 26 miles of the Badulla and Batticaloa road have been completed at a cost averaging £1,280 per mile. The Rambukkan road, 10½ miles in length, opening the Dolosbage district to the Railway, has also been satisfactorily completed, at a cost of £1,490 per mile, exclusive of two bridges of 80 feet span.

The completion of the Lemastota road has been delayed in consequence of disputes with the contractors, which have been referred to arbitration, but the road has been opened for traffic. It will be necessary to increase the span of one of the large bridges, but meanwhile the traffic is carried by a temporary bridge.

The completion of the Galmal-oya road has also been delayed in consequence of the excessive sickness which prevailed in that unhealthy valley, and the contractors engaged on the work have failed to carry out their contracts.

The works on the Morawak korale road have been vigorously commenced, and tenders have been accepted for a large portion of the work at satisfactory rates. A large proportion of the earthwork has been executed, and if the contracts are duly carried out, a considerable saving on the estimate may be expected.

The following list shows the principal bridges in course of construction during the year:—

Names of Bridges.	No. of Spans.	Length of each Span.	Cost.			Date of probable Date of Completion.
			£	s.	d.	
Dikwella ..	1 ..	100 ..	1,820	10	0 ..	December, 1868
Mahamodara ..	1 ..	150 ..	3,241	8	9 ..	do.
Matara ..	3 ..	{ 2 of 100 } { 1 of 150 }	8,912	0	0 ..	July, 1869
Bentota ..	2 ..	140 ..	6,010	0	0 ..	do.
Deduru-oya ..	3 ..	120 ..	8,980	0	0 ..	December, 1869
Maha-oya (Polgahawela) ..	3 ..	120 ..	7,878	0	0 ..	July, 1869
Mirisgoni-oya ..	1 ..	120 ..	4,992	0	0 ..	December, 1869
We-ganga (Yatiyantota) ..	1 ..	140 ..	5,475	7	5 ..	July, 1869
Kalu-ganga (Ratnapura) ..	3 ..	{ 1 of 140 } { 2 of 120 }	15,000	0	0 ..	June, 1868
Palampoddar ..	1 ..	120 ..	4,500	0	0 ..	July, 1869
Nikapota ..	1 ..	140 ..	4,322	12	0 ..	December, 1869
Lemastota ..	1 ..	100 ..	3,730	0	0 ..	March, 1869
Talagalla ..	1 ..	80 ..	1,389	0	0 ..	January, 1869
Hingula ..	1 ..	80 ..	1,272	0	0 ..	do.
Morawak korale road	1 ..	100 ..	1,779	0	0 ..	October, 1869

Mr. Charles P. Layard, Government Agent of the Western Province, writes in his Administration Report:—

The suspension of railway works, and the absorption by the Railway, now completed, of nearly the whole of the traffic for which it was intended, threw hundreds of families out of employment, and added to the general distress; and the Kandy road, which had been till recently one continuous street, teeming with bustle and animation, was in the month of May little more than a line of ruins, rotting carts,

abandoned cattle sheds, and roofless and tumbling boutiques, to which the owners clung with an instinctive affection, or because they were disabled by sickness from quitting them, marking the character and extent of helplessness to which an Eastern population, always averse to change, may be reduced by the sudden introduction among them of the instruments and appliances of a higher civilization than their own.

Mr. G. E. Worthington, Assistant Government Agent, Kegalla, writes regarding the opening of the road from Mawanella to Rambukkana station :—

With reference to public works, it is gratifying to be able to report, in the interests of the district generally, and in that of the Dolosbage planters in particular, the construction of the road from Mawanella to Rambukkan station, $10\frac{1}{2}$ miles in length, at an easy gradient throughout its entire extent. The coffee estates are now brought within an average distance from the Railway of about 25 miles, of which over 20 consist of metalled road. The Yatiyantota bridge has also been completed, connecting the poorest portion of the district with the parts better circumstanced. The still more important bridge across the Maha-oya at Polgahawela, besides being nearly the largest in the Island, an ornament to the Kandyan Provinces, and connecting Four Korales with the sister district of Seven Korales, will also be ready by July 1.

With regard to the Main Roads in the Central Province, Mr. P. W. Braybrooke writes :—

The main roads in the Province generally were kept in a state of efficient repair throughout the past year, and those leading into the various planting districts of Kandy proper were especially maintained in excellent order. The road from Teldeniya to Galmal-oya was completed after great delay, owing partly to the large amount of sickness amongst the labourers, and partly to the inferior quality of the masonry work in culverts and retaining walls, which were carried away or thrown down by the heavy rains. It is desirable that this road should be extended as a cart road as far as the Nugatenna Gap, and this might be done under the provisions of the Grant-in-Aid Ordinance, for my belief is that the number of estates to be assessed would enable proprietors to contribute the moiety of the cost without any serious burden, whilst the opening of a cart road to that point would be of immense benefit to them.

The Dikoya road has been completed as far as the 9th mile from Ginigathena Gap, and the work seems to have been well done, though I think a great mistake has been made in deviating so much from the trace of the old road, which has had the effect of rendering the first part of the new one very steep, and must entail considerable cost in its upkeep. As the planters' moiety for completing the road as far as Dunbar store has since been paid up in full, there is every prospect of the work being carried out to that point without delay, and this will be a great advantage to the district, as the present terminus is a most inconvenient one, there being no adequate accommodation for carts stopping, or for the storage of rice and produce.

The Dimbula road is in beautiful order, and I am glad to see that there is a likelihood of its being extended for 2 or $2\frac{1}{2}$ miles, so as to come within reach of a block of the remote estates in the Dimbula Valley.

The Hunnagiriya or Dotala road was completed in last year as far as the Elkaduwa store, and is a very creditable work, though I think a better trace might have been adopted for a portion of the distance, had it not been that a cart road to the Hunnagiriya store was already opened, when the work was undertaken, and it was thought right to adopt that line, both to save expense and to benefit the extensive Hunnagiriya estates.

There is no present intention of extending the road beyond Elkaduwa, under the Grant-in-Aid Ordinance, but the proprietors of estates beyond that point have agreed to open a less expensive cart road to Dotala at their own cost.

Great progress was made during the year, in the opening of the new road from Badulla to Batticaloa, 21 miles of which are now open to cart traffic. The work done on this important and useful line is admirable, and the masonry bridges constructed over the streams are particularly worthy of praise. I have never seen such neat and apparently solid work done in the Island. When this line is open for carts to Batticaloa, it will be of incalculable benefit to the inhabitants of both districts, for though the estates will not use it for the transport of their crops to Batticaloa for shipment, supplies of rice, salt, fish, and other necessaries will be brought up from Batticaloa and disposed of at comparatively reasonable prices to the estates and villages near the route and in the Badulla market. In this light I look upon it as being destined to prove one of the most useful lines of communication in the Island.

The road from Badulla to Ratnapura, or rather that portion of it within the limits of the Central Province, has been much improved; but experience has proved that the traffic on it is too great for a merely gravelled road. The Government should therefore make up its minds to metal it by degrees, as the expenditure would be amply justified by the importance of the line, uniting as it does two such flourishing districts as Badulla and Ratnapura, and forming the main outlet for both to the shipping port.

The Lemastota grant-in-aid road has been completed, with the exception of the iron bridge over the Nikapota river. A temporary wooden bridge had to be erected in the first instance, as it was found necessary to put up a bridge of larger span than was originally proposed, and this had to be procured from England.

Great improvement has been effected in the state of the central road as far as Dambulla, and a very fine lattice bridge has been erected over the Mirisgoni-oya, near the northern boundary of the Province. All the principal streams to that point are now bridged over, and only one or two smaller bridges are required to make the road passable for carts at all seasons.

Mr. W. E. Sharpe, writing regarding the Badulla District, states:—

As might be expected the operations of the Public Works Department were carried on with great energy, 20 miles of the new Batticaloa road were opened out in the year; the Kandapalla grant-in-aid road was all but finished; 5 miles of the Ratnapura road beyond Dikwella were metalled; and the Nuwara Eliya road was much improved.

In his report on the Puttalam District, Mr. W. C. Macready writes:—

The Superintending Officer of Puttalam, Mr. Giles, was removed to Colombo in the middle of the year, and was succeeded by Mr. R. Ormsby, in October.

Under both these gentlemen the interests of the Public Works Department appear to me to have been well attended to. The votes for the year were liberal, and, as far as I can judge, the money has been well and judiciously expended.

In the northern part of the division 4 miles of the Kurunegala road have been thoroughly re-gravelled and 3 miles have been repaired. (I believe 4 miles beyond my boundary have also been thoroughly re-gravelled.) The gravel on the road between the 5th milepost and Anamadu is generally of bad quality, and I have before urged that it would be better to metal it at once. There is plenty of stone to be had along the road, and the improvement would be a permanent one.

Rather more than 3 miles of the Anuradhapura road have been gravelled, but the bridge which I recommended for the Mi-oya has, I am sorry to say, not been constructed.

Mr. J. W. W. Birch, Government Agent, Eastern Province, writes :—

The bridge at Palampoddaaru will be finished early next year, and I venture to express a hope that the Government will steadily continue the improvements on this road. The road may be said now to be fairly drivable to Kantalai, and is passable for carts to Dambulla. I think £1,000 a year ought at least to be given for it, and by degrees it will be made very passable; but another sum of £500 will then be necessary for upkeep.

The resthouses on this road are very important, and are in a most disgraceful state. The Road Committee have not the means to repair them; and I must therefore solicit, and I do so most earnestly, a vote for the repair of the resthouses of Habarana, Kantalai, and Alut-oya. A sum of £300 will be sufficient, and, once put in order, the Road Committee will guarantee keeping them so.

Mr. E. Elliott, writing on the Matara District, states :—

In public works large sums have been devoted for the Morawak korale road and Matara bridges; on the former considerable and most satisfactory progress has been made under Mr. Young's supervision. The Dikwella bridge was completed, and that at Matara is in course of erection.

Under heading Irrigation, Mr. Molesworth writes :—

Notwithstanding all the efforts which have been made in different quarters to raise a prejudice against the Irrigation Scheme, and to dissuade the cultivators from availing themselves of the aid offered to them by the powers of the Irrigation Ordinance, the Government scheme for irrigation is becoming, as predicted in my report for 1867, a most popular measure amongst the cultivators, and is beginning to be thoroughly appreciated. Village meetings have been held in many parts of the country requesting the aid of Government under the powers of the Ordinance for the execution of works to an amount exceeding £70,000.

It will be impossible to undertake the greater part of these projects for some years to come.

The works of irrigation undertaken are as follows :—

1. Rugam, near Batticaloa, a tank of 2,400 acres, the construction of which is estimated to cost £8,736, and to benefit 5,000 acres.
2. Boralesgamuwa, a tank of about 36 acres in the Western Province.
3. Alut-ela, near Badulla, consisting of a masonry dam thrown across the river, and the improvement of the existing irrigation channels.
4. Borale, a tank near Weligama in the Southern Province, benefiting about 300 acres.
5. Denagame, a large tank about 18 miles from Matara for the irrigation of about 1,600 acres.
6. Buttala-ela, near Alupota, consisting of the construction of a new irrigation channel and a permanent dam across the Buttala river, for the purpose of irrigating 1,200 acres.
7. Allai, a tank for the irrigation of about 1,600 acres, estimated to cost £2,674.
8. Periyakulam, a tank about 9 miles north of Trincomalie, for the irrigation of about 600 acres.

Mr. Molesworth in his report for the year 1869 writes :—

1869.

At the close of the year the expenditure will probably amount to £295,000, or about £31,000 less than that of the preceding year. This decrease is mainly owing to the fact that very limited provision was made for new works in the Supply Bill for the year, owing to circumstances which it is unnecessary for me to particularize. (Fall in revenue of Rs. 300,000.)

The expenditure in each Province, including the cost of Establishment; divided proportionally over the Provinces, is approximately as follows :—

	1869. £	1868. £	Decrease. £	Increase. £
Central ..	112,284	103,963	—	8,321
Western ..	88,925	128,151	39,226	—
North-Western ..	19,050	25,453	6,403	—
Northern ..	15,013	16,822	1,809	—
Southern ..	51,886	36,482	—	15,404
Eastern ..	8,199	15,153	6,954	—
Total ..	295,357	326,024	30,667	—

The expenditure on upkeep and improvement of roads of late years has been as follows :—

	£		£
In 1866 ..	152,337	In 1868 ..	116,644
1867 ..	132,036	1869 ..	119,527

so that since 1866 there has been a decrease of £33,000 ; although there has been a considerable addition to the length of roads to be maintained. This decrease cannot, however, be all attributed to the actual improvement in the system of upkeep, but also to the prevention of unauthorized expenditure on the upkeep funds, and to a more stringent supervision, which renders the frittering away of money less easy. The upkeep of roads is now reduced to a system which affords data for checking the expenditure, though I still believe that further reduction may be made with advantage, when additional experience has been gained in the present system.

Previous to 1867 lump sums had been voted for each road ; this was altered by Mr. Molesworth, and detailed estimates framed, drawing a distinctive line between maintenance, improvement, and construction. Mr. Molesworth also introduced the standard of measurement : 1 line = 100 lineal feet, 1 cube = 100 cubic feet, and 1 square = 100 square feet, thus doing away with lengthy calculations in square and cubic yards.

The Urugodawatta road, the Galmaloya road, and the Lemastota roads have been completed during the year ; and a large portion of the Badulla and Haputale road has been converted from a gravelled to a metalled road.

The Badulla and Batticaloa road has been pushed on ; the works to the Lunugala Pass being nearly completed, the road will probably be opened in April as far as the 48th mile, and the junction with the old Batticaloa road near the 40th mile made shortly afterwards. It is intended next year to commence at Eraur, and work from the Batticaloa end of the road.

The completion of the Dikoya road has been delayed by the non-payment of the private contribution which prevented the commencement of the work before the setting in of the rains. The improvement of the Central road to Jaffna has been surveyed, and will be commenced early next year.

The progress of the Morawak korale has been slow, owing to the failure of the contractors employed on that road to carry out their contracts, in consequence of the scarcity of labour ; and it has been necessary to take several of the contracts out of the hands of the contractors. But I have sent a Division of Pioneers to take up the work, which is now progressing more favourably.

The Polgahawela, Palamputar, and Mirisgoni-oya bridges have been completed, and the Matara and Bentota bridges advanced so far as to be ready for traffic ; but the pressure of work in the foundry, in consequence of the numerous sluices and other castings required, has prevented the supply of some castings which are necessary for their entire

completion. The bridge over the Deduru-oya is nearly completed, but a supplementary estimate will be required to complete the approaches, owing to the excessive fever which prevailed at the commencement of the work, and the necessity for removing the division which had suffered from malaria and fever to such an extent as to render it practically useless.

Mr. H. S. O. Russell, Government Agent, Central Province, writes in his Administration Report :—

Notwithstanding the continuously wet weather of the last half of 1869, and the heavy cart traffic to which principal roads were exposed during that period, their general condition was very creditable to the Public Works Department. The Dikoya road has been opened as far as Woodlands, and the remaining section of 4 miles to the Dunbar store is now well-nigh completed. The planters are anxious for the further extension of this important line of communication, which, it is to be hoped, will eventually be carried to Bagawantalawa. But some difference of opinion exists among those interested in the road as to which line should be adopted for the next section of it. The discovery of the best outlet for the Maskeliya crop is another problem of difficulty. I have been favoured by Mr. J. D. Young with a copy of his report on the Bambarabotuwa trace, which he advocates. It seems to me, however, that, looking at the matter with reference to the general interests of the Central Province, the Maskeliya outlet should fall into the Dikoya road. The fine and still improving district of Dimbula requires an extension of its cart road, the state of which during the past year has been very satisfactory. A similar remark applies to the road from Katugastota to Teldeniya, but the new section between Teldeniya and Galmal-oya, although perfectly practicable for carts, was rather rough. The extension of this road to Urugala (where a court-house was built in 1869) is much required. The Rangala, Panwila, Matale, and other main roads of this district bear testimony to the ability and zeal of the Provincial Assistant, Peradeniya, and the officers under his command.

Mr. W. E. Sharpe, writes on the Badulla District :—

The new Batticaloa road is unquestionably one of the finest of our great trunk roads, and reflects infinite credit on Mr. Arneil and the officers employed under him, whether one looks to the general trace or to the character of the work done; the stone bridges along it will bear comparison with any on the railway as regards strength, elegance, and finish. The Gal-oya bridge, a stone structure of two arches, is nearly finished, and the road will be, I doubt not, by the end of this year, practicable for wheel traffic to the place where it crosses the old Batticaloa road, 56 miles from Badulla.

Mr. A. R. Dawson, Assistant Government Agent, Matara, writes :—

The new iron bridge over the Nilwala-ganga in Matara has been opened for traffic, and is a well-built, handsome structure.

Great progress is being made towards the completion of the road from Akuressa to Morawaka; £1,200 has been voted by the Government for its extension beyond the latter village towards Deniyaya, the mouth of the coffee valley, and, by a judicious combination of old and new traces, the Provincial Assistant hopes to make this vote go a long way towards converting the existing trace for some miles into the semblance of a cart road.

Mr. J. W. W. Birch, Government Agent, Trincomalee, writes :—

On the Kandy road a very handsome bridge has been erected over the Palampodda-aru. It cost £3,094, and considering the means at his disposal, and that he had no Pioneers, Mr. MacBride deserves great credit for it, as he does, I must be allowed to say, for all his works.

SIR GUILFORD LINDSAY MOLESWORTH, K.C.I.E.

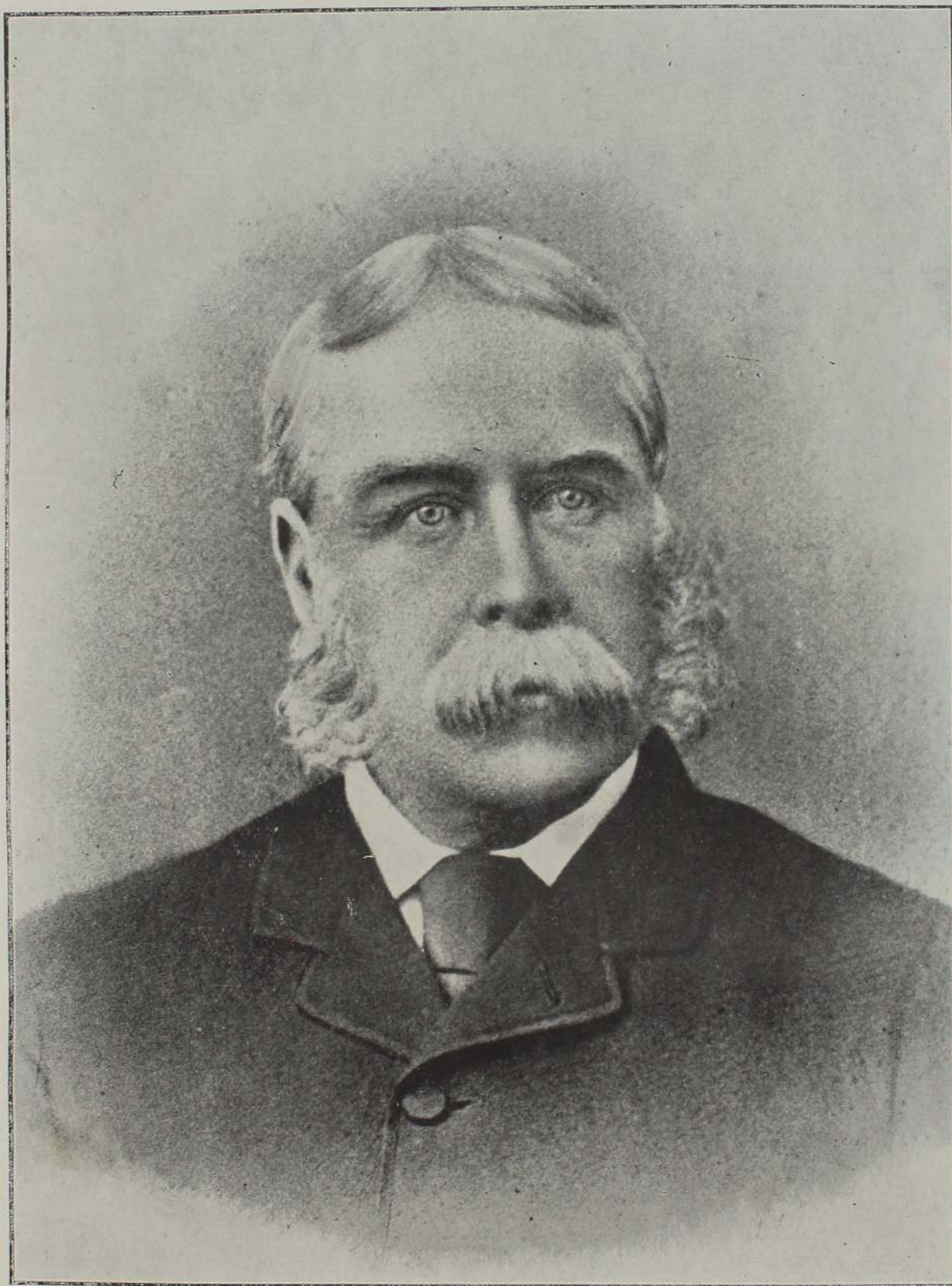
The subject of our memoir was born at Mellbrook in Hampshire, England, in 1828, and is, therefore, in his sixty-sixth year. His father, the Rev. John Edward Nassau Molesworth, D.D., was Vicar of Rochdale, and sent his youngest son first to King's School, Canterbury, and then to the College of Civil Engineers at Putney.

Young Molesworth was a pupil of the late Mr. Dockray, of the London and South-Western Railway, as to civil engineering, and of the late Sir William Armstrong as to mechanical engineering in Manchester. He was then employed on engineering works connected with ironworks in South Wales and on various railways, and in 1852 became Chief Assistant Engineer on the London, Brighton, and South Coast Railway. Thence young Molesworth went to Woolwich, and was employed at the Arsenal there during the Crimean War, and it was here he first became a Government servant. He did not stop very long, and set up as a Consulting Engineer in Westminster, joining the Institution of Civil Engineers in 1854; in 1858 he was awarded a Watt medal and a Manby premium for his paper on "The Conversion of Wood by Machinery." It was in 1859 he first came to the East and acted as Agent and Chief Engineer to the Ceylon Railway Company for two and a half years. He had many difficulties to overcome and much opposition to encounter as a new man, but by dogged perseverance he finally triumphed over all obstacles and was able to complete the railway and save thousands of pounds by new alignments. The estimates based on the schemes of his predecessors ranged from £1,872,000 (Mr. Hawkshaw's estimate) to £2,214,090 (Captain Moorson's). Mr. Hawkshaw expressed an opinion that the line could not be constructed and stocked under any circumstances for £1,500,000; Mr. Molesworth completed it for £1,435,127. Many of our readers have been over the line, which will for all time be a monument to the skill and daring of the engineers who planned it and successfully carried it out. His services were so appreciated that in 1862 he was appointed Chief Engineer of the Ceylon Government Railways; in 1865 Director-General of the Railway; and in 1867, before he was forty years old, Director of Public Works.

In the beginning of 1871 Mr. Molesworth visited the Festiniog Railway at the suggestion of Sir James Elphinstone, and wrote a report on it, which would form an excellent monograph on light and narrow gauge railways. In it he says:—"I have for years contemplated the introduction of light railways into Ceylon, should it be determined to open up certain mountain districts by railway communication; it would, however, be, in my opinion, a great mistake to make a break of gauge in carrying out the extension to Gampola reform in rolling stock is more required than in gauge, and I think it would be well to see how far it would be possible, by means of modern appliances for passing round curves, by engines especially designed for low speeds and by light rolling stock to secure the advantage of a light railway, without having recourse to a break of gauge."

In his report on the Public Works Department for the year 1867, Mr. Molesworth as Director wrote:—"One *deteriorating* influence has, I believe, been an undue recognition of seniority claims." And he proposes to remedy the evil by acting on "the principle that claims of seniority must be *entirely* subordinate to those of qualification and individual fitness. The italics in the above extracts are ours, and we have quoted to show the strong common sense which characterized Mr. Molesworth early in his career, and of which he has strong proofs ever since. He was essentially a practical working man, and, by his superior intelligence, worked himself to the front by qualification and individual fitness."

The Government of India were not slow in spotting him, and towards the close of 1871 appointed him Consulting Engineer for State Railways.



S. G. O.

The Hon : COLONEL AMELIUS BEAUCLERK FYERS R.E.

Surveyor General

1866 - 1881

Acting Director of Public Works
and

Director General of Ceylon Railway

1870.

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Died at Bath 1883.

Meanwhile he has brought out his famous Pocket Book, of which six editions appeared in the first year (1862); he originated and was mainly instrumental in introducing the system of decimal coinage adopted in Ceylon; he planned a set of rules for the improvement of the efficiency and condition of the Pioneer Force; and while the Public Works of Ceylon were under his charge, he effected a reduction to the extent of £35,694 per annum in the upkeep of roads alone with increased efficiency, and on the occasion of his leaving Ceylon for the mainland, the Under Secretary of State for the Colonies wrote: "I am directed by the Earl of Kimberley to state that . . . he gladly avails himself of this opportunity to express his sense of the value of the services you have rendered to the Colony."

We have now allowed Mr. Molesworth to this country; his early career is not generally known to the present generation, but his career as Consulting Engineer has so recently been closed, and the space at our command has become so restricted, that we must pass lightly over the next twenty-three years. Mr. Molesworth served with the Army in the field in Afghanistan and Burma, for which he received the Afghan medal and Burma medal and clasp; also in 1881 the thanks of Her Majesty for excellent services rendered during the Afghan campaign. The following list of works written by a particularly busy man are a standing proof of his great energy and power:—Decimal Coinage in Ceylon, 1868; in India, 1871; Reports on Public Works, Ceylon, 1869; Light Railways, Ceylon, 1870; Festiniog Railway, 1871; State Railways, India, 1872; Gauge of Railways, India, 1873; Training of Engineers, 1874; Graphic Diagrams, 1877; Metrical Tables, 1879, in which year he joined the Institution of Mechanical Engineers; Railway Construction, 1880; State Railway Managements, 1881; Masonry Dams and Re-organization of Public Works Department, 1883; Madras Harbour, and Iron Manufactures in India, 1884; Establishment of an Engineering Volunteer Corps and Imperialism in India, 1885; Text Book of Bimetallism, Land as Property, Bimetallic Currency, The Silver Question, The Abt System and Instinct, &c., Reason in Ants, 1886; Political Economy in its Relation to Strikes (the author had been examined at length on this subject before a Parliamentary Committee in 1856), and Silver and Gold (Prize Essay of the Bimetallic League), 1890; Divorce of Silver and Gold, 1891; Mombasa Railway, 1891, 1892, and 1893; and Indian Currency, 1893

Sir Guildford Molesworth married in 1854 Maria Elizabeth, daughter of J. T. Bridges, Esq., of St. Nicholas' Court, Thanet, and granddaughter of Sir Robert Affleck, Bart., and has three children living. He was made C.I.E. in 1879, and K.C.I.E. in 1888, and is a Fellow of the University of Calcutta; he resigned his appointment as Consulting Engineer to the Government of India for State Railways in 1889, and was in 1893 appointed, jointly with General Strachey, to represent the Government of India at the Monetary Conference at Brussels.—"Indian Engineer" (*Ceylon Literary Register*, June, 1894).

On February 10, 1870, Mr. Molesworth went on leave, and 1870. Captain (afterwards Lieut.-Colonel) A. B. Fyers, Surveyor-General, acted as Director of Public Works, Lieut.-Colonel J. G. Jervois, R.E., acting as Surveyor-General. In his Administration Report Captain Fyers does not give the total expenditure of the Department for the year.

The total mileage of road maintained was 2,058·25 miles, of which—

668·75 miles were metalled;
431·50 miles were gravelled;
958·00 jungle roads neither metalled nor gravelled.

2,058·25

The length of canals maintained was 163·5 miles.

The expenditure incurred on "upkeep" during the year was as follows:—

	£	s.	d.
On roads and bridges	105,558	19	8½
On canals	5,172	17	3
On irrigation works	414	11	11½
Total	111,146	8	11½

The expenditure on new works was £20,465. 18s. 0d.

The expenditure on new roads during the year amounted to £45,081. 15s. 7¼d., of which £22,700. 4s. 2½d. were on the new Badulla and Batticaloa road. Considerable progress has been made on this road during the past year, and all the work on it has been well executed. About 30 miles of new road were completed and 30 miles cleared preparatory to commencing work in 1871.

In previous years 37 miles had been completed at a cost of £49,780. 13s. 2½d. The total length of road from Badulla to Eraur will be about 101 miles, so that at the end of 1870, about 34 miles remained to be completed. Of these, 5 miles provided for in the Estimates for 1870 are in course of construction, and 18 miles are included in the Estimates for 1871. It will be necessary therefore to make provision in 1872 for about 11 miles, exclusive of bridges, of which there will be five. Greater progress could be made in the construction of the bridges on this road, if it were not for the difficulty of procuring a sufficient supply of skilled labour.

There are six Divisions of Pioneers employed on the road, but they are all under their strength, and both officers and men at times suffer considerably from fever.

Four miles of the Dikoya road were completed in 1870, viz., from Woodlands to Dunbar, making a length of 14 miles since the road was commenced in 1868, at a total cost of £26,870. 13s. 1d.

The Dimbula road extension was only commenced in July last; 1·6 miles were completed by the end of the year, at a cost of £3,748. The work is being executed by the 9th Division of Pioneers.

The western terminus of the Urugodawatta road was completed early in the year.

The road from Akuressa to Morawaka was completed. The distance is 16 miles, and the cost £17,619. 12s. 5d. It is a gravelled road, and contains four 50 ft. and one 100 ft. iron girder bridges, four stone-arched bridges, 20 ft. span, one of 16 ft. span, and one arched bridge of three spans. 4½ miles of extension of this road beyond Morawaka were also completed at a cost of £4,762. The 5th Division of Pioneers is employed on the road, and the work is progressing satisfactorily.

In consequence of a considerable portion of the Central road being impassable in rainy weather, a new trace along the high ground, or watershed, of that part of the country, has been opened out, from Elephant Pass to Kanakarayen, for a distance of 33 miles. Nothing has been done, except to open out the road and to sink for water, which is unfortunately at a greater depth than was anticipated. To be of any use, this road will have to be completed and ultimately connected with the Jaffna peninsula by a causeway. The sum of £1,815. 9s. 10d. was expended on the new trace in 1870.

The other new roads executed during the year were Nedunteru road, Jaffna, half a mile; Deltota extension, 2 miles; half a mile approaches to Maturata bridge.

The road between Galle and Akuressa, which was only proclaimed a principal road in 1870, was improved as far as practicable. The first 6 miles from Galle have been gravelled, and the 22 miles between the high road at Galupiyadda and Akuressa have been widened and improved. All the cross drains, culverts, and bridges have been repaired or rebuilt, and several additional ones constructed; and the

bridge at Kananke has been thoroughly repaired and widened. As the road is not metalled, and the trace is in some places defective, it is very heavy during rainy weather.

Thirteen miles of the road between Dambulla and Habarana were improved at a cost of £1,650. 5s. 7½*d.* This portion of the road was formerly in very bad order, and the expenditure now incurred has improved it considerably.

The metalling of 14 out of 19 miles of the road between Ratnapura and Badulla, provided for on an estimate for £9,905, has been completed at a cost of £8,058. 12s. 8*d.* Of these, 12 miles were completed between Pelmadulla and Gurukandura; 1½ mile between Gurukandura and Haputale; and half a mile between Haputale and Naula.

The expenditure on new bridges during the year amounted to £10,886. 3s. 6*d.*

The old wooden bridge at Dikwella, near Badulla, having been found to be decayed, was replaced by a new one, consisting of a wooden platform on wrought iron lattice girders at a cost of £659. 5s. 2*d.*

A bridge over the Badulla-oya on the new Badulla and Batticaloa road was also commenced, and completed at a cost of £222. 12s. 2*d.*

Of bridges commenced in former years, the Bentota bridge consisting of two 140 ft. spans of Brotherhood's lattice girders was completed at a total cost of £5,929; another bridge of 120 ft. span, also at Bentota, was completed, except ornamental work; its total probable cost will be £3,053.

A masonry bridge of two arches of 35 ft. span each over the Gal-oya, on the new Badulla and Batticaloa road, was completed at cost of £1,865.

The Matara bridge, consisting of three spans, viz., one span of 150 ft., and two spans of 104 ft. 5 in. each of Brotherhood's lattice girders, on iron cylinder piers, was completed, except ornamental work; the total cost of this bridge will be £8,912.

The bridge over the Deduru-oya, on the road between Kurunegala and Puttalam, was nearly completed by the end of the year. It consists of three of Brotherhood's 120 ft. iron lattice girder bridges. The unhealthiness of the banks of the Deduru-oya caused considerable sickness amongst the men employed in constructing the bridge, and there have been so many changes amongst the officers in charge that it has taken a long time to build. It is, however, now completed at a cost of about £10,034. 3s. 11*d.*

The bridge at Hatagala, on the road between Tangalla and Hambantota, having been washed away by heavy floods, a new pile bridge has been nearly completed, at a probable cost of £173.

A bridge over the Madura-oya, on the new road to Batticaloa, was commenced during the year. It will consist of two arches of 30 ft. span each, and is estimated to cost £1,460.

The hospital accommodations in the Island at the end of the year was :—

	Patients.		
Colombo	210
Kandy	176
Gampola	58
Matale	44
Ratnapura	32
Badulla	37

Irrigation works completed were :—

	£	s.	d.
Deduru-oya head sluice	425	3	5
Periyakulam channel	157	3	7
Denagama and Weanwewa	1,638	8	8
Horaborawewa	669	7	11
Kudawewa	674	12	9
Kinchiguna works	577	12	9
Rukam tank	8,699	0	2

Those in hand :—	Probable Cost.
Muddur channel, Allai tank ..	1,536 0 0
Divilane tank ..	3,490 0 0
Deduru-oya channel ..	1,652 0 0
Kadukkumunai villu ..	2,478 0 0
Kurumekange-arū dam ..	500 0 0
Kospotu-oya, Kudugalpitiya ..	1,400 0 0
Rukam spur ..	370 0 0
Sengapadai dam ..	4,100 0 0
Tiripitiyawewa, Madampe ..	3,000 0 0
Denegama and Weanwewa bund ..	2,990 0 0
(Repairs of bund washed away) ..	1,779 0 0
Kekanadura works ..	6,072 0 0

Captain Fyers writes :—

Those who travel on a road after it has been completed, when rest-houses have been built and traffic has commenced, can form no idea of the hardships that have been undergone by those who first commenced to open out the trace. They are generally employed in an out-of-the-way part of the country, far from supplies of all kinds, sometimes, in consequence of floods or from other causes, running short of stores, generally suffering from fever, and being unable to obtain the comforts and attendance considered necessary even for a patient in hospital. I have frequently seen these young men scarcely able to stand when the attack of fever was on them; but the next morning, when they felt temporarily better, they mustered their Divisions, and set their men to work at daylight.

I have considered it due to the Pioneer Officers of the Public Works Department to make these remarks on the hardships they have to endure, and the cheerful uncomplaining manner in which they perform their arduous duties.

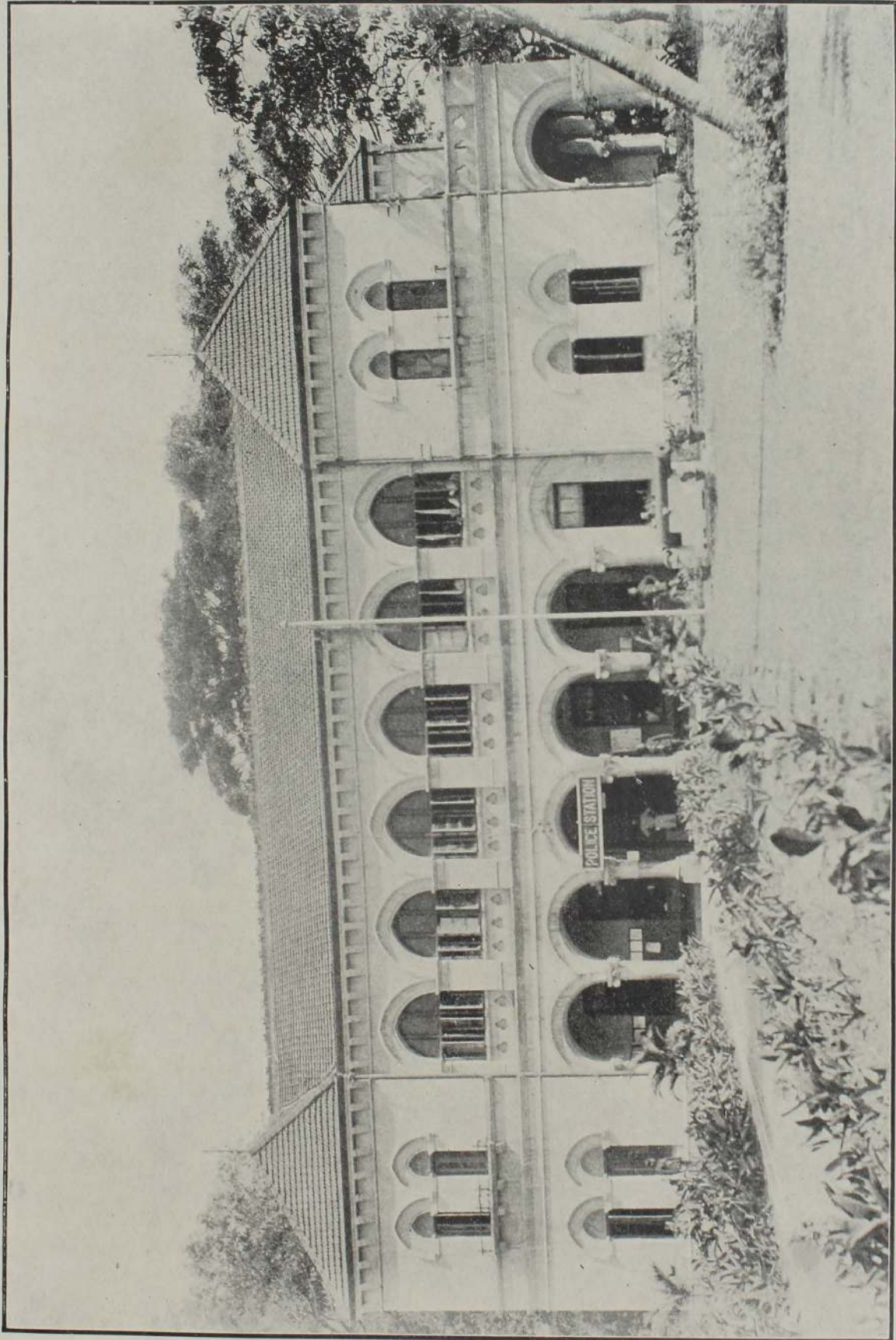
In his report on the Ceylon Government Railway as Acting Director-General, Captain Fyers writes :—

I wish to bring to the notice of His Excellency the Governor my opinion as to the position of the officer termed "Director-General of the Ceylon Government Railway," which is certainly a misnomer, as that officer has no power whatever, and is unable to issue any orders, to, or interfere with the working of the Departments of either the Engineer or Traffic Manager, who correspond direct with Government, and are quite independent of him. The Director-General is only referred to when there is a difference of opinion between the other officers, or when it is necessary to pass a minute for the purpose of altering rules, or recommending the manner in which the vote for additional accommodation, &c., is to be expended. He is, in fact, merely an arbitrator or referee, and the designation ought, I think, to be changed to that of "Consulting Engineer," which would express more accurately what his duties really are.

Mr. H. S. O. Russell, Government Agent, Central Province, writes :—

The extension of the Dikoya grant-in-aid road was carried on last year to Dunbar—distant 43 miles from Kandy—and the work was thoroughly well executed. The further extension to the Glencairn coffee estate, a distance of 4 miles, is now being made under an estimate of £8,058. It is at last generally admitted that the outlet of the Maskeliya valley should fall into the Dikoya road, although the precise point at which the junction should be effected is still an unsettled question.

An opinion is entertained by some persons that a road through Kotagalatenna to Craigie Lea would bid fair to offer the best line for Dikoya traffic, if the railway were extended beyond Nawalapitiya toward Dimbula. The Dimbula grant-in-aid cart road has now reached



S. G. O.

THE POLICE STATION KANDY.
Built by H. A. Evatt,
And G. Burton.
1868 - 70.

Talawakele, 47 miles from Kandy, and the extension of it to Walaha, 51 miles from Kandy, is in progress. Two estimates have been sanctioned for this road since my last year's report was written, viz., estimate of £3,748 for extension from Dimbula bazaar to the Nanu-oya, a distance of 1 mile and 1,078 yards, and estimate of £7,146 for extension from the Nanu-oya junction to the Tillicoultry estate, a distance of 4 miles.

A proposal has been sanctioned by the Provincial Road Committee for a new road from Dimbula to Nuwara Eliya, by which a saving of several miles will be made. Private persons interested in the road have agreed to contribute £120, two-thirds of the cost of the road, and a trace has been made, but the exact point to which this road should be carried in Dimbula has yet to be decided. A bridge over the Nanu-oya has for more than one year been included in the list of proposed works submitted by the Government Agent to Government. This communication between the two banks of the river is very much needed, but the work is one which can scarcely be undertaken under the Grant-in-Aid Ordinance, and the planters, with good reason, ask that it should be paid for from the public revenue.

For many weeks before the actual arrival of His Royal Highness the Duke of Edinburgh at Kandy the Prince's visit was a prominent subject of conversation in every village of the Central Province, and especially of the Kandy and Matale Districts. Persons of every class and caste, from the Diyawadana Nilame and Ratemahatmayas to the lowliest peasant, cheerfully gave all the aid in their power toward the work of offering a fitting reception to their illustrious guest; and the result proved not to be unworthy of their efforts. So full and graphic an account of the Duke of Edinburgh's visit to Ceylon has lately been given to the public in a handsome volume by Mr. John Capper, Editor of the "Ceylon Times," and special correspondent of the "Times," that it appears to me to be unnecessary here to do more than record the dates of the occurrences which marked the Royal Prince's progress through the Central Province :—

- April 12 : Arrival of the Duke of Edinburgh at Kandy; Levee at the Pavilion; illumination of the town of Kandy.
- „ 14 : Exhibition of the Sacred Tooth to the Prince and suite at the Maligawa.
- „ 16 : Departure of His Royal Highness for Bopattalawa.
- „ 17 : Arrival at Bopattalawa.
- „ 18 : Hunt at Bopattalawa; dinner given by the Dikoya Hunt to the Prince.
- „ 19 : Visit to Dimbula; dinner given to His Royal Highness by the Planters of Dimbula at Craigie Lea.
- „ 20 : Return to Kandy.
- „ 21 : Reception of Kandyan ladies of rank at the Pavilion.
- „ 22 : Departure of His Royal Highness from Kandy.

CHAPTER IV.

PUBLIC WORKS UNDER THE ADMINISTRATION OF MR. JAMES ROBERT MOSSE, M.Inst.C.E., 1871-1876.

1871. ON June 10, 1871, Mr. Molesworth retired from the Public Works Department on being appointed Consulting Engineer for State Railways to the Government of India, and Mr. James Robert Mosse, M.Inst.C.E., was appointed Director of Public Works and Director-General of the Ceylon Railway, Mr. E. G. Strong being appointed Chief Resident Engineer.

The expenditure of the Department for the year was £282,575, or £5,085 in excess of the expenditure for 1870 :—

	1871. £	1870. £	Increase. £	Decrease. £
Establishment, including transport, rent, and contingencies ..	36,867	35,153	1,714	—
Upkeep of roads, bridges, canals, and irrigation works ..	117,913	111,146	6,766	—
Repair of buildings ..	11,792	11,395	397	—
Departmental charges ..	6,985	9,829	—	2,843
New works and buildings ..	11,248	19,664	—	8,416
Alterations and additions to buildings ..	2,176	4,312	—	2,136
New roads and additions to roads ..	59,489	59,114	375	—
New bridges ..	3,905	9,426	—	5,521
Irrigation works ..	26,964	15,745	11,219	—
Inland navigation ..	5,230	1,701	3,529	—
	<u>282,575</u>	<u>277,490</u>	<u>24,001</u>	<u>18,916</u>

The expenditure by Provinces was :—

	1871. £	1870. £	Increase. £	Decrease. £
Western Province ..	82,238	84,433	—	2,195
North-Western Province ..	20,465	18,467	1,998	—
Southern Province ..	37,805	36,368	1,437	—
Eastern Province ..	49,608	36,200	13,407	—
Northern Province ..	13,961	19,080	—	5,119
Central Province ..	78,498	82,940	—	4,443
	<u>282,575</u>	<u>277,490</u>	<u>16,842</u>	<u>11,757</u>

The mileage of road maintained was—

	Miles.
Metalled ..	781·50
Gravelled ..	643·25
Natural ..	1,036·50
Total ..	<u>2,461·25</u>

The average cost per mile was £45. 15s. 0d.

Bridges constructed during the year were the Digarolla timber bridge rebuilt at a cost of £1,244 ; the new bridge over the Walawe river at Ambalantota, consisting of piles and timber work, built on the site of the present ferry, the work was nearly finished, and £458



JAMES ROBERT MOSSE, M. Inst: C.E.
Director of Public Works
and
Director General of Ceylon Railway.
1871 - 1882.

S. G. O.

Died at Tunbridge Wells,
December 18, 1904.

was expended out of an estimate of £656 ; the bridge over the Bilihul-oya consisting of three arches, each of 30 feet span, the whole being built in rubble masonry ; this work was recently completed at a cost of £1,452.

Roads under construction were :—

	Length. Miles.	Cost.			Remarks.
		£.	s.	d.	
Badulla and Batticaloa road	59.75 ..	27,052	10	3 $\frac{3}{4}$..	In addition to the expenditure incurred in 1870
Morawaka road	.. 13.75 ..	8,057	17	0 ..	Expended during 1871
Dikoya road	.. 4.00 ..	5,550	11	2 $\frac{3}{4}$..	do.
Dimbula road	.. 5.63 ..	5,904	2	4 $\frac{1}{2}$..	In addition to the expenditure incurred in 1870
Nitre Cave road	.. 13.75 ..	249	4	10 $\frac{3}{4}$..	Tavalam road in charge of Provincial Road Committee
Badulla and Ratnapura road	9.50 ..	4,180	17	9 $\frac{1}{2}$..	For metalling
Baseline road, Borella	.. .68 ..	275	0	0 ..	Forming and graveling
Kegalla and Polgahawela road	2.75 ..	1,253	9	10 $\frac{3}{4}$..	Improving and graveling 7 $\frac{3}{4}$ miles whole length
Causeway between Taladu and Mannar	2.43 ..	1,625	16	6 ..	Work superintended by Headman, Northern Province
Siyane korale road	.. 25.00 ..	284	10	0 ..	Minor road
Deltota road	.. 1.90 ..	418	18	8 $\frac{3}{4}$..	Balance brought forward—amount of original estimate £1,787. 17s. 7d.
Navala and Gurukandura road	7.00 ..	1,559	7	5 $\frac{3}{4}$..	Metalling—original estimate £3,613
Galmal-oya road	.. 4.47 ..	38	13	1 $\frac{1}{2}$..	Work commenced in 1867
Trace from Elephant Pass to Kanagarayan-arua	— ..	164	10	7 $\frac{1}{4}$..	—
Sundry works of additions and improvements to existing roads	— ..	2,874	3	3 ..	—
Total	..	59,489	13	2 $\frac{1}{4}$	

Mr. Mosse writes :—

The Acting Director of Public Works in his report for the year 1870, thus expressed his views on the present scale of travelling allowances :—

“It will be seen that £1,838. 2s. 1d. was paid to officers for travelling over 75,209 miles of road, or at the rate of 5.86d. per mile. My opinion is that officers ought to be given every inducement to pass as much of their time as possible on the roads under their charge ; but according to the present scale, it is impossible to keep a horse (in some districts two are necessary), pay tolls, and resthouse and other charges, without exceeding the commuted allowance, which it will be seen is under 6d. a mile. I think it would be much better to pay each officer a certain rate per mile for the distance actually travelled by him each month, the maximum during the year not to exceed a fixed sum. Should His Excellency the Governor prefer to retain the present system of giving each officer a certain sum per mile of road under his charge, I would strongly recommend that the existing scale be revised, so as to increase the allowance to each officer.”

Under Irrigation the principal works in progress were :—

	£.	s.	d.
Restoration of Tinipitiyawewa ..	2,131	14	0
Hali-ela dam ..	2,058	0	7½
Repairs to Udukiriwila tank ..	2,366	15	0
Restoration of Divilane tank ..	2,524	12	7½
Senkapadai dam completion ..	2,444	7	11½

In this year a regulation was introduced requiring all officers of the Department to pass an examination in the following subjects in order to qualify for promotion :—

Subjects for Examination.

Subjects.	Pioneer Officers and Second Class Superintending Officers, Salary not exceeding Rs. 3,000 per Annum.	First Class Superintending Officers, Salary above Rs. 3,000 per Annum.
Language ..	English, dictation and composition, and (within eighteen months from the date of their appointment) Tamil colloquially	Tamil or Sinhalese colloquially
Arithmetic ..	Rule of three, vulgar and decimal fractions	Compound multiplication and division, proportion, vulgar and decimal fractions and logarithms
Algebra ..	Addition to simple equations, inclusive	Quadratic equations
Geometry ..	First book of Euclid	.. First four books of Euclid
Mensuration ..	Taking out quantities and estimating	Taking out quantities and estimating, analysis of work
Trigonometry ..	—	.. Practical trigonometry. Heights and distances
Civil Engineering ..	—	.. General engineering and practical work
Surveying and levelling ..	Chain surveying and levelling	Surveying, levelling, and adjustment of instrument
Drawing ..	Plan drawing and tracing	.. Plan drawing, elevations, sections, and details
Departmental rules and accounts ..	—	.. Departmental rules and accounts

Mr. Mosse in conclusion writes :—

As reported by my predecessors, the staff of the Department is still deficient in strength ; but little work can be done by Europeans during the heat of the day, and the officers and men suffer so much in health from the malarious districts in which they frequently reside that the work is often carried on under great disadvantages. It is also difficult to obtain the skilful supervision required for many of the works. For irrigation surveys, for the charge of irrigation works, new roads, and large bridges, a considerable amount of engineering experience is necessary ; whereas for the mere upkeep of roads and buildings an inferior style of knowledge would suffice, and the remuneration sufficient for the latter case would be altogether inadequate for the former. But officers in the Public Works Department cannot be thus sub-divided ; their salary at starting did not contemplate a professional education, and their claims for promotion, arising from length of service and good conduct, cannot fairly be ignored. Hence the difficulty, which can only be met by appointing to the Public Works Department none but men who, owing to their professional education, have fair engineering experience ; and though this course may at first sight appear to increase the expense of the Department, I have no doubt that ere long it will be found to be true

The following statement shows the provision made in the Supply Bill for 1871 for the extension and upkeep of roads under the Grant-in-Aid Ordinance in the Central Province—

	No. of Estimate.	Length in Miles.	Government Moiety. Rs.	Amount of Toll Rents. Rs.	Private Contribution. Rs.
1. Extension, Dimbula road, from Nanu-oya to Tillicoultry estate, a distance of 4 miles	166	4	35,730	—	35,730
2. Extension, Dikoya road, from Dunbar store to the Glencairn estate	168	4	40,290	—	40,290
3. Dimbulla road, upkeep	119	15½	6,300	1,800	4,500
4. Dikoya road, upkeep	120	13¼	6,750	—	6,750
5. Pundaluoya road, upkeep	121	9¼	3,770	1,250	2,520
6. Pupuressa road, upkeep	122	9½	4,750	1,350	3,400
7. Dotale road, upkeep	123	10¼	4,100	—	4,100
8. Kelebokka to Kabaragala, upkeep	124	3¼	750	—	750
9. Madulkele to Bambara-Ella, upkeep	125	7¾	3,320	3,320	—
10. Lemastota road, upkeep	126	8	4,000	1,400	2,600
11. Deltota road, upkeep	127	18½	7,400	5,650	1,750

In 1872 the expenditure of the Department was calculated for the first time in rupees, and amounted to Rs. 2,983,224, being Rs. 157,473 in excess of the previous year. Details of expenditure may be classed as follows :—

	1872. Rs.	1871. Rs.	Increase. Rs.	Decrease. Rs.
Establishment, including transport, rent, and contingencies	347,080	368,674	—	21,593
Upkeep of roads, bridges, canals, and irrigation works	1,334,950	1,179,131	155,819	—
Repairs of buildings	84,598	117,927	—	33,329
Departmental charges	78,743	69,856	8,887	—
New works and buildings	166,163	112,484	53,679	—
Alterations and additions to buildings	16,183	21,765	—	5,582
New roads and additions to roads	338,747	594,897	—	256,149
New bridges	233,534	39,060	194,474	—
Irrigation works	334,106	269,649	64,457	—
Inland navigation	49,117	52,307	—	3,190
Total	2,983,224	2,825,750	477,317	319,843

The mileage of roads maintained was—

	Miles.
Metalled	804·25
Gravelled	746·50
Natural	988·75
Total	2,539·50

The average expenditure per mile was Rs. 507·65.

The following was the expenditure on new roads and additions to roads :—

Roads.	Miles.	Amount. Rs. c.	Remarks.
Opening and metalling two roads in the town of Ratnapura	·41	7,572 52	Expended during 1872
Badulla and Batticaloa road	42·75	41,476 39	In addition to the expenditure incurred in 1870 and 1871

Roads.	Miles.	Amount. Rs. c.	Remarks.
Dimbula road ..	8.74 ..	66,756 25 ..	In* addition to the expenditure incurred in 1870 and 1871
Baseline-Borella road ..	.75 ..	2,940 0 ..	Expended during 1872
Dikoya road ..	7.25 ..	50,375 76 ..	In addition to the expenditure incurred in 1871
Morawaka road ..	9.39 ..	21,778 22 ..	do.
Causeway between Taladi and Mannar ..	— ..	7,741 69 ..	Work superintended by Government Agent, Northern Province
Road from Puliyantivu to the bar ..	— ..	999 21 ..	Work superintended by road Committee, Eastern Province
Nitre Cave road ..	— ..	507 55 ..	Tavalam road in charge of Road Committee
Compensation, Dotale road ..	— ..	250 0 ..	—
Compensation, Polgahawela road ..	— ..	120 0 ..	—
Widening Nawalapitiya and Tispane road ..	7.72 ..	23,424 76 ..	—
Metalling 6 miles of the Badulla and Batticaloa road ..	6 ..	29,403 36 ..	—
Improvement, Kegalla and Polgahawela road ..	7.75 ..	20,387 79 ..	Improving and gravelling
Improvement, Deltota road ..	— ..	5,749 41 ..	Improvement of about 9 miles
Improvement, Pupuressa road ..	— ..	11,874 93 ..	Re-metalling 6 miles
Restoring Racket Court road ..	— ..	9,944 55 ..	—
Metalling Naula and Gurukandura road ..	— ..	6,681 10 ..	—
Improvement, Ratnapura road ..	— ..	1,169 26 ..	—
Improvement Coast road between Toppu and Chilaw ..	— ..	400 0 ..	—
Sundry works of additions and improvements to existing roads ..	— ..	29,194 79 ..	—
Total ..		338,747 54	

Mr. Mosse writes regarding the Badulla and Batticaloa road :—

With the exception of the large bridge over the Maha-oya, this road 100 miles in length, commenced in 1867, is now nearly completed. Each portion has been opened for traffic from time to time, as soon as finished ; and during the past year 96 miles have been repaired on upkeep. The road is really a fine one, much superior to the ordinary roads in the Colony. Owing to a number of circumstances, of which the chief were the want of proper surveys, the scarcity of labour, and the unhealthiness of the district, the cost has considerably exceeded the original estimates ; but the total expenditure has been approximately as follows :—

	Rs.	Average per Mile. Rs.
Earthwork and foundation ..	540,997 ..	5,409
Gravelling 100 miles ..	259,997 ..	2,600
Bridges and Masonry ..	500,296 ..	5,003
Total ..	1,301,290	13,012

equal to Rs. 13,012 per mile of road, a sum not high considering its character and the difficulties under which it has been constructed.

The following was the expenditure on new bridges :—

	Rs.	c.
Digarolla bridge	5,919	69
Gintara bridge	77,804	74
Seven bridges on the Badulla and Batticaloa road	147,466	33
Ambalantota bridge	2,342	99
Total ..	233,533	75

Mr. C. P. Layard, Government Agent of the Western Province, writes :—

The most memorable event of the year 1872 is the flood which occurred between the 9th and 13th days of September last, and which (though at the latter date, when it rose to 11 feet and 11 inches above the ordinary level of the Kelani-ganga, it did not reach the height at Colombo of the floods of 1828, 1834, and 1837) was certainly the most destructive on record.

Mr. E. N. Atherton, Assistant Government Agent, Ratnapura, writes :—

One thousand Eight hundred and Seventy-two will be long remembered as the year of the disastrous flood, which devastated a large part of the district of Ratnapura. The scene on the morning of the 9th September last was dreadful; the river had risen in a few hours to the height of 40 feet, overflowed its banks, and inundated the country far and wide. So sudden was the occurrence that the people had to fly for their lives, leaving their property and even their clothing to the mercy of the current.

With difficulty, and the offer of a large reward, I succeeded in securing the services of few boatmen to ferry me over to the fort. Some idea of the extent of the flood may be formed when I state that, with the exception of a few houses, the whole town was submerged, and I had to paddle over the roofs of buildings on my way thither.

The fort was literally crowded with men, women, and children, huddled together, shivering with cold and fright. As they were without cover or food, I at once threw open the public buildings for their accommodation, and ordered the distribution of food to all who had need.

Mr. J. Parsons, Government Agent, Central Province, writes :—

The following statement shows the provision made in the Supply Bill for 1872 for the extension and upkeep of roads under the Grant-in-Aid Ordinance :—

Roads under the Grant-in-Aid Ordinance.	No. of Estimate.	Length. in Miles.	Government Moiety. Rs.	Amount of Toll Rents. Rs.	Private Contribution. Rs.
Craige Lea to Kottagaloya, Dimbula ..	181 ..	— ..	18,162 ..	— ..	18,162
Dimbula extension, Tillicoultry to Diyanillakandura ..	183 ..	— ..	12,348½ ..	— ..	12,348½
Dikoya extension, Glencairn to Elbedda ..	— ..	— ..	33,034 ..	— ..	33,034
Upkeep, Dimbula road ..	135 ..	19½ ..	7,750 ..	3,200 ..	4,550
Do. do. (supplementary Estimate)	— ..	— ..	2,000 ..	— ..	2,000
Do. Dikoya road ..	136 ..	17¼ ..	7,331 ..	— ..	7,331
Do. do. (supplementary Estimate)	— ..	— ..	1,000 ..	— ..	1,000
Do. Pundalu-oya road ..	137 ..	9¼ ..	3,770 ..	550 ..	3,220
Do. Pupuressa road ..	138 ..	9½ ..	3,350 ..	500 ..	2,350
Do. do. (supplementary Estimate)	— ..	— ..	5,940 ..	— ..	5,940

Roads under the Grant-in-Aid Ordinance.	No. of Estimate.	Length in Miles.	Government Moiety. Rs.	Amount of Toll Rents. Rs.	Private Contribution. Rs.
Upkeep, Dotale road ..	139 ..	10 $\frac{1}{4}$..	9,350 ..	— ..	9,350
Do. do. (supplementary Estimate)	— ..	— ..	350 ..	— ..	350
Do. Kelebokka to Kabaragala ..	140 ..	3 $\frac{1}{4}$..	810 ..	— ..	810
Do. Madulkele to Bambarella ..	141 ..	7 $\frac{3}{4}$..	3,332 ..	— ..	3,332
Do. Lemastota road ..	142 ..	8 ..	4,800 ..	2,300 ..	2,500
Do. Deltota road ..	143 ..	19 ..	6,550 ..	5,750 ..	900
Do. do. (supplementary Estimate)	— ..	— ..	6,609 ..	— ..	6,609
Bridge over the Kotmale-oya at Belgravia ..	190 ..	— ..	12,436 ..	— ..	12,436

The extension of the Dimbula road was opened for wheel traffic to Diyanillakandura by the end of the year. The bridging of the Kotmale-oya at Belgravia, the Government contribution to which was provided for in the Supply Bill for 1871, had unfortunately to be deferred till this year, owing to the delay on the part of certain estates in paying up their contributions. An important Ordinance, No. 4 of 1873, was passed in the last Session of the Legislative Council, to enforce more prompt payment of these contributions. The further extension of the Dimbula road as far as Caledonia Gap has been sanctioned.

The extension of the Dikoya road has also been progressing most satisfactorily. By December 31 last it was completed to Glencairn; and its extension as far as Elbedda towards Bagawantalawa has been sanctioned, with every prospect of its being continued to the other side of the Tientsin estate. A branch road from the main Dikoya road to open up the Maskeliya valley has been sanctioned. It will strike off at the point where the road crosses the Hamban-oya in Norwood estate, and be carried up to the Blair Athol Gap, whence a road will have ultimately to be made at least as far as the Brownlow estate.

1873. The expenditure of the Department was Rs. 3,178,424, being Rs. 195,199 in excess of that of the previous year, or an increase of 6.54 per cent.

The expenditure in each Province, including the cost of Establishment, was—

	1873. Rs.	1872. Rs.	Increase. Rs.	Decrease. Rs.
Western Province ..	811,628 ..	798,543 ..	13,084 ..	—
North-Western Province ..	257,410 ..	228,562 ..	28,847 ..	—
Southern Province ..	447,566 ..	458,548 ..	— ..	10,982
Eastern Province ..	354,835 ..	464,378 ..	— ..	109,542
Northern Province ..	231,379 ..	168,982 ..	62,396 ..	—
Central Province ..	1,075,605 ..	864,209 ..	211,395 ..	—
Total ..	3,178,424	2,983,224	315,724	120,524

The mileage of road maintained was—

	Miles.
Metalled ..	831.67
Gravelled ..	536.23
Natural ..	890.00
Total ..	2,257.90

the average expenditure per mile being Rs. 583.89.

Under heading New Works and Buildings, some of the more important were—

	Rs.	c.
New Jails at Badulla, Batticaloa, Puttalam, Nuwara Eliya, Welikada, Point Pedro, Jaffna, and Negombo	74,982	87
New Hospitals at Galle, Puttalam, and Mahaiyawa, Kandy ..	45,950	49
Medical Officers' quarters, Galle, and Medical Students' quarters, Colombo	11,256	19
Purchase of a house at Galle for a school	15,000	0
Purchase of a house at Nuwara Eliya for use as Queen's House, and for certain improvements	31,943	19
Opening second entrance to Galle Fort	10,670	20
Operations in connection with Galle Harbour	10,930	40
Export and import Jetties at Galle	17,164	13
Hospital buildings, &c., in connection with cooly immigration ..	23,597	63

Under heading New Roads and Additions to Roads the following works were carried out :—

Roads.	Miles.	Amount. Rs. c.	Remarks.
Dimbula road extension (proper) ..	2·85	7,647 20	Expenditure in 1872 was Rs. 21,800·62. Work not completed
Dikoya road (proper) ..	7·30	46,052 36	Do. Rs. 25,302·98 do.
Extension of Cheneyastreet, Jaffna ..	·20	2,885 7	For raising, forming, and metalling
Road from Mullaittivu to Central road ..	1·00	2,677 76	—
Road, Cinnamon Gardens, Colombo ..	—	5,846 50	—
Dimbula road to Kotagaloya ..	2·07	19,895 99	Expenditure in 1872 Rs. 16,260·89
Causeway between Taladi and Mannar ..	—	2,999 81	Work superintended by Headman, Northern Province
Lemastota road towards Wellawaya ..	6·00	201 70	Just commenced
Dikoya and Maskeliya road ..	4·18	14,982 92	—
Improvement, Deltota road ..	—	7,461 78	—
Do. Pupuressa road ..	—	11,986 42	Metalling 4·8 miles
Do. Kotmale, road ..	—	2,816 70	For widening road, extending culverts, &c.
Do. Pelmadulla and Gurukandura road ..	—	2,932 79	For forming stone depôts
Do. Dikwella and Gurukandura road ..	—	2,977 86	Rounding off corners, widening culverts, &c.
Do. Badulla and Batticaloa road ..	—	28,446 47	Metalling 6½ miles
Rebuilding culverts, Kotte road ..	—	3,134 52	—
Rebuilding culverts, Urugodawatta road ..	—	3,009 7	—
Forming Pachewalaikaratero road ..	·56	1,738 4	—
Improvement, Dotale road ..	—	7,485 77	Substituted three bridges for three Irish fords and inserting more culverts
Do. Gampola and Nuwara Eliya road ..	—	7,416 51	Building parapet walls, widening road and culverts, and metalling

Roads.	Miles.	Amount. Rs. c.	Remarks.
Improvement, Matale and Habarana road	— ..	17,698 28 ..	Building culverts, and metalling 4½ miles of road
Do. Habarana and Trinco road	9.25 ..	26,921 74 ..	Work not completed
Do. Central road, Jaffna	.. 4.14 ..	31,998 31 ..	Forming and gravelling and providing bridges
Do. Nuwara Eliya and Badulla road	.. — ..	759 75 ..	For widening and partly diverting 3 miles of road, and for building parapet and retaining walls, and for widening road and culverts. Work just commenced.
Do. Dikwella road towards Haputale	.. — ..	3,574 41 ..	Widening and metalling portions widened, and for building parapet and retaining walls. Work just commenced.
Road from east to west end of Railway Yard, Kandy	— ..	2,206 89 ..	—
Rebuilding retaining wall, Ratnapura	.. — ..	2,329 26 ..	—
Improvement, Kegalla and Polgahawela road	.. — ..	4,464 83 ..	—
Opening trace from Vane-keni to Panichankeni	.. — ..	989 15 ..	—
Works of additions and improvements to existing roads, and for sundry small works	.. — ..	26,308 37 ..	—
Total	..	299,846 23	

New Bridges.

The following was the expenditure under this heading :—

	Rs. c.
Malwatu-oya and Manel-aar on the Central road, Jaffna	.. 25,768 69
Gal-oya on the Trincomalee road	.. 28,390 73
Belgravia bridge	.. 24,060 59
Gintara bridge	.. 8,310 17
Pallevayal, Kulampitiya-oya, Mundini-aar, and Maha-oya bridges on the Badulla and Batticaloa road	.. 69,947 28
Bridge on the Negombo road	.. 9,221 50
Bridge on the Kandy road	.. 7,520 20
Welimada and Moratota bridges on the Nuwara Eliya and Badulla road	.. 5,482 27
Kahawatura-oya bridge on the Ambagamuwa road	.. 8,427 68
Talakolahena bridges	.. 14,665 55
Pussellawa bridge	.. 7,266 68
Total	.. 209,061 34

The following important Irrigation works were in progress during the year :—

	Rs.	c.
Restoration of Chadiyantawala tank ..	31,223	1
Ambara extension ..	12,761	16
Pulukanawa tank ..	13,092	15
Sagamatukulam ..	12,530	71
Elawela tank and channels ..	51,773	43
Udukiriwila tank ..	23,017	59
Tissamaharama tank ..	10,449	46
Channel from Hali-ela to Urapola ..	10,041	0
Restoration of Magalawewa ..	13,754	84

Mr. Mosse writes :—

The small proportion which salaries in this Department bear to the expenditure has frequently been alluded to in previous Administration Reports. This proportion during the past year was 9·84 per cent., a ratio which, considering the distances travelled by officers and the nature of their duties, must still be held “insufficient for proper supervision.”

Having in the Administration Reports for 1871 and 1872 alluded to the condition of the staff and to the changes which, in my opinion, were essential for the present requirements of the Department, I need only add that the experience of each year fully confirms the views previously expressed.

After a good deal of correspondence, His Excellency the Governor, on November 26 last, was pleased to submit to the Legislative Council a memorandum on the Department, proposing that in future it shall be recruited by men who have served for three years under a member of the Institution of Civil Engineers, and have passed an examination previous to their appointment.

His Excellency's memorandum also provides for an addition to some of the existing salaries of the superintending officers.

This scheme having, early in the present year (1874), been approved by the Secretary of State, will now come into force, and four Engineers from England are shortly expected.

There can be no doubt that this is the first step necessary to increase the efficiency of the Department, and that it will bear satisfactory results eventually. I should, however, remark—

1st.—That owing to the number of officers (63) at present in the Department, and the slow promotion which takes place, it will be several years before the changes now introduced will produce their full benefit.

2nd.—That I fear, considering the demand for English Engineers which exists in India, in the Colonies, and in North and South America, where generally salaries are much higher than in Ceylon, that the rates at present fixed, and the chances of promotion in this Department, will not be found sufficient to procure the class of men which it is so desirable to obtain.

3rd.—That on account of the salaries now named it is only possible to insist on a professional training of three years, instead of one of four years, as at first proposed.

I take this opportunity of expressing the opinion that further improvements beyond those now introduced into the Public Works Department will be found necessary to place it in a satisfactory state of efficiency.

It is not merely that the salaries of officers of this Department average only Rs. 4,010 per annum, whereas the salaries of officers in the ordinary Civil Service of the Colony average about 6,900, but the latter have much greater chances of promotion than the former, not only from the number of high-paid officers, but also from the numerous changes constantly arising from acting appointments.

The best men will naturally seek the best market, and the Public Works Department cannot hope to obtain them unless it offer advantages equal to those common to other branches of the Public Service.

Central Province.

The following statement shows the provision made in the Supply Bill for 1873 for the extension and upkeep of roads under the Grant-in-Aid Ordinance :—

Roads under the Branch Roads Ordinance, 1866.	No. of Esti- mate.	Length. of Road. Miles.	Government Moiety. Rs. c.	Toll Rents. Rs. c.	Private Contribution. Rs. c.
Upkeep of Deltota road	121	19·00	6,500 0	6,250 0	250 0
Do. Dimbula road	113	20·50	20,660 29	600 0	14,660 29
Do. Dimbula road (supplemen- tary esti- mate, 1872)	—	—	621 0	—	621 0
Do. Dimbula road (supplemen- tary esti- mate, 1873)	—	—	5,000 0	—	5,000 0
Upkeep and improvement of Pupuressa road	116	10·00	9,100 0	750 0	8,350 0
Upkeep of Pundalu-oya road	115	9·25	6,479 0	1,100 0	5,379 0
Do. Lemastota road	120	8·00	5,850 0	2,400 0	3,450 0
Do. Dikoya road	114	20·25	13,142 50	1,613 41	11,529 9
Upkeep and improvement to Dotale road	117	10·25	10,702 0	—	10,702 0
Upkeep of Kelebokka road to Kabaragala	118	3·25	1,000 0	—	1,000 0
Do. Madulkele to Bambaraela	119	7·75	3,332	—	3,332 0
Do. Craigie Lea and Kotagaloya road	122	2·07	828 0	—	828 0
Extension of Dikoya and Maskeliya road from Ireby to Blair Athol Gap	189	4·50	37,064 0	—	37,064 0
Extension of Dimbula road from Diyanellakandura to Caledonia estate	190	2·00	19,974 0	—	19,974 0
Repair of Daluk-oya bridge on the Knuckles road	852	—	1,372 0	—	1,372 0
Supplementary estimate to meet over-expenditure on estimate No. 183 of 1872, for the extension of the Dimbula road between Tillicoultry and Diyanellakandura	—	—	477 60	—	477 60
Extension of Dikoya road from Elbedda to Tientsin	—	4·00	41,895 50	—	41,895 50
Supplementary estimate for completing the ex- tension of the Dikoya road from Glencairn to Elbedda	622	—	1,164 0	—	1,164 0
Total	..	121·82	185,161 89	12,713 41	167,048 48

1874. The expenditure during the year was Rs. 3,614,815, being Rs. 436,391 in excess of that of the previous year, or an increase of 13·72 per cent.

The expenditure in each Province, including cost of Establishment, was—

	1874. Rs.	1873. Rs.	Increase. Rs.	Decrease. Rs.
Western Province ..	1,089,119	811,628	277,491	—
North-Western Province ..	191,198	257,410	—	66,212
Southern Province ..	454,525	447,567	6,959	—
Eastern Province ..	279,641	354,835	—	75,194
Northern Province ..	293,607	231,379	62,228	—
North-Central Province ..	91,179	—	91,179	—
Central Province ..	1,215,546	1,075,605	139,941	—
Total ..	3,614,816	3,178,424	577,798	141,406

In 1873 the North-Central Province was created, and Mr. R. K. MacBride appointed first Provincial Assistant.

The mileage of road maintained was—

	Miles.
Metalled ..	905·92
Gravelled ..	529·22
Natural ..	922·25
Total ..	2,357·39

The average expenditure per mile was Rs. 589·34.

Under New Works and Buildings the principal works carried out were—

	Rs.	c.
For erecting a Museum, Colombo ..	83,470	53
For erecting Custom-house, Colombo ..	53,741	87
For erecting a house for the Assistant Agent, Badulla ..	21,148	25
For hospital buildings and Medical Officers' quarters in connection with cooly immigration ..	19,129	62
For new Jails at Badulla, Puttalam, Batticaloa, Nuwara Eliya, lock-up at Haldummulla and Avissawella, Welikada Block A ..	35,270	74
For powder magazine and guardroom, Galle ..	11,030	85
For buildings for the Police ..	10,356	90
For operations in connection with Galle Harbour ..	20,799	13
For hospitals at Batticaloa and Galle, and Medical Officers' quarters at Hambantota, Kurunegala, Puttalam, Ratnapura, and Galle ..	18,489	32
For boundary walls, Mahaiyawa cemetery; burial ground, Dadalla, Galle; and from the well at the Government Agent's house to steps leading to the Agent's bungalow, Kandy ..	15,442	27

Under New Roads and Additions to Roads the following was the expenditure for the year:—

	Miles.	Rs.	c.
Dikoya and Maskeliya road, from the bridge at Ireby to Blair Athol Gap ..	4·18	48,848	38
Dimbula road, from Deyanellakandura to Caledonia estate ..	1·87	31,591	33
Dikoya road extension, from Elbedda to Tientsin ..	4·93	32,008	76
Cinnamon Garden road ..	—	5,810	0
Causeway from Taladi to Mannar ..	—	3,000	0
Dimbula road to Craigie Lea ..	2·07	891	81
Dimbula extension from Deyanellakandura to Agra-patanas ..	3·60	13,209	35
Lorne road ..	5·85	43,724	1
Walaha road ..	1·91	23,924	0
Dikoya and Maskeliya road to Brownlow ..	2·75	18,378	14
Road from Oodumaden to Vellendi ..	·73	10,663	89
Road from Kankesanturai to Tondamannar ..	6·00	12,069	56
Approach road to Railway Station, Gampola ..	·25	2,600	0
Minor roads in the Northern Province ..	—	11,222	56
Minor roads in the North-Western Province ..	—	2,725	65

	Miles.	Rs.	c.
Gravelling 3 miles, Maturankuli road	.. — ..	14,966	79
Metalling 6 miles, Badulla and Batticaloa road	.. — ..	27,670	3
Improvements, Dambulla and Habarana road	.. — ..	10,484	31
Do. Habarana and Trincomalee road	.. — ..	47,123	52
Do. Central road	.. — ..	52,078	13
Do. Galkulam and Anuradhapura road	.. — ..	1,990	33
Do. Ratnapura and Pelmadulla road	.. — ..	4,871	80
Do. Kurunegala and Beligamuwa road	.. — ..	4,399	64
Do. Pelmadulla and Gurukandura road	.. — ..	5,957	97
Do. Dikwella and Gurukandura	.. — ..	3,416	30
For completing widening of the Point Pedro road	.. — ..	2,995	16
For improvements, Dimbula road	.. — ..	7,921	55
Do. Nawalapitiya road	.. — ..	4,999	15
Do. Panwila road	.. — ..	9,426	52
Do. Kotmale road	.. — ..	4,745	15
Do. Galle and Morawaka road	.. — ..	26,020	8
Do. Nilaweli to Irrakakanda	.. — ..	2,582	19
Do. Kurunegala to Giriulla	.. — ..	5,498	69
Do. Matara to Hakmana	.. — ..	5,000	0
Do. new trace of the Central road	.. — ..	9,419	73
For building retaining wall, new Batticaloa road	.. — ..	1,048	61
For re-opening an ela at Bandarawela	.. — ..	1,797	24
For improvements, Gampola and Nuwara Eliya road	.. — ..	2,512	59
Do. Matale and Dambulla road	.. — ..	2,291	77
Do. Lake road, Kandy	.. — ..	2,261	0
Do. Nuwara Eliya and Badulla road	.. — ..	8,349	0
Do. Dikwella road towards Haputale	.. — ..	20,386	6
For restoring damages caused by accident to the Kotagal-oya bridge approach	.. — ..	4,895	4
For works of additions and improvements to existing roads, and for sundry small works	.. — ..	46,770	87
Total	..	602,546	66

Under New Bridges the following works were carried out :—

	Rs.	c.
Welimada and Moratota bridges on the Nuwara Eliya and Badulla road	7,248	31
Kahawatura-oya bridge on the Ambagamuwa road	1,876	59
Talakolahena bridge	3,089	94
Bridges on the Kandy road on the 5th and 8th miles	19,938	98
Bridge on the 5th mile, Negombo road	14,893	4
Kalkandomedu, Malwatu-oya, and Manal-arua bridges on the Central road	40,545	20
Gal-oya and Alut-oya on the Kandy and Trincomalee road	52,209	32
Maha-oya bridge on the new Batticaloa road	4,144	47
Bridge over the river at Kananke on the Galle and Morawaka road	52,831	61
Bridge at Chilaw	4,107	70
Bridges in the town of Nuwara Eliya	8,161	29
Bridge over the river at Kalutara	1,648	40
Total	210,694	85

Under Irrigation, on the more important works the following expenditure was incurred :—

	Rs.	c.
Kantalai tank and channel	31,867	6
Ellavella tank	13,357	57
Tissamaharama tank	21,783	35
Petre anicut	12,947	18
Channel from Hali-ela to Urapola	9,736	80
Alawatugoda anicut	11,568	86
Bassawakulam	19,591	14
Maha Madawachchiya tank	11,762	53



S. G. O.

R. D. ORMSBY, H. A. EVATT
(Standing)
H. W. HAWKES, E. VENNING, E. HOLLAND
H. E. H. HAYES, H. B. CHRISTIE, A. FISHER.

Mr. Mosse writes :—

The proportion which salaries bore to the expenditure of the Department during 1874 was even lower than the usual rate, being slightly under eight per cent.—a figure which shows, considering the numerous small works undertaken, that the supervision could be increased with advantage.

The experience of another year has confirmed the views expressed as to the staff of this Department in the Administration Report for 1873.

Of the four additional officers expected from England, and alluded to in paragraph 11 of that report, two arrived here in July last ; the two others did not reach Ceylon until early in 1875.

This delay arose from the difficulty of finding professionally trained men willing to come to Ceylon for the salary of Rs. 3,000 offered.

While India and other Colonies offer higher remuneration, engineers will naturally go there, and I think it will be found impossible to obtain for a salary commencing at less than Rs. 4,000 per annum the class of men required in Ceylon.

In accordance with the memorandum laid by His Excellency before the Legislative Council on November 26, 1873, an examination of officers of this Department, eligible for promotion, took place in September last, on papers prepared by the Acting Surveyor-General, the Acting Director of Public Instruction, and the Irrigation Assistant.

The under-mentioned officers having passed satisfactorily were promoted as follows :—

Senior Class.

Mr. Murray to be Second Financial Assistant, Rs. 4,000.

Mr Ormsby to a salary of Rs. 4,500.

Mr. Christopher

Mr. Holland

Mr. Venning

} to a salary of Rs. 3,500.

Junior Class.

Mr. MacGregor

Mr. Potger

Mr. Christie

} to a salary of Rs. 3,000.

On September 1 last the Provincial Assistant, Central Province, Mr. Evatt, retired on pension after a service of thirty-two years. The records of this office bear testimony to the ability, zeal, and integrity with which, during this long period, Mr. Evatt served the Department, and show that a more honourable, worthy man never entered the Public Service.

I allude with much regret to the following deaths :—

Mr. E. FULLER : This officer, who was in England on sick leave, served as Superintending Officer from December, 1866, until June, 1874, and discharged his duties in a very satisfactory and zealous manner.

Mr. HORSFALL : This officer was a young man of much promise, well educated, and one likely to rise to the highest rank in the Department. For some months he had been in poor health, suffering from depression and fever, to the effects of which he finally succumbed.

I regret having again to allude to the death of three elephants belonging to the Department, and to the difficulty which is still found in replacing them. It appears that the class of large elephants which formerly were so valuable to the Department no longer exists in Ceylon, and that they can only be replaced by a smaller class of animals caught young and trained at great expense.

It will be seen that the increase in the number of miles of metalled road maintained in 1874, as compared with 1873, was $74\frac{1}{4}$, and that the average expenditure per mile on principal roads was Rs. 589.34 in 1874, as compared with Rs. 583.89 in 1873, the increase being Rs. 5.45 per mile.

During the past year the roads in the Colony generally have been kept in good repair, and no complaints, I believe, were made against them.

Every effort has been made to reduce, as far as is consistent with efficiency, the cost of upkeep; but with the increasing traffic on many of the roads no reduction is possible, and for the reasons given in the Administration Report for last year the cost of upkeep will doubtless remain apparently high.

Of the new roads undertaken in 1874, only the following call for special remark:—

Dikoya and Maskeliya road, from Ireby bridge to Blair Athol Gap, a work of much importance, was completed on December 31, 1874.

Dimbula road, from Deyanella to Caledonia estate, was completed on October 31, 1874.

Dikoya road, from Elbedda to Tientsin. This work is well advanced, and will probably be completed by the end of 1875.

For the coffee interests the extension of the road from Blair Athol Gap to Brownlow estate is of importance, and about 30 per cent. of its cost was expended during last year.

Similar remarks apply to the road from Belgravia to Lorne and to the Walaha road, both of which have made good progress during 1874.

The gradual improvements of the Central and Trincomalee roads from Dambulla should not be omitted, nor the metalling of 6 miles of the road from Badulla to Batticaloa.

In the Southern Province the road from Galle to Morawaka has also been improved, at a cost of Rs. 26,020.

Of the new bridges, I need only allude to the following:—

Those on the 5th and 8th miles on the Kandy road, and on 5th mile on the Negombo road (two and four spans of 30 feet each, respectively) are of brick abutments and piers, with five plate iron girders carrying the buckled plates which support the roadway. These bridges were recommended by the Flood Commission of 1872.

The bridges over the Kalkandumedu, Malwatu-oya, and Manal-arua are of substantial masonry, carrying wrought iron superstructures of about 60 feet span each.

The bridge over the Gal-oya on the Trincomalee road consists of two Brotherhood's iron bridges, 150 feet span each, resting on masonry abutments and pier. This masonry is remarkably good, and would be creditable in any country.

The Alut-oya bridge consists of masonry abutments with one span of 100 feet iron lattice girder.

The bridge over the Kananke river on the Galle and Morawaka road is of masonry abutments, carrying a Brotherhood iron bridge of 150 feet span.

All these bridges are substantial and creditable to the Department, the masonry in some cases being very superior.

The following statement shows the provision proposed for the extension and upkeep of roads under the Grant-in-Aid Ordinance for 1874 in the Central Province:—

Upkeep and Repair.	No. of Estimate.	Length. of Roads. Miles.	Government		Toll		Private	
			Moiety.	Rs. c.	Rents.	Rs. c.	Contribution.	Rs. c.
Dimbula road	.. 137..	21·98..	31,667	0..	9,000..	22,667	0	
Dikoya road	.. 138..	20·25..	21,125	0..	—	21,125	0	
Pundalu-oya road	.. 139..	9·25..	4,469	0..	800..	3,669	0	
Pupuressa road	.. 140..	10·00..	3,750	0..	750..	3,000	0	
Dotale road	.. 141..	10·25..	7,851	0..	—	7,851	0	
Road between Kelebokka and Kabaragalla	.. 142..	3·25..	1,000	0..	—	1,000	0	
Madulkele to Bambra-ela	143..	7·75..	4,094	50..	—	4,094	50	
Haldummulla and Lemastota	.. 144..	8·00..	7,800	0..	2,410..	5,390	0	
Deltota road	.. 145..	19·00..	7,125	0..	5,000..	2,125	0	

Upkeep and Repair.	No. of Estimate.	Length of Roads Miles.	Government Moiety.		Toll Rents		Private Contributions.	
			Rs.	c.	Rs.	c.	Rs.	c.
Kotagaloya road ..	146..	2·07..	1,035	0..	—	..	1,035	0
Belgravia Bridge road ..	147..	0·27..	135	0..	—	..	135	0
For completing the road from Craigie Lea to Kotagaloya ..	426..	2·00..	450	0..	—	..	450	0
Culverts, Deltota road ..	— ..	— ..	129	0..	—	..	129	0
Supplementary estimates, upkeep and repair, Dimbula road ..	— ..	— ..	3,518	0..	—	..	3,518	0
Do. Dikoya road ..	— ..	— ..	2,553	0..	—	..	2,553	0
Total ..		114·07	96,701	50	17,960		78,741	50

The expenditure of the Department during the year was 1875. Rs. 4,238,862, being Rs. 624,046 in excess of that of the previous year or an increase of 17·26 per cent.

The expenditure in each Province, including the cost of Establishment, was—

	1875. Rs.	1874. Rs.	Increase. Rs.	Decrease. Rs.
Western Province ..	1,375,231	1,089,119	286,112	—
North-Western Province ..	236,478	191,198	45,280	—
Southern Province ..	367,643	454,525	—	86,881
Eastern Province ..	289,762	279,641	10,121	—
Northern Province ..	341,324	293,607	47,717	—
North-Central Province ..	280,547	91,179	189,368	—
Central Province ..	1,347,877	1,215,546	132,331	—
Total ..	4,238,863	3,614,816	710,928	86,881

Mileage of road in charge of the Department during the year was—

	Miles.
Metalled ..	955·40
Gravelled ..	537·38
Natural ..	885·40
Total ..	2,378·18

The average cost of upkeep per mile was Rs. 584·73.

Under heading New Works and Buildings some of the more important works carried out were—

	Rs.	c.
For Medical Officers' quarters, Hambantota, Kurunegala, Puttalam, Batticaloa, Gampola, and Ratnapura ..	28,877	96
For new Jail at Kandy ..	20,898	20
For new Custom-house and for fitting gas pipes, almirahs, and flagstaffs, &c. ..	60,224	59
For Museum, and for fitting a portion of the building with gas piping ..	36,093	72
For new works and buildings connected with the Customs premises, Colombo ..	52,428	1
For schools at Peradeniya, Kadugannawa, Ratnapura, and Puttalam ..	11,505	62
For upstairs house for Assistant Government Agent, Anuradhapura ..	10,935	96
For hospital at Batticaloa ..	5,147	11
For Jailers' houses at Anuradhapura, Ratnapura, Matara, Kurunegala, and Batticaloa ..	8,019	19
For new office for the Surveyor-General, Colombo ..	25,672	0
For rebuilding landing jetty at Galle ..	10,608	78
For residences for the subordinate officers of the Anuradhapura Kachcheri ..	6,942	39
For a medical lecture room, Colombo ..	7,200	0
For Galle harbour works ..	8,454	48
For Police Stations ..	6,048	31

Under heading New Roads and Additions to Roads the following expenditure was incurred—

	Miles.	Rs.	c.
Dimbula road extension from Deyanilakandura to Caledonia ..	1·87..	8,610	0
Dikoya road extension, from Elbedda to Tientsin ..	4·93..	29,766	56
Road from Kankesanturai to Tondamannar ..	6·00..	879	93
Dimbula road extension, from Caledonia to Agrapatanas ..	3·60..	43,740	65
Lorne road ..	5·85..	50,470	61
Walaha road ..	1·91..	18,696	24
Uda Pussellawa road ..	4·07..	59,085	27
Dikoya-Maskeliya road to Brownlow ..	2·75..	35,992	19
Approach road to Gampola Railway Station ..	0·25..	4,000	0
Lemastota road extension ..	14·75..	85,105	36
Kannetteddi road ..	— ..	5,981	99
Rakwana road to Bulatota ..	9·31..	49,736	94
Dikoya and Maskeliya road to Cruden Gap ..	3·67..	57,001	17
Minor road from Wellepanna to plumbago diggings ..	10·00..	5,856	62
Road to western salt pans, Puttalam ..	— ..	5,103	53
Road from Kankesanturai to Matakal ..	6·00..	5,997	54
Road from Dean's bridge to junction of Kotte road ..	0·84..	3,821	44
Dikoya road extension to Cotteagala estate ..	2·41..	6,625	3
Lagalla tavalam road ..	16·00..	602	9
Road from Ferry street to Skinner's road ..	— ..	2,541	7
For opening out Kadewidiya, Matara ..	— ..	5,000	0
For minor roads in the Northern Province ..	— ..	3,838	17
For improvement of Central road to Jaffna ..	— ..	121,759	32
Do. Kandy-Trincomalee road ..	— ..	87,135	99½
Do. road from Mankulam to Mullaitivu ..	— ..	22,364	45
Do. Hambantota roads towards Wellawaya ..	— ..	32,276	72
For metalling 6½ miles of Badulla and Batticaloa road in Central Province ..	— ..	28,342	88
For metalling 3 miles of road in the Eastern Province ..	— ..	12,890	45
For sinking 7 wells on the road between Kalodai and Batticaloa ..	— ..	1,358	2
For improvement of road between Nuwara Eliya and 63 milestone ..	— ..	4,030	36
For improvement of road between Mi-oya and Trincomalee ..	— ..	14,844	56
For improvement of Battal-oya and Maturankuli road ..	— ..	14,939	47
Do. Gampola and Nuwara Eliya road ..	— ..	11,618	19½
Do. Ratnapura-Pelmadulla road ..	— ..	3,917	24
Do. Pelmadulla-Gurukandura road ..	— ..	5,921	99
For metalling 1 mile of road, north salt pans ..	— ..	3,261	21
For improving road round Fort salt stores, Puttalam ..	— ..	2,207	45
For improvement of Dikoya road ..	— ..	4,965	56
Do. Dimbula road ..	— ..	3,646	41
Do. Haragama and Bilihul-oya road ..	— ..	2,235	91½
Do. Dotale road ..	— ..	5,432	35
Do. North Coast road, Trincomalee District ..	— ..	1,850	79
Do. Lewaya road, Hambantota to facilitate removal of salt ..	— ..	3,498	0
For repairing damages, Urugodawatta road ..	— ..	6,859	9
For works of additions and improvements to existing roads and for sundry small works ..	— ..	40,284	14½
Total ..		924,092	97

New Bridges.

The following was the expenditure under this heading :—

	Rs.	c.
Bridge over the river at Kalutara ..	237,380	34
Manel-ar and Kalkandomedo bridge on the Central road ..	18,884	71
Kananke bridge on the Galle and Morawak korale road ..	7,614	97

	Rs.	c.
Bridge across the river at Chilaw ..	1,412	88
Bridge near Mr. McLaren's shop at Nuwara Eliya ..	1,219	71
Alut-oya, Gal-oya, and Paravy Panjan-aru bridges on the Kandy-Trincomalee road ..	10,150	6
Kal-aar bridge on the Mannar-Madawachchi road ..	30,349	45
Maha-oya bridge near Toppu ..	3,572	56
Bridge near Scandal Corner, Nuwara Eliya ..	4,867	68
Bridge over the Karakuruvi-aru, Batticaloa ..	2,998	15
Total ..	318,450	51

Mr. Mosse writes :—

The second examination of officers of this Department for promotion took place in July last, and the following officers passed and were promoted as follows :—

Senior Division.

Mr. Lynam—This officer is eligible for promotion on completing three years' service.

Mr. H. B. Christie promoted from Rs. 3,000 to Rs. 3,500.

Junior Division.

Mr. Hayes
Mr. Creasy
Mr. Elliott } Promoted from Rs. 2,360 to Rs. 3,000 per annum.

Mr. Fuller promoted from Rs. 2,500 to Rs. 3,000 per annum.

New Bridges.—Of the expenditure under this heading, I need allude chiefly to the Kalutara bridge, upon which Rs. 237,380 were expended in 1875.

At the spot where this bridge crosses the Kalu-ganga the river is about 1,800 feet in width.

Advantage being taken of an island in the river, the bridge, which consists of two abutments and six spans of 100 feet each, is in duplicate, with an embankment over the island between them.

The cylinder piers are formed of cast iron rings 6 feet in diameter, which when sunk to the solid rock will be filled with cement concrete, and the bridge work consists of rivetted lattice girder having a corrugated iron flooring, over which a cement roadway will be spread.

A single line of rails will also be laid down the centre of the bridge.

Much greater difficulty than was anticipated has been found in putting in the abutments and in sinking these cylinders.

A stratum of gravel which was thought to be solid proved on further examination to consist of a thin layer only, insufficient to support the structure ; and hence the necessity of passing through this gravel to the solid rock.

The rock has also proved even in a distance of 6 feet to be shelving, so that while one edge of the cylinders rested on rock, the opposite edge rested on soft material, which, of course, had to be removed until the cylinders rested equally all round, either on rock or on a solid stratum.

As these cylinders had to be sunk by divers, the operation has hitherto been slow and costly ; but it is hoped that the most troublesome cylinders have now been sunk, and that the others will involve less difficulty. If such prove to be the case, the bridge will probably be completed by July, 1877.

The bridges over the Gal-oya and the Alut-oya in the North-Central Province have been completed during 1875 ; as also one over the Kal-aar, on the Mannar and Madawachchi road in the Northern Province. For ordinary roads the bridges are heavy works, and the masonry is practically second to none that need be had, or can be found in any country.

Under heading Irrigation the following was the expenditure on more important works :—

	Rs.	c.
Tissamaharama tank	36,431	36
Denegama tank	22,439	11
Kanthalai tank	30,574	88½
Bassawakkulam tank	19,409	3
Maha Madawachchiya tank	12,724	21
Village sluices, Nuwarakalawiya district	18,291	50
For surveying lands benefited by restoration of irrigation works	11,984	45

Mr. Mosse concludes his report with the following remarks :—

As the works of the Colony and the requirements of the Department in undertaking them remain much as they were at the end of 1874, I need only repeat the remarks made in the Administration Report for that year, adding that, with an increasing number of works and increasing expenditure, *these wants become yearly more pressing* :—

1st.—Increased skilled supervision; more trained officers to meet cases of illness and emergencies.

2nd.—Increased salaries, so as to induce engineers to come to Ceylon instead of going elsewhere.

3rd.—The necessity of keeping up the Pioneer Force.

4th.—The advantage of undertaking departmentally all works of construction, and much more those of upkeep, in the manner found most advantageous in each case, rather than letting the whole work to a contractor.

Grant-in-Aid Roads, Central Province.

The following statement shows the provision proposed for the extension and upkeep of roads under the Grant-in-Aid Ordinance for 1875 :—

Roads.	No. of Estimate.	Length. of Road. Miles.	Government Moiety.		Toll Rents. Rs.	Private Contribution.	
			Rs.	c.		Rs.	c.
Dimbula road, upkeep ..	147..	21·98..	34,644	40..	—	33,651	60
Dikoya road, upkeep ..	148..	21·75..	23,195	46..	—	23,111	53
Pundalu-oya road, upkeep	149..	9·25..	3,806	66..	1,100..	2,030	84
Pupuressa road, upkeep.	150..	10·00..	3,755	14..	1,100..	2,644	86
Dotale road, upkeep ..	151..	10·25..	8,939	0..	—	8,939	0
Kelebokka to Kabragalla, upkeep ..	152..	3·25..	1,000	0..	—	1,000	0
Madulkele to Bambraela	153..	7·75..	4,393	36..	—	4,393	36
Haldummulla to Lemastota ..	154..	8·00..	7,650	0..	2,950..	4,700	0
Deltota road to Lemastota road, upkeep ..	155..	19·00..	7,155	0..	5,300..	1,855	0
Kotagal-oya road ..	156..	2·07..	1,200	0..	—	1,200	0
Approach to Belgravia bridge ..	157..	0·27..	165	0..	—	165	0
Maskeliya road, upkeep	158..	4·18..	2,508	0..	—	2,508	0
Extension, Maskeliya road from Glentilt estate to Cruden Gap .	229..	3·1186..	55,215	0..	—	55,215	0
Extension, Dikoya road, from Tientsin to Kotagal-oya ..	—	2¼·2867..	34,765	0..	—	34,765	0
Re-planking of the Nikapota bridge, Lemastota road ..	445..	—	3,225	0..	—	3,225	0
Re-planking of the Lemastota bridge ..	446..	—	2,185	0..	—	2,185	0

Mr. W. E. T. Sharpe, Assistant Government Agent, Badulla, writes :—

The Nuwara Eliya road under the contractors, and the Ratnapura road under the Public Works Department, were kept in excellent order, but the heavy rains in November and December gave much trouble. The roadway between Dikwella and Badulla suffered much, and is, while I write, in a very rough state. I trust that no time will be lost in widening this section, which in its present state is quite unequal to the enormous traffic thrown on it, that of both the Ratnapura and the Nuwara Eliya roads. The new Batticaloa road was kept in good order as far as it was metalled, but the lower portion became in the rainy months much cut up by the heavy traffic between Madulsima and Batticaloa. The metalling of the entire length to the boundary of the Province will, I trust, be pressed on as fast as possible. The Hambantota, Madulla, and Teldeniya roads were fairly kept up. The new grant-in-aid extension from Lemastota towards Wellawaya was pushed on with vigour, and reflects great credit on Mr. Campbell, the contractor.

The expenditure of the Department during the year was **1876.** Rs. 4,656,801, being Rs. 417,938 in excess of the previous year, or an increase of 9·85 per cent.

The expenditure in each Province, including Establishment, was—

	1876. Rs.	1875. Rs.	Increase. Rs.	Decrease. Rs.
Western Province ..	1,453,111 ..	1,375,231 ..	77,881 ..	—
North-Western Province..	288,663 ..	236,478 ..	52,185 ..	—
Southern Province ..	475,088 ..	367,644 ..	107,444 ..	—
Eastern Province ..	230,750 ..	289,762 ..	— ..	59,012
Northern Province ..	409,723 ..	341,324 ..	68,398 ..	—
North-Central Province..	371,471 ..	280,547 ..	90,924 ..	—
Central Province ..	1,427,995 ..	1,347,877 ..	80,118 ..	—
Total ..	4,656,801 ..	4,238,863 ..	476,950 ..	59,012

The mileage of roads maintained was—

	Miles.
Metalled ..	1,007·83
Gravelled ..	618·02
Natural ..	825·43
Total ..	2,451·28

The average cost per mile was Rs. 637·46.

Under heading New Works and Buildings the following were the more important undertaken :—

	Rs.	c.
For schools at Borella, Pettah, and Maradana ..	16,974	5
For Police Stations, Ramboda, Ratnapura, Negombo, Maskeliya, Belgravia, Matara, and Kew Barracks ..	17,583	61
New jail at Kandy ..	55,961	64
For new office for the Surveyor-General ..	40,321	6
For fountains at Matale and Gampola ..	10,329	26
For Government grant for erection of a Seamen's Home ..	10,000	0
For resthouses at Panichankulam, Kekirawa, Tiripane, and on the 10th mile, Central road ..	16,043	19
For new buildings at Welikada Jail ..	20,033	83
For new District Court, Kandy ..	10,965	37½

The following important buildings were completed in 1876 at the under-mentioned cost :—

	Rs.	c.
Post Office and quarters, Gampola	6,403	0
Surveyor-General's Office	65,993	6
A block of 32 cells, Welikada Jail	11,041	84
The Colombo Museum	119,993	93
The Custom House, Colombo	112,267	88
The Medical lecture room	11,984	92

The following important buildings were commenced in 1876 at the under-mentioned estimated cost :—

	Rs.	c.
Police Stations at Negombo, Ratnapura, and Matara	21,800	0
New jail, Kandy	365,365	0
Schools at Pettah, Maradana, and Ratnapura	15,656	83
Clerks' quarters, Vavuniyavilankulam	16,000	0
Assistant Agent's Quarters, Vavuniyavilankulam	16,000	0
Kachecheri at Vavuniyavilankulam	14,000	0
Superintending Officer's Quarters, Vavuniyavilankulam	6,400	0
Lock-up at Vavuniyavilankulam	8,950	0
House for Provincial Assistant, Anuradhapura	14,000	0
House for Assistant Government Agent, Kurunegala	7,559	0
District Court, Kandy	33,000	0
Grand Bazaar, Jaffna	18,000	0
Converting Elephant Pass resthouse into a jail	15,000	0

On New Roads and Additions to Roads the following was the expenditure :—

	Miles.	Rs.	c.
Lemastota road extension	14.75	141,961	96
Rakwana road to Bulutota	9.31	86,957	79
Dikoya-Maskeliya road to Blair Athol Gap	4.18	17,360	2
Dikoya road, Elbedda to Tientsin	4.93	17,027	70
Dimbula road to Agras	3.60	21	19
Lorne road	5.85	10,805	88
Walaha road	1.91	5,227	76
Uda Pussellawa road	4.07	19,280	23
Dikoya-Maskeliya road, Blair Athol to Brownlow	2.75	850	0
For improvement, Kandy-Trincomalee road	—	69,510	43½
For opening road from Mankulam to Mullaattivu	25.00	8,943	21
For improvement to the Central road to Jaffna	—	226,470	38
For improvement of road between Nuwara Eliya and 53rd milestone	—	462	83
For opening a minor road from Wellepenna to the plumbago diggings, Kalutara District	10.00	9,077	2
For improvement of road from Hambantota towards Wellawaya	—	58,494	54
For metalling the Urugodawatta road	—	12,754	27
For improvement of Puttalam-Trincomalee road	—	24,739	57
Do. Gampola-Nuwara Eliya road	—	532	2
Do. Haragama and Bilihuloya road	—	687	46
Do. road from Anuradhapura towards Kurunegala	—	819	15
For improving Lewaya road	—	1,500	0
For minor road from Topawewa to Mahagantota	—	1,228	86
For completing road through Moon Plains, Nuwara Eliya	—	2,053	85
For Lagalla tavalam road	—	4,198	99
For extending Dikoya road to Cotteagala estate	2.41	37,580	16
For Madampitiya road	1.70	38,134	19
Road to Kalkudah	6.25	9,756	32
For extending Galle Face path	—	8,372	29
For Uplands walk	—	7,375	17
For Dikoya-Maskeliya road to Cruden Gap	3.67	41,364	59½
For Dimbula road extension to Railway Gorge	3.04	26,663	36½
For Dikoya road from Wanarajah bridge to Castlereagh bridge	2.65	9,972	45



S. G. O.

THE COLOMBO MUSEUM
Designed by Mr. J. G. SMITHER
Built by Mr. F. VINE
1876

	Miles.	Rs.	c.
For road from Puliyantivu to Kalmunai ..	—	19,563	45
For road from Kankasanturai towards Matakal	3·00	7,828	5
For opening two streets in Matara ..	—	4,999	24
For metalling the Badulla and Batticaloa road	—	60,926	48½
For improvement of the Morawaka road ..	—	8,776	95
For widening road from Dikwella to Wilson's Bungalow ..	—	20,220	0
For improvement of road between Batala-oya and Maturankuli..	—	16,239	96
For improvement of Puttalam-Nikaweratiya road ..	—	3,847	25
For improvement of Toppu road ..	—	3,740	55
For deviation of a portion of Kemagoda-Hambantota road ..	—	2,356	29
For improving Maturata road, from Nuwara Eliya to junction with Moon Plains road ..	—	3,456	0
For improvement of road between Nuwara Eliya and the Horton Plains ..	—	1,413	50
For re-constructing a further portion of the Maturata road from foot of hill at new barracks to junction with Bazaar road, Nuwara Eliya ..	—	4,533	67
For improvement of the Dikoya road ..	—	4,431	85
For road from Nattandiya to Gregorywila ..	—	1,835	0
For works of additions and improvements to existing roads and for sundry small works ..	—	35,365	15½
Total ..		1,099,716	55½

On New Bridges the following amounts were expended :—

	Rs.	c.
Bridge over the Kalutara river ..	272,639	14
Alut-oya bridge ..	89	75
Kal-aar bridge on the Mannar-Madawachiya road ..	120	53
Bridges on the Mannar-Madawachiya road ..	31,996	41½
Maha-oya bridge, near Toppu..	20,054	35
Bridge at Ja-ela on the Negombo road ..	18,958	93
Kananke bridge ..	40	32
Malwatu-oya bridge, Central road ..	682	57
Deduru-oya bridge ..	3,782	48
Mi-oya bridge ..	4,320	19
Bridge on the new road to Mullaittivu ..	15,386	99
Naneri-oya bridge ..	12,716	64
Bridge at Gintota ..	13,374	74
Coopa-oya bridge ..	3,200	0
Bridge over the Nupe canal ..	8,099	95
For four iron buckled plate bridges over the Nanthekadel, near Mullaittivu..	1,579	44
For Horakellai bridge ..	515	68
Total ..	401,358	11½

Mr. Mosse writes :—

Of the new bridges in hand during the past year the most important are the following :—

	Estimated Cost.
	Rs.
Kalutara bridge ..	604,295
Deduru-oya bridge, one span of 150 feet ..	46,692
Mi-oya bridge, one span of 100 feet ..	44,347
Bridges on the new road to Mullaittivu ..	26,500
Naneri-oya bridge ..	21,736
Bridges on the Mannar-Madawachchi road ..	39,500
Bridge at Gintota ..	13,948
Coopa-oya bridge, Uda Pussellawa road ..	4,200
Horakellai bridge ..	8,674
Bridges over the Nanthekadal near Mullaittivu ..	17,600
Ja-ela bridge ..	22,870

By the end of last year the difficulties in sinking the cylinders of the Kalutara bridge were overcome, and in view of the destruction by floods of so many bridges in India, it is satisfactory to state that all the piers of the Kalutara bridge rest on the solid rock. This work will be completed by the date already named, the end of next month (July, 1877).

The class of masonry now put up by the pioneers, whether in dry stone culverts or in bridges in mortar, is very substantial; it will bear comparison with masonry in any other country; it is quite as good as is necessary; and any further expenditure would be merely ornamental.

Under Irrigation, the expenditure on the more important work was :—

	Rs.	c.
Denagama and Weangwewa	24,510	48
Tissamaharama	26,651	54
For sundry work to the Gangaboda pattu irrigation works ..	34,949	54
Village sluices and permanent kalingulas	31,642	45
Maha Uswewa tank	26,467	38

Mr. Mosse again writes :—

From the time occupied in recruiting the staff of the Department in England there would appear to be much difficulty in obtaining suitable men at the commencing salary (Rs. 3,000) provided. It has frequently been reported that while India and many other Colonies offer better inducements than Ceylon, suitably trained men are not likely to come here, and this remark applies especially to the Public Works Department of India, where the field being so much larger, and the salary of the junior officers commencing at Rs. 4,200 instead of Rs. 3,000 as here, both the remuneration obtained and the chances of promotion are there far greater than in this Colony.

Examination.—The third examination of officers in this Department for promotion took place on July 3 last, when the under-mentioned officers passed and were promoted as follows :—

Senior Division.

Mr. Finch, from Rs. 3,000 to Rs. 3,500.
 Mr. Fuller from Rs. 3,000 to Rs. 3,500.
 Mr. Harvey
 Mr. Hawkes
 Mr. Hayes

} Eligible for promotion on a vacancy.

Junior Division.

Mr. J. Johnstone, from Rs. 2,360 to Rs. 3,000.
 Mr. A. W. Taffs, from Rs. 2,360 to Rs. 3,000.
 Mr. R. Macpherson, from Rs. 2,360 to Rs. 3,000.
 Mr. Senanayaka, from Rs. 1,500 to Rs. 3,000.
 Mr. C. Koch, from Rs. 1,500 to Rs. 3,000.

Mr. Mosse concludes :—

I am compelled again to repeat the concluding remarks of the Administration Reports for the years 1874 to 1875 that no increased staff has been provided to meet the daily increasing works devolving upon the Department; that, without question, careful surveys and ample skilled supervision are true economy, and that for want of the latter many works are imperfectly executed and much extra expense is incurred.

I would repeat that skilled labour can command its value, and that experienced engineers will not join this Department for less remuneration than they can obtain elsewhere.

The experience of another year confirms the opinion already expressed that works either of construction or of upkeep are better done departmentally, in the manner most suitable to each case, rather than by large contracts.

The following statement shows provision made in the Supply Bill, 1876, for grant-in-aid roads, Central Province :—

Roads.	No. of Estimate.	Length. of Road.	Government Moiety.		Toll Rents. Rs.	Private Contribution.	
			Rs.	c.		Rs.	c.
Dimbula road, upkeep	166..	25·57..	38,965	80	—	35,234	20
Dikoya road, upkeep	167..	24	25,519	24	—	24,930	75
Pundalu-oya road, upkeep	168..	9·25..	3,943	75	1,200..	2,293	75
Pupuressa road, upkeep	169..	10	3,775	0	1,200..	2,575	0
Dotale road, upkeep	170..	10·25..	7,131	80	—	7,074	20
Kelebokka to Kabragalla, upkeep	171..	3·25..	1,066	31	—	983	69
Madulkelle to Bambra-ela, upkeep	172..	7·75..	5,753	8	—	5,740	92
Haldummulla to Lemas-tota, upkeep	173..	8	8,917	93	3,050..	4,262	7
Deltota road, upkeep	174..	19	7,180	0	5,300..	1,880	0
Kotagaloya road, upkeep	175..	2·07..	1,284	45	—	1,245	55
Approach to Belgravia bridge	176..	0·27..	186	75	—	173	24
Maskeliya road, upkeep	177..	6·68..	4,400	0	—	5,400	0
Lorne road, upkeep	178..	5·85..	2,900	0	—	4,200	0
Walaha road, upkeep	179..	1·91..	650	0	—	1,700	0
Extension, Dimbula road, from Caledonia to Railway Gorge	257..	3·83..	59,618	0	—	59,618	0
Extension, Dikoya road, from Wanarajah bridge to Castlereagh bridge	258..	2½·260..	35,835	0	—	35,835	0

CHAPTER V.

PUBLIC WORKS UNDER THE ADMINISTRATION OF MR. JOHN FLEMING CHURCHILL, M.Inst.C.E., 1877-1884.

1877. ON July 18, Mr. Mosse was appointed Chief Engineer, Railway Extension, and Mr. John Fleming Churchill, Assoc.M.Inst.C.E., Senior Provincial Assistant, was appointed to act as Director of Public Works. The expenditure of the Department during the year was Rs. 5,058,011, being Rs. 401,210 in excess of the previous year, or an increase of 8·61 per cent.

The expenditure by Province was :—

	1877. Rs.	1876. Rs.	Increase. Rs.	Decrease. Rs.
Western Province ..	1,286,048	1,453,111	—	167,063
North-Western Province ..	384,723	288,633	96,090	—
Southern Province ..	495,783	475,088	20,695	—
Eastern Province ..	311,436	230,750	80,686	—
Northern Province ..	580,143	409,723	170,421	—
North-Central Province ..	397,747	371,471	26,276	—
Central Province ..	1,602,131	1,427,995	174,136	—
Total ..	5,058,011	4,656,801	568,303	167,063

The mileage of road maintained was—

	Miles.
Metalled ..	1,038·05
Gravelled ..	723·55
Natural ..	718·75
Total ..	2,480·35

at an average cost of Rs. 644·62 per mile.

The increase in the mileage of principal roads in 1877 as compared with 1876 is thus accounted for :—

	Miles.
Rakwana towards Bulutota ..	4·00
Hambantota towards Tanamalwila ..	8·25
Kalkudah road ..	3·50
Karativu to Samanturai ..	2·00
Mullaattivu new trace ..	1·00
Central road (Mirisgoni-oya to Kalkandumadu) ..	0·60
Maskeliya road ..	0·16
Dikoya road ..	2·41
Naula to Wallawa ..	10·00
	31·92
Deduct Moon Plains road ..	} 2·85
Deduct Elephant Pass to Kalkandumadu ..	
	29·07

Under heading New Works and Buildings the most important works carried out were—

	Rs.	c.
For building a hospital at Kalutara	9,748	64
For new jail, Kandy	81,156	73
For public buildings at Vavuniyavilankulam	35,978	69
For operations in connection with Galle Harbour	10,560	1
For erecting public buildings at Kalutara	12,686	0
For powder magazine, Kandy	9,687	26
For ornamental wall, Museum, Colombo	8,120	81
For drainage, Cinnamon Gardens, Colombo	8,650	18
For building Grand Bazaar, Jaffna	8,606	64
For house for Office Assistant, Kurunegala	5,380	50
For Police Stations, Negombo, Ratnapura, and Matara	11,941	88
For an upstairs residence for the Provincial Assistant, Anuradhapura	12,086	35
For new District Court, Kandy	18,826	6½

Under heading New Roads and Additions to Roads the following important works were carried out :—

	Miles.	Rs.	c.
For roads from Hambantota to Tanamalwila	—	42,027	9
For Rakwana road extension	9·31	62,895	34
For road from Deniyaya to Wiharahena	—	28,767	28
For road from Wellaway to Tanamalwila	—	24,496	0
For road from Ratnapura to Nambapana	—	22,627	22
For extension of Maturata and Nildandahena road	4·07	51,251	18½
For road from Nuwara Eliya to Kirklees estate	—	33,491	68
For Dimbula road extension from Caledonia Gap to Railway Gorge	3·04	26,415	19
For improvement of Central road to Jaffna	—	155,043	22
For improvement of road between Puttalam and Trincomalee	—	65,211	21½
For improvement of road from Puliyantivu to Kalmunai	—	47,071	17
For metalling 6 miles of the Badulla-Batticaloa road	—	90,727	18½
For metalling 9 miles of the new trace of the Central road	—	24,319	38
For improvement of the road from Vavuniyavilankulam to Horawapotana	—	13,802	20
For improvement of the road from Divulpitiya to Mirigama	—	20,597	22
For a metalled road from Dikoya Post Office to Blink Bonnie Gap	—	26,284	47½
For forming 6 miles of metalled road to connect the districts of Dimbula and Dikoya	6	25,843	61
For gravelling the Kalada-Kalmunai road	—	16,532	36
For Dimbula road, from Caledonia Gap to Agra-patana	3·60	18,728	35
For road from Belgravia bridge to Lorne estate	5·85	14,992	0
For road from Layard's Broadway to Madampitiya	1·70	24,952	57
For Dikoya road, from Wanarajah bridge to Castlereagh bridge	2·65	38,779	13
For Lemastota road, from Naula to Wellawaya	14·75	53,936	18
For road from Tientsin bridge to Kottiagalle estate	2·41	15,276	77½

Under heading New Bridges the following important works were carried out :—

	Rs.	c.
For the Kalutara bridge	94,216	42
For bridging the Mullaittivu road	39,244	21
For bridging the road from Vavuniyavilankulam to Horawapotana	7,823	96
For bridge over the Nilwala-ganga at Akuressa	23,377	12

	Rs.	c.
For replacing wooden bridges with permanent structures of iron or masonry	20,224	57½
For bridge over the Ginge-oya, Chilaw road	10,432	41
For bridge over the Pankulam-arū	7,892	48
For two buckled plate bridges on the Hakmana road	8,528	0
For bridges on the Central road	19,672	53
For four buckled plate bridges on the Madawachchi and Mannar road	7,503	58½
For bridge over the Maha-oya at Toppu	24,620	6
For rebuilding iron bridge at Dodanduwa	6,624	40
For bridge over the Kala-oya on the Puttalam-Trincomalee road	48,364	57
For an iron bridge, 150 feet span, on the 6th mile, Dambula road	40,867	34
For bridge of 100 feet span over the Mi-oya on the Puttalam-Anuradhapura road	29,887	91
For two bridges over the Per-aar on the new road from Mankulam to Mullaittivu	9,916	41
For an iron bridge over the Naneri-oya	7,413	68
For bridges over the Nanthekadal, new Mullaittivu road	14,249	2
For a bridge at Horakella on the Negombo-Chilaw road	7,396	28

Under heading Irrigation the following important works were carried out :—

	Rs.	c.
For Gangaboda pattu irrigation works	16,584	85
For anicut and flood channel, Ellavella	8,581	36
For store tank and channel at Dandeniya	9,201	48
For Rugam tank	7,321	1
For village sluices and permanent kalingulas	38,007	97
For surveying lands benefited by the restoration of irrigation works	12,137	84
For completing the repairs of Maha Uswewa	11,060	58
For a reservoir in Barrack Plain at Nuwara Eliya	9,853	89½

Of the new bridges in hand during the year, the most important were the following :—

	Estimated Cost.	
	Rs.	c.
Bridges on the Mullaittivu road	51,500	0
Bridge over the Nilwala-ganga at Akuresa	36,700	0
Bridge over the Gin-oya, Chilaw District	25,170	0
Bridge over the Pankulam-arū	23,200	0
Bridges on the Central road	24,550	0
Kala-oya bridge	48,367	34
For an iron bridge 150 feet span on the 6th mile, Dambula road	40,867	34
For an iron bridge, 100 feet span, over Mi-oya on Puttalam-Anuradhapura road	29,887	91

Mr. Churchill writes :—

The annual examination for promotion of officers already in the Department took place in October, and the following officers who passed have been promoted :—

Senior Examination.

Mr. L. Creasy to a salary of Rs. 3,500.

Mr. M. MacGregor to a salary of Rs. 3,500.

Junior Examination.

Mr. F. Robinson to a salary of Rs. 3,000.

Mr. E. R. Templer to a salary of Rs. 3,000.

The advantage of the present mode of selecting professionally qualified officers in England for the Department is already being felt, and the works of the Department are in consequence being satisfactorily carried out. By the continuation of this system it is expected that in two or three years the Department will be officered by a very efficient staff.

The upkeep and extension of grant-in-aid roads in the Central Province was—

Roads.	No. of Estimate.	Length of Road	Government Moiety.		Toll Rents.		Private Contribution.	
			Rs.	c.	Rs.	Rs.	c.	
Upkeep, Dimbula road	168..	25.57..	38,539	25½..	—	..	38,260	74½
Do. Dikoya road	169..	26.41..	27,679	56	—	..	37,931	44
Do. Pundalu-oya road	170..	9.25..	3,208	75	1,500	..	1,708	75
Do. Pupuressa road	171..	10.00..	3,390	0	1,600	..	1,790	0
Do. Dotale road	172..	10.25..	6,305	32	—	..	6,274	68
Do. Kelebokka and Kabragalla	173..	3.25..	1,030	0	—	..	1,030	0
Do. Knuckles road	174..	7.75..	5,762	0	—	..	5,762	0
Do. Haldummulla and Nahavilla	175..	12.00..	12,661	98	3,050	..	9,611	98
Improvement, Haldummulla to Lemastota	886..	—	2,750	0	—	..	2,750	0
Upkeep, Deltota road	176..	19.00..	6,535	0	6,000	..	535	0
Craigie Lea to Kotagal-oya	177..	2.07..	1,352	50	—	..	1,352	50
Approach, Belgravia bridge in Dimbula	178..	0.27..	1,240	0	—	..	1,240	0
Maskeliya road	179..	10.33..	7,068	50	—	..	8,068	50
Belgravia bridge to Lorne in Dimbula	180..	5.85..	3,955	0	—	..	3,955	0
Walaha road to Lorne in Dimbula	181..	1.91..	1,175	0	—	..	1,175	0
Compensation, Glentilt to Cruden Gap	468..	—	3,864	91	—	..	4,114	91
Construction, road from Dikoya Post Office to Blinkbonny Gap	692..	4.25..	60,000	0	—	..	60,000	0
Construction, road from Brownlow to Laxapana	267..	1.00..	13,240	0	—	..	13,240	0

Mr. W. E. T. Sharpe writes regarding Badulla District :—

The principal roads were kept in excellent order under Mr. MacBride and his successor, as Provincial Assistant, Mr. Ormsby, until the monsoon rains set in, and continued without intermission to the end of the year, so abnormally heavy as to cause great damage to all the hill roads, and especially to the Nuwara Eliya road, which was with difficulty kept open, and to the Ratnapura road, where an enormous landslip at Halpe, below Haldummulla, quite stopped all traffic for some time, and caused the price of rice and other necessaries in the bazaars to rise to famine prices in the close of the year.

Mr. A. R. Dawson writes on the Sabaragamuwa District :—

The condition of all the main lines of thoroughfare continues, with one exception, to be exceedingly good. Owing to the unusually large quantity of rain which fell during November, a portion of the road at Halpe, near the 99th milepost, was destroyed, and traffic was for a short time seriously impeded. The Superintending Officer, Mr. Christie, did all that was possible towards its repair, and succeeded in giving as good a passage to carts as, under the circumstances, could have been made. The new road to Nambapana makes but little progress. So much of it as is finished is little better than an ordinary minor road, and it will, I fear, when completed, fail to answer the requirements of the heavy traffic which will be thrown upon it. A larger vote for this work must be given if it is to be really useful. The extension of the Rakwana road southwards was satisfactorily carried on. Little or nothing was done towards the improvement of the Kaluganga. The Ratnapura waterworks were finished, and are a complete success. Since the opening of the fountain the health of the town has been excellent.

1878. During the year Mr. J. F. Churchill continued to act as Director of Public Works. The expenditure of the Department was Rs. 5,553,638, being Rs. 495,627 in excess of the previous year, or an increase of 9·80 per cent.

The expenditure by Province was—

	1878. Rs.	1877. Rs.	Increase. Rs.	Decrease. Rs.
Western Province ..	1,345,468	1,286,048	59,420	—
North-Western Province ..	482,347	384,723	97,624	—
Southern Province ..	454,085	495,783	—	41,698
Eastern Province ..	445,173	311,436	133,737	—
Northern Province ..	482,430	580,143	—	97,713
North-Central Province ..	420,058	397,747	22,311	—
Central Province ..	1,924,078	1,602,131	321,947	—
Total ..	5,553,639	5,058,011	635,039	139,411

The mileage of road maintained was—

	Miles.
Metalled ..	1,120·37
Gravelled ..	785·96
Natural ..	731·20
Total ..	2,637·53

at an average cost per mile of Rs. 653·50.

The increase in the mileage of principal roads in 1878 as compared with 1877 is thus accounted for :—

	Miles.
Rakwana towards Bulutota ..	3
Approach roads to railway stations on the Moratuwa line ..	2·25
Nambapana road ..	6
Divulpitiya to Mirigama ..	8
Dunagaha road ..	11·90
Minuwangoda to Kotadeniya ..	10·94
Minuwangoda to Henaratgoda ..	8
Road to western salt pans, Puttalam ..	0·75
Road to southern salt pans, Puttalam ..	0·50
Matara Fort streets and new entrance ..	1·50
Gravets of Trincomalee ..	4·50
Pangaduveli road ..	1·50
Gravets of Jaffna ..	10
Point Pedro to Punnalai ..	5·50
New trace, Central road, to Mullaittivu ..	·50
Achchuveli to Tondamannaru ..	3·50
Pannaitturai to Velanai ..	6
Chavakachcheri to Karavetti ..	5
Karanavai to Tunalai ..	5·50
Tillippalai to Pandaitteruppu ..	4·50
Horawapotana towards Vavuniyavilankulam ..	23
Circular roads to Anuradhapura ..	8
Badulla to Maduru-oya ..	0·25
Haragama to Bilihul-oya ..	4
Matale to Dambulla ..	1·74
Approach roads to Gampola railway station ..	0·25
Uda Pussellawa road ..	3·90
Wanarajah road ..	2·51
Lagalla tavalam road ..	16
	158·18
Deduct Maduru-oya to Eraur ..	0·50
Deduct approach road to brick kiln, Nuwara Eliya ..	0·50
	1
	157·81

Under heading New Works and Buildings the following were the more important works :—

	Rs.	c.
For Police Barracks, Kandy	40,000	0
For building permanent cooly lines	12,971	31½
For operations in connection with Galle Harbour	14,089	6
For a hospital at Point Pedro	10,479	71½
For a lock-up at Vavuniyavilankulam	9,847	16½
For new jail, Kandy	94,651	30¾
For Boys' Industrial School, Kandy	12,084	67½
For hospital at Kalutara	13,644	36
For boundary wall for jail at Anuradhapura	9,426	71
For permanent buildings for lower school, Colombo Academy..	8,214	35

The following important buildings were completed in 1878 at the under-mentioned cost :—

	Rs.	c.
Police Barracks, Kandy, Blocks C and F	39,100	0
Hospital at Kalutara	23,393	0
Offices for the Assistant Government Agent, Kalutara	17,974	0
Boundary wall, Anuradharura Jail	10,000	0
Powder magazine and keeper's quarters, Kandy	17,574	7
Permanent buildings for the lower school, Colombo Academy..	8,214	35

Under heading New Roads and Additions to Roads the following were the more important works :—

	Rs.	c.
For extending the Nambapana road through the Dodampe village	10,723	87¾
For road from Horawella to Pellewatta	27,347	85
For extension of the Rakwana road, 12·31 miles	48,282	35½
For road from Hambantota to Tanamalwila	49,896	73
For road from Deniyaya to Wiharahena, 4·25 miles	41,232	72
For road from Chavakachcheri to Karaveddi	29,928	42
For causeway at Elephant Pass	59,963	69
For causeway between Punnalai and Karativu	26,818	34
For road from Wellawaya to Tanamalwila	55,504	0
For extension of the Uda Pussellawa road	90,494	26¾
For extension for grant-in-aid portion from Kandapola Gap towards Kirklees	22,689	36
For extension of Maturata road, 6 miles	56,738	9½
For road from Nawalapitiya to Dolosbage, 6 miles	93,216	87
For Dimbula road extension, 6 miles	60,715	52¼
For road to connect the districts of Dimbulla and Dikoya, 6 miles	75,661	68¼
For road from the main road, Dikoya Post Office, to the Blink Bonnie Gap	64,479	4¾
For improvement of the road from Minuwangoda to Henaragoda	24,813	57½
For metalling 8 miles of the Puttalam-Kala-oya road, 8 miles	24,149	76
For improvement of the Naranmulla-Madampe road	19,496	87
For road from Toppu to Madampe	22,921	21
For improvement of the road between Puttalam and Trincomalee	51,842	93½
For metalling of the Badulla-Batticaloa road	59,838	91¼
For metalling 9 miles of the new trace, Central road	24,999	22
For the Halpe deviation	20,212	25
For road from Caledonia Gap, Lindula, up the Gorge	43,148	88½
For improvement of the Central road from Rambewa junction to Madawachchi	20,450	5½

The following important roads were completed in 1878 at the under-mentioned cost :—

	Rs.	c.
Road from Dean's road by Maradana Bridge to Middleton's saw mills	13,485	77
Road from Narammulla to Madampe	19,496	87
Road between Matakai and Punnalai	14,487	33
Road from Karanavai to Tunnalai	14,496	84
Road from Pannaitturai to Vellanai	19,982	99
Road from Tillipallai to Pundaitteruppu	14,998	23
Mullaittivu road	10,000	0
Road from Ruanwella to Dolosbage	9,892	12

Under heading New Bridges the following were the more important in progress:—

	Rs.	c.
For bridge over the Alut-ela, Wadduwa	16,086	69
For iron bridge at Mabola, Negombo road	35,808	90
For bridging the Mannar-Madawachchi road	19,337	15½
For bridging the Mullaittivu	18,084	67¾
For bridge over the Yan-oya on the Trincomalee-Anuradhapura road	18,067	54
For bridge over the Nilwala-ganga at Akuesssa	10,887	77
For bridge over the Kalu-oya on the Puttalam-Anuradhapura road	12,749	40
For bridging the Kankarayan stream on the Mullaturi road	12,254	39
For bridge over the Gin-oya on the road from Toppu to Madampe	14,453	93½
For bridge over the Pankulam-aar on the road from Trincomalee to Anuradhapura	10,063	37¾

Under Irrigation Works the following were the more important in progress:—

	Rs.	c.
For store tank and channel, Dandeniya	19,851	13½
For completion and repairs to the Gangaboda pattu irrigation works	32	25
For channels for Petre anicut	956	71½
For completing Aluwatugoda anicut	173	35
For repair of damages, Rugam tank	12,600	13
For repairing damages, Divilane tank	20,590	79
For repairs to Kantalai tank	2,108	10
For the restoration of the Yoda-ela	33,167	26
For reservoir, Barrack Plain, Nuwara Eliya	13,298	72½

The usual annual examination for promotion was held in October, when the following officers passed:—

Senior Examination.

Mr. E. J. H. Christie
Mr. H. S. Potger

Mr. Cecil Koch

The following professionally qualified officers appointed in England to the Department on probation by the Secretary of State passed the colloquial examination in Tamil:—

Mr. W. Wrightson

Mr. A. S. Moss

Mr. A. G. Burleigh

Mr. C. J. Townsend

Mr. A. J. Winchester

Mr. L. M. Ackland

Mr. H. T. S. Ward

Mr. G. L. Bouchier

Mr. C. E. Spooner (transferred
from Survey Department)

Mr. A. E. Williams

Mr. A. W. Butlin

Mr. H. E. MacMahon

Mr. Churchill writes:—

Three tons (including the weight of the cart, about 10 cwt.) is not an unusual load conveyed by two-wheeled bullock carts commonly used in this Island. The tires of the wheels have only a breadth of 2½ inches, and with so heavy a weight as 30 cwt. on each wheel, it is not surprising that metal, even though of the hardest description, is rapidly worn through.

Two tons (inclusive of the weight of cart, about 10 cwt.) is the ordinary load of a two-wheeled bullock cart with 2½-inch tires. This weight is even excessive on these tires, for, in continuous wet weather, the metal is ground down to mud. It is only by their being kept in the most perfect order that these roads can sustain such heavy weights, and as all the carts are drawn by bullocks, the surface has to be carefully blinded and pounded down to a smooth surface free of loose metal, otherwise the bullocks could not travel.

Bullock carts always travel in gangs, mostly at night, sometimes as many as twenty together in a line, following exactly the same track, the result of which is that a deep rut is soon formed in a road made of the very hardest and best metal.

Attempts have been made with the view of scattering the carts over the surface of the roads so as to make the wear more even, and also to compel the use of broader tires to the wheels, but each attempt has resulted in raising the cart hire and enhancing the cost of transport (which is all done by contract) by many of the cart contractors refusing to work their carts upon any other conditions than the present system; and as transport must be obtained at any price by estate proprietors for the conveyance of rice and coffee, it seems to be an accepted fact by the general public that it is better to have the roads kept up in their present perfect order at a high cost than to attempt to interfere with the present system, for what might be saved in upkeep would be more than lost by enhanced rates and the difficulty of obtaining transport when absolutely required.

An amended code of departmental regulations is now in the hands of the Government Printer, and will, I trust, after receiving the sanction of His Excellency, be ready for circulation in the course of a month or two. The code embraces all the important departmental orders issued during the last ten years and such new rules as are now found necessary.

It contains also as appendices specifications on building and road works, for surveys of road and irrigation works, and for the construction of village tanks with necessary plans and sections. This book will be a most useful guide to departmental officers in the discharge of their various duties, and I have to express my satisfaction with the way in which it has been compiled by Mr. A. Murray, the Acting Financial and Office Assistant.

The provision for the grant-in-aid roads in the Central Province was—

Roads.	No. of Estimate.	Length of Road.	Government		Toll	Rents.	Private	
			Rs.	c.			Rs.	c.
Upkeep, Dimbulla road	182..	25·57..	37,653	63	..	—	36,496	37
Do. Dikoya road ..	183..	26·41..	34,224	25	..	—	34,441	75
Do. Pundalu-oya road ..	184..	9·25..	3,168	75	..	1,000..	2,168	75
Do. Pupuressa road	185..	10 ..	3,750	0	..	800..	2,950	0
Do. Dotale road ..	186..	10·25..	6,289	3	..	—	6,210	97
Do. Kelebokka and Kabaragalla	187..	3·25..	1,056	78½	..	—	943	21½
Do. Knuckles road	188..	7·75..	5,739	10½	..	—	5,704	89½
Do. Haldummulla and Nahavila	189..	12 ..	9,850	14	..	2,000..	7,349	86
Do. Deltota road ..	190..	19 ..	7,164	24½	..	5,700..	1,445	75½
Do. Craigie Lea to Kotagal-oya ..	191..	2·07..	1,240	0	..	—	1,240	0
Do. Approach to Belgravia bridge	192..	·27..	193	50½	..	—	136	49½
Do. Maskeliya road	193..	10·33..	8,283	3	..	—	8,864	77
Do. Belgravia bridge to Lorne ..	194..	5·85..	2,740	0	..	—	4,310	0
Do. Walaha road ..	195..	1·91..	1,238	15	..	—	1,061	85
Do. Wanarajah road in Dikoya ..	213..	2·51..	1,255	0	..	—	1,585	0
Construction, 5th and 6th miles, Dolosbage road	939..	2·00..	20,227	50	..	—	20,227	50
Building retaining wall, Pundalu-oya road ..	681..	— ..	750	0	..	—	750	0
Upkeep, Caledonia Gap to Railway Gorge ..	726..	3·00..	1,200	0	..	—	1,200	0
Widening Agra road ..	637..	— ..	4,150	0	..	—	4,150	0
Construction, Kandapola Gap to Uda Pussellawa district ..	288..	6·00..	89,905	0	..	—	89,905	0

Roads.	No. of Estimate.	Length. of Road. Miles.	Government Moieties. Rs. c.	Toll Rents. Rs.	Private Contribution. Rs. c.
Construction, Dimbula road, from Agra to Dimbulla Coffee Company's land	.. 654..	6.75..	110,975 0 ..	— ..	110,975 0
Repairing damages, Pundalu-oya road (supplementary Estimate)	.. —..	— ..	2,050 0 ..	— ..	2,050 0
Compensation, Lemastota and Nahavila road	701..	— ..	4,408 0 ..	— ..	4,408 0

On the Matale District, Mr. H. L. Moysey, Assistant Government Agent, writes :—

The heavy floods in January caused great damage to the roads. Two bridges in and near the town were carried away, and another on the minor road leading to Galewila on the Trincomalee-Colombo road rendered so dangerous that it has been necessary to pull it down and rebuild it. A fourth bridge, rotten from age, had to be rebuilt on the road to Balakaduwa, and another on the Elkaduwa road. The limited resources of the District Road Committee were thus most severely taxed, and it was with great difficulty that the chief roads were kept passable.

1879. During this year Mr. J. F. Churchill continued to act as Director. The total expenditure of the Department was Rs. 4,913,999, being Rs. 639,639 less than the previous year, or a decrease of 11.52 per cent.

The expenditure by Province was—

	1879. Rs.	1878. Rs.	Increase. Rs.	Decrease. Rs.
Western Province	.. 1,375,910	.. 1,345,468	.. 30,442	.. —
North-Western Province	.. 301,879	.. 482,347	.. —	.. 180,468
Southern Province	.. 357,556	.. 454,085	.. —	.. 96,529
Eastern Province	.. 335,076	.. 445,172	.. —	.. 110,096
Northern Province	.. 271,491	.. 482,430	.. —	.. 210,939
North-Central Province	.. 311,716	.. 420,058	.. —	.. 108,342
Central Province	.. 1,960,370	.. 1,924,078	.. 36,292	.. —
Total	.. 4,913,999	.. 5,553,639	.. 66,734	.. 706,373

The mileage of road maintained was :—

	Miles.
Metalled	.. 1,198.17
Gravelled	.. 860.11
Natural	.. 703.00
Total	.. 2,761.28

at an average cost of Rs. 598.36.

The increase in the mileage of principal roads in 1879 as compared with 1878 is thus accounted for :—

	Miles.
Rakwana to Bulutota	.. 3
Approach roads to railway stations, Moratuwa line	.. 2.75
Nambapana road	.. 1
Roads, Museum grounds	.. 1
Town Hall to Mattakkulie	.. 3
Riverside road, Ratnapura	.. 1
Horawella to Pelawatta	.. 10
Narammulla to Madampe	.. 27
Akuressa road, between Kananke and Wiharahena	.. 4.75
Hambantota towards Tanamalwila	.. 14

	Miles.
Municipality road between Piyadegama junction and Galupiyadda	3·75
Pannaïtturai to Vellanai	0·75
Chavakachcheri to Karavetti	7
Horawapotana-Vavuniyavilankulam road	6
Teldeniya to Rangalla	1·50
Haldummulla to Nahawila	2·50
Maturata road, between Haragama and Kurundu-oya	4
Uda Pussellawa road, from Nuwara Eliya towards Uda Pussellawa	2·75
Lagalla road	8
Bathford Valley road	4·25
Railway Gorge road	3·00
Dolosbage road, 1st section	4
Wattegama road	1·85
Moon Plains road, Nuwara Eliya	2·50
Dimbula-Dikoya road	6·00
Mirisgonioya to Galkandamadu	0·25
Approach roads to public buildings, Anuradhapura	0·90
	126·00
Deduct—Matara new entrance road	0·25
Nahawila to Wellawaya	2·00
	2·25
	123·75

Under heading New Works and Buildings the following were the more important in progress :—

	Rs.	c.
For boundary walling, entrance offices, baths, and blocks of twenty-four cells, Kalutara Jail	28,794	0
For new prison, Kandy	47,265	91 $\frac{3}{4}$
For building dharma lines and hospital, Katugastota	14,610	0
For Kachcheri at Kandy	42,580	0
For block A and latrine to C and F., Police Barracks, Kandy	23,000	0
For the erection of jail cells at Anuradhapura	12,538	0
For flooring girders, new Lunatic Asylum	11,303	27 $\frac{1}{2}$
For constructional work at the entrance offices, Lunatic Asylum	23,178	20
For construction of a portion of one block of wards, new Lunatic Asylum	61,385	99
For the foundation of the administration block, Asylum	16,706	63
For general cemetery for the town of Matale	14,087	31

The following important buildings were completed in 1879 at the under-mentioned cost :—

	Rs.	c.
Police Station at Belgravia	7,998	54
Do. Maskeliya	6,615	15
Do. Dikoya	7,349	87
Do. Avissawella	4,438	0
Do. Pasyala	5,200	0
Industrial School, Kandy	18,990	0
Jail at Kalutara	31,144	0

Under heading New Roads and Additions to Roads the following were the more important in progress :—

	Rs.	c.
Road from Ratnapura towards Nambapana, 8 miles	11,987	66 $\frac{1}{2}$
For extension of Rakwana road, 12 miles	35,819	41 $\frac{3}{4}$
Road from Deniyaya to Wiharahena, 4·25 miles	27,356	69
Road from Hambantota to Tanamalwila, 14 miles	16,549	93
Road from Chavakachcheri to Karaveddi	9,990	84
Causeway at Elephant Pass	29,999	87
Causeway between Punnalai and Karativu	16,997	94
Road from Wellawaya to Tanamalwila, 22 miles	19,742	93
Uda Pussellawa road, 6 miles	157,272	49
Extension of Nawalapitiya-Dolosbage road, 10·25 miles	123,397	31
Extension of Dimbula road, 6·01 miles	119,473	47

	Rs.	c.
Wattegama road	51,957	34
For the Halpe slip	8,405	56
Maskeliya road, from Brownlow to Laxapana, 1 mile	20,629	15
Tavalam road, from Kabaragala Gap through Lagalla to Nitre Cave	10,231	43½
Maturata and Nildandahena road	421	11
Road to connect the districts of Dimbula and Dikoya, 6 miles	18,767	88½
Railway Gorge road, 3 miles	1,216	6
Wanarajah road, 2·50 miles	16,314	79
Bathford road, 4·25 miles	29,227	24
Improvement of the road between Puttalam and Maturankuli	20,000	0
Improvement of the road from Toppu to Madampe	19,991	51
Metalling Badulla-Batticaloa road	49,984	87½
Improvement of the Sammanturai-Veraadi road	13,295	38
Improvement of the road between Trincomalee and Puttalam	4,965	74½
Improvement of the North Coast road, Batticaloa District	6,540	38
Completing North-Central road, between Mihintale and Gal-kandamadu	16,129	99½
Improvement of the road from Horawapotana towards Vavuniya-vilankulam	3,969	62
Metalling new trace, Elephant Pass	2,000	0

The following important roads were completed in 1879 at the under-mentioned cost :—

	Rs.	c.
Third section of the Uda Pussellawa road	83,064	82½
Six miles of metalled road to connect the districts of Dimbula and Dikoya	120,273	18
10½ miles of road from Nawalapitiya towards Dolosbage	219,960	0
Three miles of the Rakwana and Morawaka road from Bulutota towards Itakanda	67,850	41½
Road from Deniyaya to Wiharahena	97,556	88
Road from Hambantota to Tanamalwila	97,416	30
Road from Dikoya Post Office to Blink Bonnie Gap	119,992	53

Under heading New Bridges the following was the expenditure :—

	Rs.	c.
For replacing old wooden bridges with permanent structures of iron or masonry	18,457	19½
For bridge over the Maha-oya at Giriulla	29,992	17
For bridge at Galtuduwa over canal, Kalutara	4,960	0
For bridge over Uma-oya	4,993	60½
For the Akuressa bridge	7,178	65
For bridge over the Mi-oya	2,995	7
The bridge over the Pankulam-aar	5,217	95
For bridge at Mabola	2,101	82
For bridge and road approaches over the Alut-ela, Wadduwa	1,599	39
For bridge over the Alut-ela, Waskaduwa	1,097	22
For bridge over the Alut-ela, Kirimetiya	347	51
For bridge over the Yan-oya, Puttalam-Trincomalee road	12,988	23½
For extra thickness of planking to platform of Gampola suspension bridge	3,993	35½
Total	95,922	17½

Under Irrigation the following important works were in progress :—

	Rs.	c.
For store tank and channel at Dandeniya	16,226	38
For repair of damage to Divilana tank	9,403	57½
For permanent anicut at Kaliodai	19,666	24
For restoration of 13½ miles of the Yodi-ela	51,306	73½
For sluices to village tank and kalingulas	58,350	20½
For puddling and repairing the Mahauswewa bund	2,792	66
For sluices to village tanks and kalingulas	21,630	64½
For an anicut across the Gal-oya	12,887	99½

Mr. Churchill writes :—

The examination for promotion was held in October, 1879, and the following officers passed :—

<i>Senior.</i>	<i>In Tamil.</i>
Mr. R. Macpherson	Mr. J. Trump
	Mr. H. E. Cottrell
	Mr. E. Robins
	Mr. F. W. Johnson
	Mr. E. H. Bouchier
	Mr. W. Long
<i>Junior.</i>	
Mr. J. MacDonnell	

Frequent changes of stations had to be made among the officers of the staff during the course of the year, owing to the works in some districts being carried out in very unhealthy places, and the only mode of keeping the staff in working order is by giving the officers when invalided a change of station. This tends to render the staff more efficient, for the officers thereby gain experience with the different races of people they have to work with, and the various description of works required which vary greatly as to the nature of the works and the materials to be obtained in the different Provinces of the Colony.

During the year several officers had to be invalided to Europe. As stated in the previous annual report the advantages of having professionally trained officers appointed is shown in the successful working of the Department.

Contracts have been let for the upkeep of 369 miles of road from January 1, 1880, for three years, with the option on the part of the Department of extending the period for a further term of two years if desirable. This will again test the advisability of extending the contract system over a greater mileage of the roads. The previous contracts having proved unsatisfactory, the Department had to resume the upkeep of the roads. Owing to all heavy traffic in Ceylon being drawn by bullocks, the metalled roads require to be kept in good order with an even surface, otherwise bullocks are unable to travel over them.

The following was the provision for grant-in-aid roads, Central Province :—

Roads	No. of Estimate.	Length. of Road.	Government Moiety. Rs. c.	Toll Rents. Rs.	Private Contribution. Rs. c.
Construction, Dolosbage					
new road	.. — ..	4·25..	50,000 0..	— ..	50,000 0
Upkeep, Dimbula road	.. 203..	25 57..	32,504 0..	— ..	32,504 0
Do. Dikoya road	.. 204..	26·41..	30,512 50..	— ..	30,512 50
Do. Pundaluoya road	.. 205..	9·25..	3,700 0..	1,050..	2,650 0
Do. Pupuressa road	.. 206..	10 ..	3,750 0..	450..	3,300 0
Do. Dotale road	.. 207..	10·25..	6,150 0..	— ..	6,150 0
Do. Kabaragalla road	.. 208..	3·25..	975 0..	— ..	975 0
Do. Knuckles road	.. 209..	7·75..	5,425 0..	— ..	5,425 0
Do. Deltota road	.. 211..	19 ..	8,550 0..	4,000..	4,550 0
Do. Craigie Lea to Kotagal-oya road	.. 212..	2·07..	1,240 0..	— ..	1,240 0
Do. Approach, Belgravia bridge	.. 213..	0·27..	165 0..	— ..	165 0
Do. Belgravia Bridge to Lorneestate	.. 215..	5·85..	2,740 0..	— ..	2,740 0
Do. Maskeliya road	.. 214..	10·33..	8,264 0..	— ..	8,264 0
Do. Walaha road	.. 216..	1·91..	1,146 0..	— ..	1,146 0
Do. Wanarajah road	.. 233..	2·50..	1,255 0..	— ..	1,255 0
Do. Railway Gorge road	.. 237..	3 ..	1,800 0..	— ..	1,800 0
Do. Bathford road	.. 236..	4·25..	2,550 0..	— ..	2,550 0

Roads.	No. of Estimate.	Length of Road.	Government Moiety.		Toll Rents.		Private Contribution.	
			Rs.	c.	Rs.	Rs.	c.	
Improvement, Pundaluya road ..	81 ..	7·25 ..	5,000	0 ..	—	..	5,000	0
Do. Deltota road ..	— ..	7 ..	5,000	0 ..	—	..	5,000	0
Supplementary Estimate, Bathford road ..	— ..	— ..	7,389	22 ..	—	..	7,389	22
Total ..			178,115	72	5,500		172,615	72

From 1879 the expenditure of the Department began to fall in consequence of a serious fall in the revenue. It fell from Rs. 5,500,000 in 1878 to Rs. 2,000,000 in 1884, when it began again to rise gradually.

1880. Mr. J. F. Churchill continued to act as Director during 1880, and in this year a Commission was appointed to inquire into the cost of construction of roads, bridges, &c. A full report of which will be found in Chapter V. of Volume II. The expenditure of the Department was Rs. 3,854,855, being Rs. 1,059,144 less than the previous year, or a decrease of 21·55 per cent.

The expenditure by Province was—

	1880. Rs.	1879. Rs.	Increase. Rs.	Decrease Rs.
Western Province ..	1,204,778 ..	1,375,910 ..	—	171,132
North-Western Province ..	240,854 ..	301,879 ..	—	61,025
Southern Province ..	295,037 ..	357,556 ..	—	62,519
Eastern Province ..	269,338 ..	335,076 ..	—	65,738
Northern Province ..	202,659 ..	271,491 ..	—	68,831
North-Central Province ..	187,703 ..	311,716 ..	—	124,013
Central Province ..	1,454,485 ..	1,960,370 ..	—	505,885
Total ..	3,854,855	4,913,999	—	1,059,144

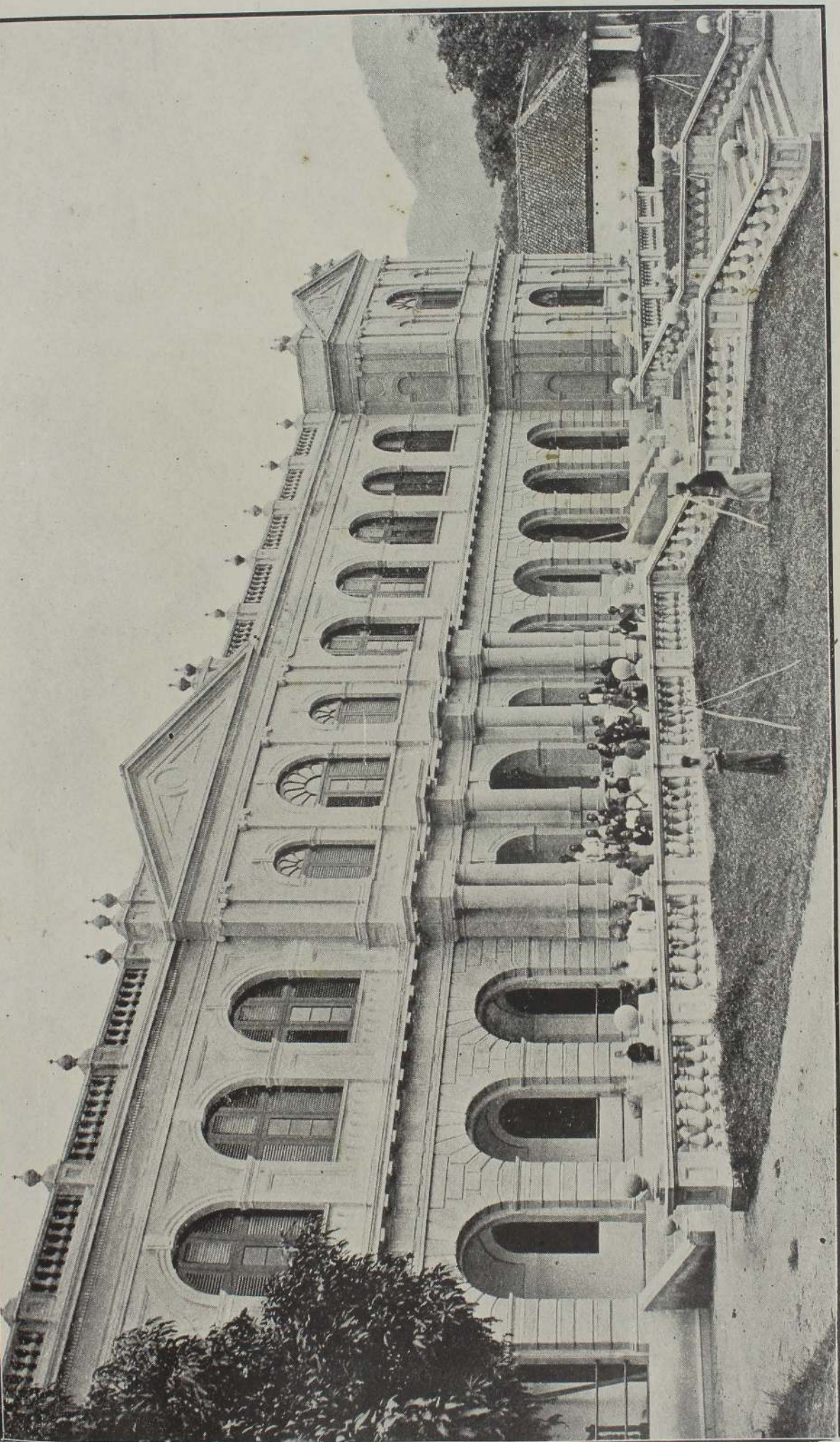
The mileage of road maintained was—

	Miles.
Metalled ..	1,289·84
Gravelled ..	831·63
Natural ..	641·25
Total ..	2,762·72

at an average cost of Rs. 599·65 per mile.

The increase in the mileage of principal roads in 1880 as compared with 1879 is thus accounted for—

	Miles.
Kesbewa road ..	3
Kirimetiya road ..	4·50
Nambapana road ..	1
Rakwana road ..	3
Municipality road, Galle ..	1
Karaitivu-Samanturai road ..	10
Gravets of Jaffna ..	1
Jaffna-Karaitivu road ..	2
Velanai road ..	·75
Gampola to Baker's Farm ..	·50
Dimbula road, Tispene junction to Agrapatanas ..	·18
Colombo-Badulla road ..	1
Dolosbage road, 2nd section ..	6·25
Iriyagama road ..	6
Ampitiya road ..	5·50



S. G. O.

THE KANDY KACHCHERI
Built by
Mr. R. K. MAC BRIDE C.M.G. & Mr. G. BURTON
1880

	Miles.
Maskeliya road, Brownlow to Laxapana	1
Dimbula road, Agras, to Coffee Company's Land	6·01
Kandapola-Uda Pussellawa road	6·01
	<hr/>
	58·69
Deduct Polgahawela road	·25
Pelmadulla to Gurukandura	1
Bentota to Goyapana	1
Hambantota to Tanamalwila	21
Old Central road	34
	<hr/>
	57·25
	<hr/>
	1·44
	<hr/>

Under New Works and Buildings the following important works were in progress :—

	Rs.	c.
For improvements to Government Agent's house, Kurunegala ..	23,000	0
For market at Kalutara	7,310	50
For police station at Panwila	4,009	92
For police building at Nawalapitiya	6,500	0
For purchase of Kalutara resthouse	8,000	0
For Lunatic Asylum, Colombo	98,273	21
For improvements to Galle Harbour	10,000	0
For Kandy Kachcheri	74,543	95
For new prison at Anuradhapura	10,109	31
For Post and Telegraph Offices, Batticaloa	7,000	0

The following important buildings were completed in 1880 at the under-mentioned cost :—

	Rs.	c.
Government Agent's house, Kurunegala	23,000	0
General and fish markets at Kalutara	8,520	50
Residence for Wanniya, Tamankaduwa	5,899	40
Kandy Kacheheri	114,700	0
New prison, Anuradhapura	38,242	40

Under New Roads and Additions to Roads the following were in progress :—

	Rs.	c.
Maskeliya road	709	25
Road from Kandapola Gap to Uda Pussellawa	16,522	30
Improvements to road from Horowapotana to Vavuniyavilankulam	1,330	37
Compensation, Kukul korale road	610	0
Nambapana road extension	11,964	41
Road from Cramer's lane to Dam street	5,000	0
Tavalam road through Kukul korale	10,269	48
Elephant Pass causeway	9,992	15
Road from Nuwara Eliya to Nanu-oya railway station	56,639	89
Dimbula road to Nanu-oya	120,920	0
Bathford road	14,763	83
Bridges, Elephant Pass causeway	11,991	11
Completion of Maturata road and the erection of a footbridge over the Kurundu-oya	14,249	69
Uda Pussellawa road	78,032	43
Metalling Badulla-Batticaloa road	9,775	70
Improvement of South Coast road	3,999	80
Completion of road from Wellawaya to Hambantota	49,681	16
Road from Labugama to Hanwella	96,679	96
Agra road	39,888	64
Additions and improvements to existing roads, the cost of which not exceeding Rs. 2,000 each	15,246	21
	<hr/>	
Total ..	568,266	38
	<hr/>	

The following important roads were completed in 1880 at the under-mentioned cost :—

	Rs.	c.
Road from Nuwara Eliya to the site of the Nanu-oya Railway Station	156,595	6
First section of the road to connect Dimbula and Nuwara Eliya	150,000	0

Under New Bridges the following was the expenditure :—

	Rs.	c.
For replacing old wooden bridges with permanent structures of iron or masonry	12,868	53
For bridge over the Maha-oya at Giriulla	56,452	0
For bridge over the lake at Slave Island	19,968	97
For completion of the iron bridge at Hatamune on the Hakmana road	4,999	61
Total ..	94,289	11

Under Irrigation Works the following important works were in progress :—

	Rs.	c.
For irrigation channel from Tissamaharama towards Sittrawella	8,835	0
For the construction of an anicut at Pattampattai-arū ..	40,700	0
For Irrikamam supply channel	37,200	0
For completing the Kali-odai anicut	930	0
For sluices to village tanks, North-Central Province ..	38,811	16
For construction of sluices to village tanks, North-Western Province	9,368	4
For an anicut across the Badulu-oya	8,613	0
For restoring the tank at Vavuniyavilankulam	10,807	97

Mr. Churchill writes :—

In October the usual examination for promotion was held, when the following officers passed the Tamil examination :—Mr. W. H. Gratiaen, Mr. H. B. Smith, Mr. F. Target.

The contracts let for the upkeep of roads have answered fairly well. As was anticipated, there was some difficulty at first in getting the contractors to work systematically and keep a sufficient quantity of materials always piled on the road sides in readiness for repair ; but by the officers of the Department firmly insisting upon this being done, the work is now being so satisfactorily carried out that the contract system will be largely extended in 1881, and upon the completion of the Dimbula railway may be applied to the main trunk lines of road in the Central Province, which the railway will supplant.

As remarked in previous annual reports, the expenditure on irrigation is proving most remunerative and beneficial. In the Eastern Province, by the erection of the anicuts and supply channels, perfect control is obtained over the rivers, the surplus waters of which are stored during the floods and distributed during the cultivating season over the vast tracts of land now brought into cultivation, and admitting of even a second crop being grown during the dry season by the aid of the flood water stored in the tanks. The same good result is also to be seen in all the other Provinces where irrigation works have been carried out. A survey and examination is being made of the ancient irrigation ("Giant's tank") and other works in the Mannar District of the Northern Province, which centuries ago was one of the great rice-producing districts of Ceylon. So far as they have gone, these surveys tend to show that these ancient works can be restored, and the now waste lands be made as productive and remunerative as of old.

Mr. F. R. Saunders, Government Agent, Western Province, writes :—

The principal large works undertaken or completed during the year were the new Kalutara Jail, Rs. 30,000 (completed), a bridge over the Maha-oya at Giriulla, Rs. 30,000 (completed), and the new Lunatic Asylum, Colombo, Rs. 120,000 (partly built).



- | | |
|---------------------------------|-----------------------------------|
| 1. J. F. Churchill. D. P. W. | 13. T. Smith |
| 2. R. D. Ormsby. F. and O. A. | 14. L. Creasy |
| 3. Edward Bouchier | 15. J. Robertson |
| 4. Tommie Johnston | 16. G. Burton |
| 5. J. G. Smither F. R. I. B. A. | 17. C. Prime |
| 6. H. M. Ffinch | 18. E. Venning |
| 7. E. Case | 19. J. Townsend |
| 8. H. E. H. Hayes | 20. Mr. Mack-Head Clerk P. W. D. |
| 9. C. E. Spooner | 21. E. J. H. Christie |
| 10. W. G. Hall | 22. A. J. Winchester |
| 11. J. A. Arneil | 23. E. C. Davies Factory Engineer |
| 12. E. Holland | |



S. G. O.

OFFICERS OF THE PUBLIC WORKS DEPARTMENT:

1880.

Mr. H. W. Green, Assistant Government Agent, Negombo, writes:—

The only public work of importance during 1880 has been the construction of the Giriulla bridge, which spans the Maha-oya about 24 miles from the town of Negombo, and connects the North-Western Province with the Negombo District. The benefits derived from this bridge will, however, chiefly be felt by the people of the North-Western Province, who will now have easy access to the railway at the Mirigama station in this district along the minor road from Giriulla to Mirigama and Pasyala.

The work of the bridge will, however, be rendered incomplete if the minor road is not taken over by the Public Works Department and made into a good principal road. At present the hills in it are some of them dangerous, while the proper upkeep of the road is beyond the financial capabilities of the District Road Committee.

The construction of the bridge has been a work of much difficulty, partly from floods, but chiefly owing to the extremely unhealthy and feverish locality. The miasma from the Maha-oya incapacitated a great number of the coolies, while not a few died, and the Resident Superintendent, Mr. Gratiaen, personally suffered severely. His completion of the work so soon reflects the greatest credit upon his pluck and perseverance.

His Excellency the Governor personally opened the bridge in January, 1881.

The provision for grant-in-aid roads in the Central Province was—

Roads.	No. of Estimate.	Length of Road. Miles.	Government Moiety.		Toll Rents.	Private Contribution.	
			Rs.	c.	Rs.	Rs.	c.
Upkeep, Dimbula road..	149..	25·57..	32,504	0..	—	32,504	0
Do. Dikoya road ..	150..	26·41..	30,513	0..	—	30,513	0
Do. Pundalu-oya road ..	151..	9·25..	3,469	0..	1,200..	2,269	0
Do. Pupuressa road	152..	10 ..	3,459	0..	800..	2,659	0
Do. Dotale road ..	153..	10·25..	6,150	0..	—	6,150	0
Do. Madulkele to Kabaragala	154..	3·25..	975	0..	—	975	0
Do. Madulkele to Bambaraella	155..	7·75..	5,425	0..	—	5,425	0
Do. Deltota road ..	157..	19 ..	10,034	0..	2,550..	7,484	0
Do. Kotagal-oya road	158..	2·07..	1,240	0..	—	1,240	0
Do. Belgravia bridge road..	159..	27 ..	165	0..	—	165	0
Do. Maskeliya ..	160..	10·33..	8,264	0..	—	8,264	0
Do. Lorne road ..	161..	5·85..	2,740	0..	—	2,740	0
Do. Walaha road ..	162..	1·91..	1,146	0..	—	1,146	0
Do. Wanarajah road	179..	2·50..	1,255	0..	—	1,255	0
Do. Bathford Valley road ..	182..	4·25..	2,550	0..	—	2,550	0
Do. Railway Gorge road ..	183..	3 ..	1,800	0..	—	1,800	0
Do. Dolosbage road (2nd section)	185..	6·25..	3,750	0..	—	3,750	0
Do. Brownlow to Laxapana ..	192..	1 ..	500	0..	—	500	0
Do. Dimbula road between the Agras and Coffee Company's land..	193..	6·01..	3,000	0..	—	3,000	0
Do. Kandapola-Uda Pussellawa road ..	194..	6 ..	3,000	0..	—	3,000	0
Do. Compensation for Bathford road						7,390	0

Roads,	No. of Estimate.	Length of Road. Miles.	Government Mqiety. Rs. c.	Toll Rents Rs.	Private Contribution Rs. c.
Upkeep, Compensation for S.E., Uda Pussellawa road	.. — .. —	6,780 14½.	— ..	6,780 14½
Do. Extension, Uda Pussellawa road	.. — .. —	71,426 91..	— ..	71,426 91
Total	207,536 5½	4,550	202,986 5½

1881. Mr. J. F. Churchill continued to act as Director during the year. The expenditure of the Department was Rs. 2,568,461, or Rs. 1,286,393 less than the previous year, or a decrease of 33·37 per cent.

The expenditure by Province was—

	1881. Rs.	1880. Rs.	Increase. Rs.	Decrease. Rs.
Western Province	800,176	1,204,778	—	404,602
North-Western Province	169,453	240,854	—	71,401
Southern Province	216,297	295,037	—	78,741
Eastern Province	157,075	269,338	—	112,263
Northern Province	223,148	202,660	20,489	—
North-Central Province	110,149	187,703	—	77,553
Central Province	892,163	1,454,485	—	562,322
Total	2,568,461	3,854,855	20,489	1,306,882

The mileage of road maintained was—

	Miles.
Metalled	1,300·82
Gravelled	885·33
Natural	622·25
Total	2,808·40

at an average cost of Rs. 519·05 per mile.

The increase in the mileage of principal roads in 1881 as compared with 1880 is thus accounted for :—

	Miles
Nambapana road	2
Ruwanwella to Bulatkohopitiya	8·20
Hanwella to Bope	8
Kukulu korale tavalam road	6
Kelani to Biyagama	8
Dematagoda to Wellampitiya	1·50
Haragama to Kurundu-oya	1·25
Dimbula road	3·24
Agra road	4·99
Kandapola-Uda Pussellawa road	4
	47·18
Deduct—Old Batticaloa road taken over by Badulla Local Board	1·50
	45·68

Under New Works and Buildings the following important works were in progress :—

	Rs. c.
For interior fittings and flooring to the administration offices, kitchen, and north transept, new Lunatic Asylum	18,857 85
For providing building materials for completing the Chilaw new jail	12,089 31
For erecting new offices for the Supreme Court, Colombo	47,379 82

Under heading New Roads and Additions to Roads the following works were carried out :—

	Rs.	c.
For metalling Badulla-Batticaloa road	13,666	59
For bridle road from Tebuwana to Neboda	7,500	0
For Uda Pussellawa road	8,380	24
For compensation for land taken for the construction of the Uda Pussellawa road	13,560	28
For compensation for damages done to estates by the construction of the road from the Agras to the Coffee Company's land	25,506	94
For the construction of bridle path from Haldummulla to Horton Plains	2,600	0
For opening road to the cemetery at Negombo	904	77
For compensation for damages done by the formation of the Kukulukorale tavalam road	540	0
For road from Labugama to Hanwela	77,007	36
For the construction of the road to connect Dikoya with the railway station on Carolina estate	55,248	13
For improvement of the North Coast road	1,683	92
For improvement of the South Coast road	1,999	96
Total ..	208,598	19

Under New Bridges the following was the expenditure :—

	Rs.	c.
For bridges for the Elephant Pass causeway	51,492	22
For completing the bridge works at Giriulla	166	0
Total ..	51,658	22

Under Irrigation the following more important works were in progress :—

	Rs.	c.
For Irrakamam supply channel	5,747	56
For construction of sluices to village tanks, North-Central Province	19,847	96
For construction of sluices to village tanks, North-Western Province	4,440	53
For erection of anicut across the Kirinde-ganga	8,144	66
For construction of sluices to tanks, Northern Province	5,139	25

Mr. Churchill writes :—

In October the usual examination was held, when the following officer passed the examination for the Senior Division :—Mr. J. MacDonnell.

A special examination for the Senior Division was held in January last, when the following officers passed :—Mr. T. Johnstone, Mr. A. Taffs.

Owing to the reduction of expenditure, seven officers have been lent to other Departments: Four to the Railway works, two to the Prisons Department for the supervision of the convict labour employed on the Colombo Breakwater works, and one to the Telegraph Department for the extension of the telegraph lines.

The system of letting the upkeep of the roads on contract is being largely extended, and is found to work fairly satisfactorily; cases arise where the contractor failing to carry out the contract and allowing the roads to fall into bad order, the contracts have to be cancelled and the work taken over by the Department. The upkeep of the whole length of the main road from Peradeniya *via* Gampola, Nuwara Eliya, and Badulla, to Batticaloa, a length of 175·25 miles, was let on contract at the end of the year.

Mr. G. W. Templer, Assistant Government Agent, Ratnapura, writes :—

The new road from Ratnapura to Nambapana has been completed to the 10th mile ; this route is of the greatest importance. Nearly all the foot passengers from Kalutara, Moratuwa, and Panadure use it, and when bridged the greater portion of the cart traffic from these populous parts will be diverted to this road ; boats and carts will then travel within a few yards of one another, and supervision will be made much easier. The completion of this road is one of the crying wants of the district, and should be attended to without delay.

Mr. John F. Dickson, Government Agent, North-Central Province writes :—

The stoppage of expenditure on public works, rendered necessary by the state of the Island finances, has come at a critical and most unfortunate time for the progress of this Province. It coincided with, and indeed greatly intensified, the distress of 1879. The stoppage of public works and the distress of 1879 have together checked the rapid improvement of this Province, which showed itself year by year for five years, and each year with increasing force from 1874 to 1878.

1882. On October 1 of this year Mr. Mosse retired from the Department and Mr. J. F. Churchill was appointed Director of Public Works after having acted as Head of the Department for five years from July, 1877, to September, 1882. The expenditure during the year was Rs. 2,284,969, being Rs. 283,491 less than the previous year, or a decrease of 11·03 per cent.

The expenditure by Province was—

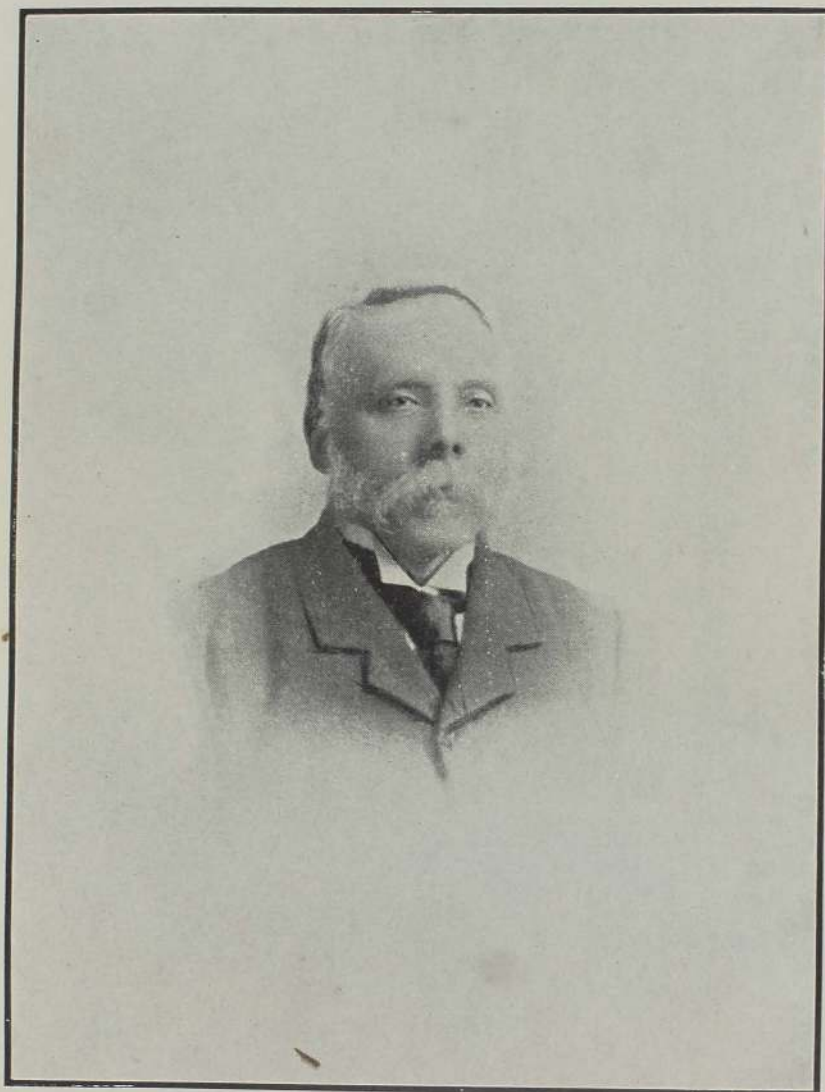
	1882. Rs.	1881. Rs.	Increase. Rs.	Decrease. Rs.
Western Province ..	721,334	800,176	—	78,842
North-Western Province ..	180,699	169,453	11,246	—
Southern Province ..	227,683	216,297	11,386	—
Eastern Province ..	124,531	157,075	—	32,543
Northern Province ..	138,768	223,148	—	84,380
North-Central Province ..	103,418	110,149	—	6,732
Central Province ..	788,536	892,163	—	103,627
Total ..	2,284,969	2,568,461	22,632	306,124

The mileage of road maintained was—

	Miles.
Metalled ..	1,341·47
Gravelled ..	872·50
Natural ..	622·50
Total ..	2,836·47

at an average cost of Rs. 491·33 per mile.

The average cost of the upkeep of the roads per mile was Rs. 27·72 less than that of the previous year, while they were maintained in equally good condition. The contract system was working satisfactorily, and upon the completion of the railway from Nawalapitiya to Nanu-oya it can be largely extended over the Dimbula and Dikoya districts. A length of 28·07 miles of new road was added to the principal roads during the year.



S. G. O.

JOHN FLEMING CHURCHILL M. Inst: C. E.

Acting Director of Public Works

1877 - 1882

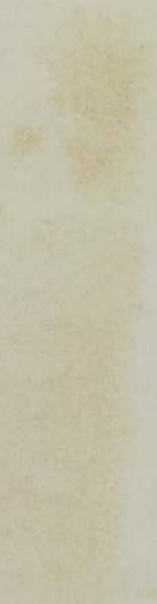
Director of Public Works

1882 - 1885

Service

1856 - 1885

(Died at Cookham Hants 6 August 1894.)



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(Pict. of the ... in ... Aug. 18 ...)

The increase in the mileage of principal roads in 1882, as compared with 1881, is thus accounted for :—

	Miles. 1881.	Miles 1882.	Decrease caused by remeasurement.	Increase.
Labugama road ..	—	8·90	—	8·90
Henaratgoda road ..	8	8·11	—	·11
Neboda road ..	—	6	—	6
Kananke to Viharahena ..	42·75	42	·75	—
Tanamalwila road ..	29	28·50	·50	—
Coast road, Batticaloa District ..	152·50	142·75	9·75	—
Trincomalee towards Anuradhapura ..	27	22·50	4·50	—
Haragama to Kurundu-oya ..	29·75	28·25	1·50	—
Agra road ..	11	14	—	3
Maskeliya road ..	10·33	9·73	·60	—
Kandapola-Uda Pussellawa road ..	10	12	—	2
Lower Badulla road ..	—	15	—	15
Carolina road ..	—	1·17	—	1·17
Railway approach road, Kandy ..	—	1	—	1
Holyrood road ..	—	·30	—	·30
Katugastota to Queen's Hotel ..	—	2·38	—	2·38
Peradeniya to Lewella ferry ..	—	5·81	—	5·81
			Decrease ..	17·60
				45·67
				17·60
			Deduct Decrease ..	
			Increase Miles ..	28·07

Under heading New Works and Buildings the more important works were—

	Rs.	c.
For telegraph line from Polgahawela to Kurunegala ..	11,745	0
For building a portion of the boundary wall of the new Lunatic Asylum ..	9,933	25
For erecting new offices for the Supreme Court ..	12,476	72
For completing the Chilaw Jail ..	8,783	12
For compensation for land for new Lunatic Asylum ..	12,459	37

Under heading New Roads and Additions to Roads the following works were carried out :—

	Rs.	c.
For the construction of a bridle path from Haldummulla to Horton Plains ..	9,340	0
For bridle path from Tebuwana to Neboda ..	5,609	85
For extension of the Uda Pussellawa road from Amherst to St. Margarets ..	23,567	47
For opening a road to the cemetery at Negombo ..	125	52
For approach road to railway station through Holyrood bridge ..	5,157	68
For compensation for damage done by the construction of the Lorne road ..	15,598	92
For embanking and gravelling North Coast road ..	1,999	66
For metalling South Coast road ..	1,999	45
For improving the road at Maradankadawala ..	872	53
For construction of road from Labugama to Hanwella ..	1,124	67
Total ..	65,395	75

Under New Bridges the following works were completed :—

	Rs.	c.
For completion of the Elephant Pass bridges ..	1,491	37

Under Irrigation Works the most important work carried out was—

	Rs.	c.
For constructing a high-level sluice and channel at the west end of the bund at Tissamaharama, Hambantota District ..	4,583	91

Mr. W. W. Hume, Government Agent of the Southern Province, writes :—

Public Works.—There are two very important works under this head which have been too long neglected, all efforts made to obtain funds for the purpose having hitherto proved unsuccessful. I allude to new bridges on the Pol-oya and Polwattamodara rivers on the road from Galle to Matara. In regard to the former, placed from year to year on the “application for new works to be undertaken,” it is recorded, “that the existing bridge is a source of constant expense owing to the action of some insect which damages the timber; various remedies have been tried with little success.” The unsafe state of the bridge must be admitted, when it is found necessary to post notices on it in English and Sinhalese, warning drivers of vehicles not to proceed over it at any but a walking pace. The bridge over the Pol-oya is similar to the other.

As previously stated, Mr. Mosse retired from the Department on October 1, after eleven years’ service, at the age of 59, on a pension of Rs. 5,250 = £525. His salary during his tenure of office as Director of Public Works and Director-General of the Ceylon Government Railway was the same as that drawn by his predecessor, Rs. 15,000 = £1,500. Prior to his coming to Ceylon, Mr. Mosse was engaged on the Waterford and Kilkenny Railway, 1847–50; Railway Works in Virginia and North Carolina, 1851–52; Nova Scotia Government Railway, 1853–62; Mauritius Government Railway, 1863–71, of which he was appointed General Manager in 1868.

While in Ceylon Mr. Mosse, in addition to his duties as Director of Public Works, &c., acted for a time as Chief Resident Engineer during the construction of the Matale and Nanu-oya Railway Extensions.

He died at Tunbridge Wells on December 18, 1904, at the advanced age of 81, having lived to draw his pension for twenty-two years.

Another officer of the Department who lived to draw his pension for a long period was Mr. Henry Byrne, Provincial Assistant of the Western Province, 1867–75. He retired in 1876 after thirty-five years’ service, and died in Dublin in 1908 at the advanced age of 87, thus living to draw his pension of £666 per annum for thirty-two years.

1883. The expenditure of the Department was Rs. 2,091,917, being Rs. 193,052 less than the previous year, or a decrease of 8·45 per cent.

The expenditure in each Province was—

	1883. Rs.	1882. Rs.	Increase. Rs.	Decrease. Rs.
Western Province ..	625,617 ..	721,334 ..	— ..	95,717
North-Western Province	157,990 ..	180,699 ..	— ..	22,709
Southern Province ..	211,372 ..	227,683 ..	— ..	16,311
Eastern Province ..	143,614 ..	124,531 ..	19,082 ..	—
Northern Province ..	154,381 ..	138,768 ..	15,613 ..	—
North-Central Province ..	87,926 ..	103,418 ..	— ..	15,492
Central Province ..	711,017 ..	788,536 ..	— ..	77,518
Total ..	2,091,917	2,284,969	34,695	227,747

The mileage of road maintained was—

	Miles.
Metalled	1,360·81
Gravelled	852·88
Natural	620·75
Total	<u>2,834·44</u>

at an average cost per mile of Rs. 436·54.

The decrease in the mileage of principal roads in 1883 as compared with 1882 is caused by re-measurement of certain roads after their improvement by easing off some of the sharp corners and bends in the roads.

Under heading New Works and Buildings the following were the more important carried out :—

	Rs.	c.
For certain works to the new Lunatic Asylum, Colombo ..	7,845	10
For bringing a supply of water from the hospital to the town of Badulla	2,088	46
For interior fittings and flooring, new Lunatic Asylum ..	3,625	48
For building a resthouse on the Dambulla road ..	2,082	57
Do. at Tonigala	3,150	0

Under New Roads and Additions to Roads the following works were carried out :—

	Rs.	c.
For a bridle path from Haldummulla to Horton Plains ..	8,050	0
For extension of Uda Pussellawa road from Amherst to St. Margarets	35,945	31
For a bridle path from the 7th mile, Ratnapura and Gilimale road, to Eratna	1,215	5
For a bridle path from St. Margarets estate to Uma-oya ..	3,500	0
For a bridle path from Kottawa to Udugama	1,288	50
For road from the new Fort railway station to Chatham street ..	12,107	92
For sand to form the new roadway from the Fort railway station to Chatham street	1,725	90
For improvements to the Main street, Pettah, Colombo ..	4,977	4
For improvements to Lower Badulla road	1,383	91
For widening the road from Badulla to Taldena, where it has been encroached by the Taldena-ela	135	21
For improvement to North Coast road, Eastern Province ..	1,996	6
For improvements to South Coast road, Eastern Province ..	1,999	99
Total	<u>74,324</u>	<u>89</u>

Under heading New Bridges the following works were carried out :—

	Rs.	c.
For erecting a bridge near the Lotus Pond	1,569	35
For two bridges over Wagoni-oya and Palwana-oya	2,172	61
Total	<u>3,741</u>	<u>96</u>

Under heading Irrigation the following were the more important works in hand :—

	Rs.	c.
For improvements to irrigation works at Tissamaharama ..	24,419	44
For construction of sluices to village tanks, North-Central Province	19,781	61
For constructing sluices to village tanks, North-Western Province	5,224	47
For an aqueduct across the Uppar in Batticaloa	14,280	63
For repairs and improvements to the Mulhal-ela	2,000	0
For water-course from Taldena anicut to the fields at Taldena ..	3,779	54
For repairs to two tanks in Dambawinne korale	2,000	0

Mr. Churchill writes :—

The contract system, with some exceptions, is working satisfactorily, and being extended when suitable contracts can be let for the proper maintenance of the roads.

There is a total saving of Rs. 144,305·90 upon the maintenance of works during the year, compared with the cost in 1882. This saving is made upon the upkeep of roads; the cost of the upkeep of canals being Rs. 82·10, and the upkeep of irrigation works Rs. 427·88, in excess of that of 1882.

The work of the year is satisfactory in point of economy and the construction and maintenance of the public works.

The irrigation works, by securing a regular supply of water for cultivation, are advancing the general prosperity of the districts in which they are constructed.

Mr. John F. Dickson, Government Agent, Central Province, writes :—

The accompanying map shows the principal roads in the Province. It will be seen that while roads have been liberally carried up every important valley, the only object had in view was to get the produce of each valley down to the port of shipment by the cheapest and most direct route without any thought of making these roads as part of a general scheme for opening up the country and placing its several districts in communication with each other. The result is that one of the great wants of this Province in the matter of roads is the making of connecting roads to take the existing roads out of the *culs de sac* into which they run, and make them through lines of communication. Of these, the most important is a road in continuation of the roads which run up the Agrapatanas and the Dikoya and Maskeliya valleys to the Colombo and Batticaloa road near Belihul-oya through Haldummulla, and so place these districts in direct communication with the salt-producing district of Hambantota. Other connecting roads of less importance are wanted, and these the Road Committees with their small means hope gradually to make. It is now in contemplation to connect the Deltota and Hanguranketa roads by $7\frac{1}{4}$ miles of new road and thus make a circuit of 56 miles. It is also proposed to connect the Madulkele road, 17·25 miles in length from Madawala, and the Hunasgiriya road, 10·25 miles in length from Madawala, by a road 5 miles in length.

1884. The total expenditure was Rs. 1,979,687, being Rs. 112,229 less than the previous year, or a decrease of 5·37 per cent.

The expenditure in each Province was :—

	1884. Rs.	1883. Rs.	Increase. Rs.	Decrease. Rs.
Western Province ..	597,463	625,617	—	28,154
North-Western Province ..	145,283	157,990	—	12,707
Southern Province ..	177,985	211,372	—	33,387
Eastern Province ..	139,102	143,614	—	4,512
Northern Province ..	149,487	154,381	—	4,894
North-Central Province ..	173,962	87,926	86,037	—
Central Province ..	596,405	711,017	—	114,612
Total ..	1,979,687	2,091,917	86,037	198,266

The mileage of road maintained was :—

	Miles.
Metalled ..	1,399·47
Gravelled ..	843·96
Natural ..	625·25
Total ..	2,868·68

at an average cost of Rs. 376·86 per mile.



S. G. O.

Messrs. MAC GREGOR, MURRAY,
DAVIES, ORMSBY, CHURCHILL, VINE,
& Clerks of the P. W. D. Head Office
Colombo
1884

The increase in the mileage of principal roads in 1884 as compared with 1883 is thus accounted for:—

	Mileage in 1883.	Mileage in 1884.	Decrease.	Increase.
Negombo to Giriulla ..	24	23·50	·50	—
Veyangoda and Ja-ela roads ..	25	25·33	—	·33
Kandapola-Uda Pussellawa road ..	12	15·16	—	3·16
Lower Badulla road, Kandy section ..	15	23·50	—	8·50
Lower Badulla road, Badulla section ..	—	15	—	15
Horton Plains road ..	—	13	—	13
			·50	39·99
			Deduct decrease ..	·50
Deduct the following roads taken over by the Local Board, Nuwara Eliya:—				39·49
Lake road, Nuwara Eliya ..		2·75		
Moon Plain road, Nuwara Eliya ..		2·50		
				5·25
			Total Increase ..	34·24

Under heading New Works and Buildings the following were the more important:—

	Rs.	c.
For bringing a supply of pure water to the hospital and the town of Badulla ..	1,271	54
For certain works at the new Lunatic Asylum ..	2,064	0
For building a resthouse at Morawaka ..	1,000	0

Under heading New Roads and Additions to Roads the following was the expenditure:—

	Rs.	c.
For forming a bridle path from the 7th mile, Ratnapura and Gilimale road to Eratna ..	3,078	51
For a bridle path from Kottawa to Udugama ..	1,180	0
For forming gravelled roads adjoining the north and south base line, Dematagoda ..	1,839	0
For extending a portion of Bulatkohupitiya road ..	10,000	0
For construction of road from new Fort railway station to Chatham street ..	2,424	54
For diverting a portion of Mannar-Madawachchiya road ..	455	98
For drainage improvements between Leyden road and reclamation ground ..	2,460	0
For improvement of South Coast road ..	639	68
For improvement of North Coast road ..	1,063	47
For deviation of road from Anuradhapura towards Kurunegala ..	3,533	33
Total ..	26,674	51

Under heading New Bridges the following expenditure was incurred:—

	Rs.	c.
For erecting a bridge of rail iron on the 39th mile, Yatiyantota road ..	604	34
For constructing a timber bridge across the Attanagala-oya, near Henaratgoda ..	5,982	50
For rail iron bridge on the 37th mile, Yatiyantota road ..	1,795	69
For iron girder bridge on the north salt pans road, near Puttalam Kachcheri ..	2,387	66
For an iron bridge on the 29th mile, Badulla-Batticaloa road ..	5,966	36
For bridge near the Lotus pond ..	340	0
For rail pile bridge at Lunawa ..	4,436	0
For completing iron and masonry works to the bridges at Pañawane and Wagane-oya ..	270	0
Total ..	21,782	55

Under heading Irrigation the following were the more important works in hand :—

	Rs.	c.
For improvements to irrigation works at Tissamaharama ..	23,390	74
For the construction of a road from Kekirawa to the old spill, Kalawewa ..	13,803	3
For clearing 40 miles and 40 lines of the Yoda-ela bund and channel ..	15,986	91
For the restoration of the 41 miles of the Yoda-ela ..	17,000	0
For the construction of sluices to village tanks, North-Central Province ..	24,904	62
For construction of sluices to village tanks, North-Western Province ..	13,183	41
For anicut across Uppar ..	155	83
For completing the Teldena-ela ..	5,155	80

Mr. Churchill writes :—

The average cost of the maintenance of the whole of the roads per mile was Rs. 59·68 less than the cost of their upkeep during the previous year. The following list shows the great reduction made in the average cost per mile of the maintenance of the roads within the last seven years, while the roads were maintained in equally good condition as hitherto :—

Year.	Total Mileage of Roads.	Total Cost of Upkeep of Roads each Year.		Average Cost of Upkeep per Mile each Year.	
		Rs.	c.	Rs.	c.
1878 ..	2,637·53 ..	1,722,441	84 ..	653	50
1879 ..	2,761·28 ..	1,652,263	39 ..	598	36
1880 ..	2,762·72 ..	1,656,789	71 ..	599	65
1881 ..	2,808·40 ..	1,457,708	63 ..	519	50
1882 ..	2,836·47 ..	1,393,649	57 ..	491	33
1883 ..	2,834·44 ..	1,237,358	74 ..	436	54
1884 ..	2,868·68 ..	1,081,093	37 ..	376	86

The expenditure upon irrigation works this year was Rs. 188,418·44, being more than double the sum (Rs. 93,830·30) spent on irrigation works in 1883. The great benefits arising from the restoration of the ancient irrigation works, and from the construction of new works, are becoming more apparent each year in the improved condition of the people in their neighbourhood, and are leading to the re-population of the once populous districts that have been lying waste for centuries.

The Public Works of the Colony were maintained in good order, and the new works completed in an economical and satisfactory manner.



S. G. O.

The Hon. Mr. ROBERT KNOX MAC BRIDE C.M.G.
Director of Public Works.
1885 - 1896

Died in London December 17th. 1905.

CHAPTER VI.

PUBLIC WORKS UNDER THE ADMINISTRATION OF THE HON.
MR. ROBERT KNOX MACBRIDE, C.M.G., 1885-1896.

ON October 4 of this year Mr. Churchill retired from the 1885. Department after a service of nearly thirty years, and Mr. Robert Knox MacBride, M.Inst.C.E., Provincial Assistant of the Central Province, was appointed Director of Public Works.

The expenditure during the year was Rs. 2,189,277, being Rs. 209,590 in excess of the previous year, or an increase of 10·58 per cent.

The expenditure in each Province, including the cost of Establishment, was—

	1885. Rs.	1884. Rs.	Increase. Rs.	Decrease. Rs.
Western Province ..	716,895	597,463	119,432	—
North-Western Province ..	134,847	145,283	—	10,435
Southern Province ..	156,586	177,985	—	21,399
Eastern Province ..	244,045	139,102	104,943	—
Northern Province ..	171,719	149,487	22,232	—
North-Central Province ..	231,479	173,962	57,516	—
Central Province ..	533,705	596,405	—	62,699
Total ..	2,189,278	1,979,687	304,124	94,534

The mileage of road maintained was—

	Miles.
Metalled ..	1,402·71
Gravelled ..	849·71
Natural ..	617·25
Total ..	2,869·67

at an average cost of Rs. 296·43 per mile.

Under heading New Works and Buildings the more important works were :—

	Rs.	c.
For certain works to the Lunatic Asylum, Colombo ..	83,640	18
For water supply, new Lunatic Asylum ..	4,555	52
For drainage, new Lunatic Asylum ..	3,400	0
For cases for the Colombo Museum ..	4,390	0
For building a set of Police lines, Jaffna ..	5,000	0
For restoring the Karaiur reclamation wall at Jaffna damaged by cyclone ..	8,600	34
For constructing a Kachcheri at Puttalam ..	6,600	57
For certain works to the Colombo Lighthouse ..	3,237	81

Under heading New Roads and Additions to Roads the following was the expenditure :—

	Rs.	c.
For bridging a portion of the Panadure-Nambapana road ..	13,629	66
For survey of the road from Pundalu-oya to Wattegoda ..	1,862	50
For extension of the Galmal-oya road towards Alutnuwara, Bintenna ..	5,000	0
For bridging, general upkeep, and improving the bridle road from the Uma-oya to the boundary of Galboda estate ..	2,084	71
For constructing road from the Barrack Plains in Nuwara Eliya to join the Dimbula and Badulla roads ..	18,267	15
For converting the horse bridge over the Kurundu-oya, at the end of the Maturata cart road, to a cart bridge ..	1,193	69
For survey of the Lower Badulla road ..	400	0

	Rs.	c.
For building culverts and drains of rubble masonry on the extension of the cart road from Kurundu-oya <i>via</i> Nildandahena ..	997	50
For the extension of the cart road from Kurundu-oya <i>via</i> Nildandahena towards Badulla	2,002	50
For completing the Trincomalee-Anuradhapura road from the 12th milepost to the boundary	58,620	6
For increased waterway and improvements to the Mannar causeway	12,177	4
For repairs to the Mannar causeway	1,149	76
For repairing and pointing the wharf wall at Mannar	109	85
For improvements of the Yakawewa-Pesalai road	4,241	76
For improvements of the Puttalam-Trincomalee road	132	73
For bridle path from 7th mile, Ratnapura road, to Eratna	499	90
For approach roads to the manufactures, kottu, and salt stores from the western salt pans road	826	13
For widening the Lindula road through the Nanu-oya bazaar	1,127	39
Total ..	124,322	33

Under heading New Bridges the following works were carried out :—

	Rs.	c.
For erecting an iron bridge, 49th mile, Ratnapura road	2,678	74
For erecting an iron bridge, 45th mile, Ratnapura road	1,645	56
For erecting an iron bridge, 49th mile, Ratnapura road	3,751	35
For erecting a rail pile bridge at Puwakkpitiya on the 27th mile, Avissawella road	4,700	0
For erecting a rail iron bridge at Mugurugampola	1,184	15
Total ..	13,959	80

Under heading Irrigation the following important works were in hand :—

	Rs.	c.
For building an anicut on the Wila-ela channel	606	78
For improvements to Udukiriwila irrigation works	11,737	19
For the restoration of the Yodi-ela	72,642	24
For the construction of the Kalawewa sluices	49,000	0
For construction of road from Kekirawa to the spill, Kalawewa	1,091	31
For construction of sluices and spills to village tanks, North-Central Province	13,099	0
For erecting a set of drainage gates at the Toragala-ela	4,230	0
For construction of sluices and spills to village tanks, North-Western Province	19,525	35
For repairing damages done by floods to Rukam tank	5,004	33
For repairing breach in Divilane tank bund	9,342	84
For anicut and storage channel, Kadukamunai tank	6,264	37
For construction of a weir and storage channel for Sagamam tank	2,431	40
For construction of Andankulam tank	13,941	65
For the restoration of Rotawewa tank	10,530	7
For Barrack Plain reservoir, Nuwara Eliya	10,766	92

The most important works in progress during the year were the restoration of Kalawewa, and Mr. MacBride writes :—

When completed, Kalawewa will be a most important reservoir, capable of holding 1,907,415,000 cubic feet of water, serving as a source of supply to the Yodi-ela, and by it supplementing the supply of no less than sixty-eight village tanks. The heavy floods already mentioned have not been without good effects; they have furnished data as to the amount of overflow to be provided for, and the design for the waste weir has been completed from calculations based upon these data.

The following officers have so far been associated with the restoration of Kalawewa :—Mr. E. Holland executed the requisite surveys, sections, and contouring for the preparation of the designs, and for calculations of the capacity and irrigating power of the reservoir. Mr. Wrightson has designed the works, and is the officer in charge of their construction. Mr. F. W. Johnson, in the capacity of assistant on the works, assumed duty in July, 1885.

Also improvements to the new Lunatic Asylum, Colombo, on which approximately Rs. 94,000 was spent. This work was carried out on contract under the supervision of Mr. A. Murray, Superintending Officer, Colombo.

Under heading Departmental, Mr. MacBride writes :—

The death of Mr. A. G. Burleigh was a serious loss to the Department ; he was a most industrious and painstaking officer. Mr. F. A. Target was permitted to resign his appointment. Mr. Burton retired on pension ; his name is associated with several public buildings in the Colony, both as designer and constructor, notably the Kandy Kachcheri. Mr. S. Fuller resigned ; he was a valuable officer when in charge of road maintenance. Mr. E. Dalton retired on pension after a service of twenty-eight years. Mr. J. F. Churchill retired on pension, having nearly completed thirty years' service. Mr. E. S. Barber, who had previously served in the Colony as an officer in charge of irrigation works, was re-appointed to the Department, and has since been stationed in the North-Central Province.

The designation of officers were changed from Provincial Assistant and Superintending Officer to Provincial Engineer and District Engineer respectively.

Mr. F. C. Fisher, Government Agent of the North-Central Province, in his Administration Report, writes regarding principal roads :—

Cart traffic with Puttalam has been temporarily interrupted by the destruction of the fine iron bridge which spanned the Kala-oya river. The flood of November 19 rose some feet over the flooring of the bridge, and the mass of débris which was sucked in and gradually accumulated under the wooden platform finally lifted the 150 feet span clean off the masonry into the bed of the river below. A vote of Rs. 12,000 is included in the Supply Bill of the present year for replacing the ironwork, but probably half as much again will be required to complete the work. Of new works in progress, the most important is the construction of the road between Trincomalee and Anuradhapura.

Under Irrigation he writes :—

First in importance of the irrigation works in progress is the repair of Kalabalaluwewa and the Yoda-ela running north from it for 53 miles and terminating at Anuradhapura.

This magnificent reservoir occupies a very commanding position in the south of the Province, and just to the north of the Dambulla rock, It receives the drainage of 240 square miles of mountainous country by three inflowing streams, the Beligamu, Dambulla, and Mirisgoni-oyas, which combine and issue at the great breach forming from this point the Kala-oya river, which widens to 800 feet when flooded. The sills of the sluices are 400 feet above the sea level, and all the land lying on both banks of the river till the sea is reached is practically within the scope of the tank, its irrigating power being only limited by the discharge of the sluices, and the quantity of water stored. The bund of the tank, which is $5\frac{1}{2}$ miles in length, is thrown across the valleys of the three streams already mentioned. It is of stupendous size, the height in places being 65 feet, the base width 250 feet, and the top width 20 feet. The whole face of the bund is covered by a stone revetment, appropriately designated *relapanawa*, or "ripple band," by the

Sinhalese, its purpose being to resist the action of constant wave play, which would inevitably eat into and destroy any dam not similarly protected. The bund is pierced by four sluices, three placed in the Kalawewa and one in the Balaluwewa bund. The first of these supplied the Yoda-ela running north to Anuradhapura and beyond into the Wilachchiya korale; the second served all lands lying immediately below and in front of the tank; the third was placed at a higher level to water about 800 acres of high land, also in front of the tank; and the fourth supplied from Balaluwewa a second Yoda-ela leading in a westerly direction for about 16 miles, and irrigating some thirty villages lying on the left bank of the Kala-oya river down to its junction with the Siyambalagamu-oya. It is now proposed to restore the first, second, and fourth of these sluices, and to dam the great breach with a spill wall 600 feet in length. The old spill was only 200 feet in width, and the repeated destruction of the tank was undoubtedly caused by the insufficiency of flood outlet. The restoration scheme contemplates the retention of 20 feet head of water, but the sluice masonry will be carried up to accommodate 25 feet head if necessary and the spill wall will be built of proportions, which will admit of 5 feet being added when a larger storage of water is required.

Writing on the Eastern Province, Mr. Allanson Bailey, Government Agent, states :—

It is much to be regretted that the amount which His Excellency the Governor proposed to allow for the road to Kandy *viâ* Alutnuwara was struck out of the Supply Bill by the Legislative Council. This is the shortest line to Kandy, and the construction of a cart road would be of great benefit to the Eastern Province. I do not know whether a practicable trace has been found for a cart road between Nugatenna and Alutnuwara. The present bridle path between the latter place and the top of Galpadihela is much too steep. But whether a cart road can be made or not, a tappal road should be opened without delay from Alutnuwara to the Badulla-Batticaloa road, and the post to Batticaloa should be carried along it. At present letters take 55 hours to reach Batticaloa. By using the Alutnuwara route at least 15 hours could be saved.

In 1884 Mr. MacBride, when Provincial Assistant of the Central Province, introduced his new system of economical road maintenance based on the Macadam system advocated by Messrs. Penfold, Hughe, Henry Law, and Codrington, &c., and as fully described in the latter's book, "The Maintenance of Macadamised roads," published in 1879. Under the new system the surface of the road was lightly picked and repaired with uniform size of broken stone (2 in.), this after being carefully laid was blinded with a small quantity of screened débris taken from the road surface and rolled with a bullock roller.

At first the rollers used (15 cwt.) were not heavy enough to secure satisfactory and permanent consolidation, and this led to much dissatisfaction with regard to the new system. Afterwards, when heavier rollers of 35 cwt. were adopted, the system in Ceylon, as in England, proved a great economical success, and no doubt saved the Colony enormous sums of money.

Under the old system a standard size of broken stone for road repairs was not adopted, and when laid was first stamped by manual labour and then coated with a thick coating of gravel and again stamped till consolidation was secured. This for the time being made a good road surface, but the work was expensive and not as lasting as pure macadam.

Mr. MacBride writes :—

In October, 1880, on return from leave, almost at the close of the labours of the Select Committee on retrenchment, I requested permission to bring my proposal to depart from the peculiar and costly system of road upkeep to the notice of that Committee, with a view to substituting one based upon sounder principles and opinions, and more extended experience than the limited number of miles of metalled roads in Ceylon could possibly have afforded ; in fact, I proposed the introduction of the present system. The permission was granted, but it was too late, and I had only time to submit a hastily-written outline, which did not find favour ; on the contrary, it met with a general disapproval, because of the imaginary injury to which the feet of draught cattle would be subjected. I am sorry I was not allowed to give it a trial at that time, for I am confident I could have satisfied the most sceptical of the fallacy of the "bullocks feet" objection. The introduction of the system then would have effected a saving during the five years which have since intervened of no less a sum than Rs. 1,958,144·32, or an average of Rs. 391,628·86 per annum.

New System of Road Maintenance.—It has been a matter of great pain to me that, instead of receiving a general support, or, at all events, some patience in waiting for results, in my endeavour to reduce the expenditure of this Department, I have been at once assailed with clamour and reprobation from the Press, from Associations, and from individuals. Hitherto there have been constant expressions of disapproval at what has been supposed to be the extravagant estimates of this Department ; and now that the Head of the Department is endeavouring to reform that system, which he is convinced does involve unnecessary expenditure and inefficiency, it is not merely doubts and fears by which his proceedings have been confronted, but by disapproval in the strongest and most passionate language, as if the experiment had been actually tried and been found a failure. The system is not merely a theory ; where it has been carried out and completed, it is a success ; and it is supported by the highest engineering authorities, by every great roadmaker since its invention by Macadam, and by every book that has ever been written on the maintenance of macadamised roads.

One fact remains unquestioned ; the Colony has been a gainer in saving of expenditure by Rs. 284,534·40 last year, and Rs. 323,652·59 this year, and similar and greater saving will follow in succeeding years

As previously stated, Mr. Churchill retired from the Department on October 4, after nearly completing thirty years of service. He came out to Ceylon in 1851, and on the nomination of Colonel Dawson, R.E., was appointed to the Civil Service as a member of the Survey Department. Three years later, however, he was induced to embark in coffee planting, but Sir Henry Ward in 1856 requested him to return to the Public Service, and he was gazetted Assistant Civil Engineer and Commissioner of Roads. From 1859 to 1861 he acted as Head of the Department, and was again appointed Acting Director in 1877, and continued to act till the retirement of Mr. Mosse on October 1, 1882, when he was confirmed in the appointment. His salary during his acting and permanent appointment was £1,500, and he retired on a pension of Rs. 9,500. After retirement he resided at Cookham, Winchfield, Hants, at which place he died on August 6, 1894, at the age of 65, having lived to draw his pension for eight years.

The total expenditure of the Department during the year was 1886. Rs. 2,600,622, being Rs. 411,344 in excess of the previous year, or an increase of 18·75 per cent.

The expenditure in each Province, including the cost of establishment, was—

Provinces.	1886. Rs.	1885. Rs.	Increase. Rs.	Decrease. Rs.
Western ..	752,587	716,895	35,692	—
North-Western ..	190,922	134,847	56,075	—
Southern ..	223,111	156,586	66,525	—
Eastern ..	156,671	244,045	—	87,374
Northern ..	223,492	171,720	51,772	—
North-Central ..	426,458	231,479	194,979	—
Central ..	445,527	533,705	—	88,178
Uva ..	181,854	—	181,854	—
Total ..	2,600,622	2,189,277	586,897	175,552

In this year the Province of Uva was created.

The mileage of roads maintained was—

	Miles.
Metalled ..	1,403·96
Gravelled ..	858·71
Natural ..	630·25
Total ..	2,892·92

at an average cost of Rs. 273·35 per mile.

Under heading New Works and Buildings the following were the more important :—

	Rs.	c.
Constructing a kachcheri at Puttalam ..	15,372	54
Certain works to the New Lunatic Asylum ..	2,557	28
Restoration of Karaiur reclamation wall ..	7,999	99
Erection of dormitories and single rooms, classes 7 and 8, new Lunatic Asylum ..	29,780	0
Erection of single rooms, classes 1 and 2, new Lunatic Asylum ..	27,351	29
Building an infirmary, left wing, new Lunatic Asylum ..	13,550	0
Building hospital and Medical Officer's quarters, Lunugala ..	8,094	5
Building a resthouse at Anuradhapura ..	4,894	17

Under heading New Roads and Additions to Roads the following were the more important works in progress :—

	Rs.	c.
Completing the Trincomalee-Anuradhapura road ..	37,493	96
Increased waterway and improvements to Mannar causeway ..	16,559	43
Constructing 3 miles of the Watagoda-Pundaluoya road ..	46,923	4
Opening a further portion of the road between Kurugammodara and Nambapana ..	10,325	16
Forming a bridle road from Middle Camp to Haputale Gap ..	15,250	0
Extension of the Bulatkohupitiya road ..	16,325	7
Improvement of the Yakwewa-Pesalai road ..	15,606	16
Metalling Badulla-Batticaloa road ..	13,670	38
Metalling of the North-Central road ..	15,706	11

Under heading New Bridges the following was the expenditure :—

	Rs.	c.
Erection of an iron bridge over the Kalu-ganga at Karawan-ela ..	3,987	5
Construction of Sitawaka bridge ..	37,211	0
Erecting a rail pile bridge at Dematagoda ..	5,577	66
Erecting four bridges on the Yatiyantota road ..	5,000	0
Substituting timber bridging by iron on Ratnapura road ..	15,662	55
Erecting a rail pile bridge over the canal at Kotte ..	4,999	35
Re-erection of Kala-oya bridge, Puttalam-Trincomalee road ..	15,953	43
Erecting a cart road bridge over the Kehelgama-oya, near Norton ..	14,979	13
Erecting bridge over the Kimbulpitiya-ela ..	1,521	45
Erecting a footbridge over the Lunumidella stream ..	810	0
Erecting an 18 ft. span bridge near Tiripana ..	1,119	18
Erecting a 12 ft. span bridge near Tiripana ..	966	62
Total ..	107,787	42

Under heading Irrigation the following were the more important works in progress :—

	Rs.	c.
Preliminary work in clearing the Rambara Vihara irrigation channel	12,000	39
Anicut across the Walawe-ganga	40,000	0
Constructing an anicut across the Kirima river at Etpitiya	7,110	6
Restoration of the Yoda-ela	50,611	22
Construction of the Kalawewa sluices	86,256	71
Erection of a spill wall across the Kala-oya at Kalawewa	51,958	14
Re-building of sluice at Balaluwewa	30,608	79
Restoration of the Batugedera-ela	7,183	24
Restoration of Kotawewa tank	10,196	43
Anicut and storage channel for Kadukamunai tank	10,035	20
Construction of irrigation dam across the Ambanganga	39,995	2

Mr. MacBride writes regarding road maintenance :—

Assuming that the votes of 1884 were enough for the efficient maintenance of the roads on the old system—which is a matter of grave doubt, strengthened into a most absolute certainty, because of the deterioration of their condition, due to previous ruthless cutting down of Estimates—the gain to the Colony since the introduction of the system now so well known as “the MacBride system” has been considerable.

In 1885, when but partially applied, the saving of expenditure was Rs. 230,430·48; in 1886 Rs. 291,269·85; and the estimated saving for 1887 is Rs. 310,739·79, total Rs. 832,440·12.

Sitawaka Bridge.—The construction of this bridge has proceeded steadily throughout the year, but not as rapidly as I had hoped to be in a position to record. Difficulty was experienced in founding one of the piers, because of a treacherous foundation and in consequence of the many times the river was in high flood during 1886. These drawbacks increased the cost of the works, and may yet lead to an over-expenditure on the estimate. The following is a brief description of the bridge, the nature of the foundation upon which it rests :— Total length 285 feet; height above river 50 feet; rise of floods 45 feet; width of roadway in approaches, 18 feet (approaches unusually heavy); concrete roadway on buckled plates; bridge piers, cement concrete blocks, upon which cylinders supporting the girders are fixed; foundations, generally speaking, unsatisfactory, without any indication of rock below; the south pier only is founded upon rock. Estimated cost Rs. 45,000; probable cost Rs. 55,000.

Kala-oya Bridge.—An unusually high flood floated the main span (150 feet) of this bridge off the piers upon which it rested. It is said that upon the occasion of this flood 200 village tanks were breached, and that they all discharged into the Kala-oya. The original estimate of Rs. 12,000 proved insufficient, and a request, based on a satisfactory explanation, for supplementary funds met with the sanction of Government. Being an iron structure, much of the ironwork was rendered unserviceable by the twisting and contorting its fall occasioned. The delay in repairing the damage was due to the difficulty in procuring a small portion of the angle iron of the bottom boom, the size not being procurable locally, nor could it have been made, while the quantity required was so small that English firms refused to supply it, because its manufacture would entail special work and involve disarrangement of their workshops. Finally, after considerable difficulty, Belgium produced the article required, and it is daily expected.

Negombo Kachcheri.—The enlarged improvement of the Kachcheri, at a cost of Rs. 9,819·83, has been completed, and the building now affords ample accommodation for revenue services. If the upper storey lately added were extended to the south wing, I believe it would

be found possible to provide space for branch offices of the Kachcheri, which are now located in rented houses in the town. The strengthening of the wing mentioned has been done, and as it is now capable of supporting an upper storey, the cost of the same need not be great; but the advantages which would accrue would, I have no doubt, be much appreciated.

Mannar Causeway.—The works designated as improvements to the Mannar causeway cost Rs. 9,996·47 during the year, and included two bridges, giving a total waterway of 160 feet, which are completed. They were sanctioned in 1885, and in progress when I entered upon my connection with them as head of the Department.

Restoration of Ruins.—To Mr. A. E. Williams, District Engineer, belongs the credit of the first successful instance of archaeological restoration in Ceylon. His Excellency entrusted him with this work at Yapahu, and he has done it admirably. I am sorry time does not permit me to quote from his interesting and descriptive report on the work done; it is, however, sufficient to record that the preservation of this historical monument has been satisfactorily accomplished for the comparatively small outlay of Rs. 1,449·42.

Under heading Departmental, Mr. MacBride writes:—

The Department lost four Officers and two Head Overseers by retirement or resignation and one by death; Mr. J. A. Arneil retired on pension after twenty-five years' service in the Survey and Public Works Departments; Messrs. Trump and Moss were permitted to resign, and have accepted service in the Native States under the Straits Government; Mr. Stewart was retired by Medical Board; Mr. Potger was drowned by his boat upsetting when returning from an inspection of work at the Foul Point Lighthouse; Head Overseers C. Velaithan and D. A. Siriwardana have been pensioned.

The Department was brought up to the strength allowed by the establishment votes by the addition of six District Engineers appointed by the Secretary of State: Messrs. Tomalin, A.R.I.B.A.; Lovegrove, A.M.I.C.E.; Edge, S.I.C.E.; Bingham, S.I.C.E.; Ward, A.M.I.C.E.; Caldicott, A.M.I.C.E.; and three appointed by His Excellency the Governor: Messrs. Hendrie, Pole-Fletcher, and Stanley-Colls. Head Overseer Sabapathy was promoted to be an Inspector, and Messrs. E. S. de Silva and M. Sanmukam were appointed Head Overseers.

On December 31, 1886, there were fifty-one Officers on the establishment of all grades, eight Inspectors, and nine Head Overseers.

There is a too general impression that persons of ordinary training are fit to effectually superintend road maintenance; in fact, that anybody can mend a road properly. But it has been found and is admitted that the duties of a road officer demand suitable education and talents, and some skill in the science of a Civil Engineer. It is, therefore, satisfactory to be in a position to record that in the appointments to the Department during the year under review gentlemen qualified by training and experience have been secured.

Mr. Æ. A. King, first Government Agent of Uva, writes:—

In the early part of the year, Uva, hitherto an Assistant Agency under the Kandy Kachcheri, was made into a separate Province.

The opening of the new Province was the chief public event of the year, and was celebrated by the Governor, in person, in an imposing and interesting ceremonial, at which immense crowds from all parts of Uva exhibited unmistakable signs of gratification.

The new Province now stands the largest but one in the Island.

In the course of the year the state of the Island's finances did not permit of any increased expenditure upon public works, but indications of the advantages arising from closer relationship with the central Government were by no means wanting.

The expenditure of the Department was Rs. 2,586,941, being 1887. Rs. 13,681 less than that of the previous year, or a decrease of 52 per cent.

The expenditure in each Province, including the cost of establishment was—

Province.	1887. Rs.	1886. Rs.	Increase. Rs.	Decrease. Rs.
Western ..	682,214	752,587	—	70,373
North-Western ..	198,729	190,921	7,808	—
Southern ..	243,733	223,111	20,622	—
Eastern ..	161,142	156,671	4,471	—
Northern ..	197,104	223,492	—	26,388
North-Central ..	357,224	426,458	—	69,234
Central ..	454,607	445,527	9,080	—
Uva ..	292,187	181,854	110,333	—
Total ..	2,586,941	2,600,622	152,314	165,995

The mileage of road maintained was—

	Miles.
Metalled ..	1,416·36
Gravelled ..	1,003·47
Natural ..	472·25
Total ..	2,892·08

at an average cost of Rs. 267·35 per mile.

Under heading New Works and Buildings the following were the more important :—

	Rs.	c.
Erection of a jetty, Colombo Customs ..	13,130	49
Improvements to the Colombo Customs ..	22,419	3
Constructing a line of telegraph from Colombo to Negombo ..	10,840	0
Postal accommodation at Hatton ..	5,028	88
Completing the new Kachcheri at Puttalam ..	6,856	89
Jail hospital at Bogambra ..	5,957	28
Hospital for Avissawella District ..	9,151	8
Infirmery and outhouses, right wing, new Lunatic Asylum ..	12,972	88
Completing new resthouse, Anuradhapura ..	4,273	59

Under heading New Roads and Improvements to Roads the following were in progress :—

	Rs.	c.
Opening a further portion of Nambapana road extension ..	14,672	94
Opening road from Ruanwella to Attanagalla ..	5,000	0
Completing the Trincomalee-Anuradhapura road, Eastern Province ..	6,395	25
Metalling the road from Elephant Pass to Iranamadu ..	4,993	70
Constructing the Watagoda-Pundaluoya road ..	47,775	21
Improvement of the Trincomalee-Anuradhapura road, North-Central Province ..	14,981	98
Completing the Watagoda-Pundaluoya road ..	23,817	72
Improvements to the Lower Badulla road ..	10,116	56
Constructing road from Wellawaya to Monaragala ..	13,698	92
Metalling the North-Central road ..	21,986	92
Repair of the Karaitivu-Veriyadi road ..	7,325	58

Under heading New Bridges the following was the expenditure :—

	Rs.	c.
Substituting timber bridging by iron on the Avissawella-Ratnapura road ..	4,925	48
Erecting a 9-ft. bridge on the Kotadeniyawa road ..	930	32
Bridge over the Kelani at Karawanella ..	33,252	49
Erecting buckled plate iron bridges, Negombo District ..	2,124	61

	Rs.	c.
Erecting a buckled plate bridge for flood outlet, Galle ..	2,499	43
Erecting a bridge over the Maskeliya-ganga ..	17,768	80
Constructing footbridges between Akkaraipattu and Sembatta estate ..	494	17
Completion of the Sitawaka bridge ..	20,782	27
Constructing a bridge at Dikapitiya on the Lamastota road ..	5,053	58
Erecting a cart road bridge over the Kehelgama-oya ..	8,657	17
Completing re-erection of Kala-oya bridge ..	4,436	25
Total ..	100,924	57

Under heading Irrigation the following were the more important:—

	Rs.	c.
Constructing an anicut across the Walawe-ganga at Liyangahatota ..	44,956	7
Constructing a channel from Liyangaha-ela anicut to Mamadola Tawaluwila, and Etbatuwa ..	20,728	81
Restoration of Nuwarawewa ..	30,178	2
Construction of sluices to tanks, North-Central Province ..	23,513	33
Spill wall across the Kala-oya ..	124,973	95
Construction of sluices to tanks, North-Western Province ..	26,639	52
Restoration of Lahugala tank ..	7,076	96
Constructing sluice, &c., Elahara channel ..	14,741	7
Headworks over the Bilihul-oya ..	6,398	16
Restoration of Mandukotai tank ..	14,859	93
Restoration of Mamadu tank ..	14,045	5

Mr. MacBride writes:—

New Roads.—The following is a brief account of some of the principal operations of last year:—A sum of Rs. 245,140·29 was expended in the construction of new roads and in additions and improvements to roads. The Nambapana road, which when completed will connect Panadure and Ratnapura and open up extensive tracts of valuable forest land, was extended a distance of 3 miles from Kurugammodara. The Trincomalee-Anuradhapura road has been completed, and so has the Watagoda-Pundalu-oya road. The Wellawaya-Monaragala road, which as surveyed, is 24 miles in length, was begun, and 4 miles were completed.

Bridges.—An expenditure of Rs. 100,924·57 was incurred in the construction of new bridges. In the Western Province, that over the Sitawaka (285 feet in length), was completed (opened early in January, 1888), and the work of substituting iron for timber bridges was continued on the Ratnapura road. The bridge over the Kelani-ganga at Karawanella was advanced considerably, notwithstanding an unfavourable season for river works in the Kelani Valley. The bridging of the Maskeliya river at Kintyre was somewhat delayed, and a serious disaster, involving loss of life, occurred through one of the transverse beams of the staging giving way under strain during the erection of the ironwork. The large bridge over the Kehelgama-oya in Ambagamuwa was completed and opened for traffic. The attempt in October to re-erect the centre span of the Kala-oya bridge on the road between Anuradhapura and Puttalam proved a failure and somewhat disastrous owing to bungling. The Inspector in charge has since been degraded.

Road Maintenance.—I have every reason to be satisfied with the condition of the roads generally. In a large Department there must naturally be found some of its members who want their own way, and my road system has during last year, though in a lesser degree than 1886, laboured under this disadvantage. The funds provided have in most instances proved ample, and there are few cases in which the votes were not spent because the roads did not need the extensive repair contemplated when the Estimates were framed. Rs. 788,933·58 were voted; Rs. 771,615·26 were expended.

Departmental.—Mr. K. H. Coxe retired on pension, and so did Head Overseer C. Marsalis, Mr. F. J. Edge was permitted to accept employment under the Colombo Municipality, and Head Overseer P. Ayathuray was permitted to resign. The Secretary of State appointed one District Engineer to the Department, namely, Mr. W. C. Price; and His Excellency the Governor appointed two, Messrs. A. S. Burnett and F. J. Pigott, and C. F. Emerson as a Tracing Officer. Two Head Overseers, Messrs. S. A. M. Jeremiah and A. H. Auwardt, were also appointed by the Governor.

The total expenditure of the Department was Rs. 2,562,902, 1888. being Rs. 24,039 less than the previous year, or a decrease of .92 per cent.

The expenditure in each Province, including the cost of Establishment, was—

Province.	1888. Rs.	1887. Rs.	Increase. Rs.	Decrease. Rs.
Western ..	774,875	682,214	92,661	—
Central ..	391,790	454,607	—	62,817
Northern ..	186,978	197,104	—	10,126
Southern ..	227,201	243,733	33,468	—
Eastern ..	241,739	161,142	80,597	—
North-Western ..	223,601	198,730	24,871	—
North-Central ..	172,278	357,224	—	184,946
Uva ..	294,440	292,187	2,253	—
Total ..	2,562,902	2,586,941	233,850	257,889

The mileage of road maintained was—

	Miles.
Metalled ..	1,486.98
Gravelled ..	953.59
Natural ..	507.15
Total ..	2,947.72

at an average cost of Rs. 294.14 per mile.

Under heading New Works and Buildings the following were the more important :—

	Rs.	c.
Reconstructing grain shed at Jaffna ..	3,218	80
Erecting jail hospital at Bogambra ..	4,486	69
Erection of a cement concrete cylinder, Colombo Customs Jetty ..	7,773	57
Constructing a line of telegraph from Colombo to Avissawella ..	7,000	0
Building the Uva Industrial School ..	6,413	12

Under heading New Roads and Improvements to Roads the following were in progress :—

	Rs.	c.
Constructing road from Wellawaya to Monaragala ..	39,513	31
Improvement of Akkaraipattu road ..	13,518	1
Colombo Harbour foreshore reclamation ..	39,322	95
Gravel road from Veriaddi to Irrakkamam ..	14,411	76
Extension of the Bogawantalawa road ..	55,774	11
Restoring the Punnalai causeway ..	22,996	40
Improvement of the Kurunegala-Anuradhapura road ..	9,994	5
Diversion of the Galle Face main road ..	7,173	43
Completing the Ratnapura-Nambapana road ..	70,818	41

Under heading New Bridges the following was the expenditure :—

	Rs.	c.
Constructing footbridges between Akkaraipattu and Sembatta estate	804	91
Erection of an iron bridge at Karawanella	38,378	26
Bridge over the Maskeliya-ganga	2,231	20
An 8-ft. bridge on the Kotadeniyawa road	948	15
Road approaches and ford at Ritigaha-oya	3,322	18
Rail pile bridge at Nambapana	9,292	19
Reconstruction of Beruwala bridge	2,360	37
A 6-ft. bridge across the Karawita-ganga	2,353	25
Erecting an iron bridge at Tebuwana	7,440	96
Rebuilding the fallen portions of the Dikwella bridge	10,572	62
Constructing a horse bridge over the Elatota-oya	2,686	51
Constructing a horse bridge over the Kalupadiya-oya, Wilson's Bungalow-Haputale road	2,299	56
Reconstructing bridge on the Mannar causeway	1,403	83
Total ..	84,093	99

Mr. MacBride writes :—

I believe roads confer more good on a people than anything else, and that there is no greater boon to a country. And I think that the improvement and bridging of the main Coast road in the Maritime Provinces of the Island, where no improvement has yet been done, deserves the favourable consideration of Government. Wherever this road has been converted from heavy sand into a well-formed gravelled roadway, even though the main rivers are still unbridged, cultivation of native products has extended, and the population has spread itself along the coast line. This is especially noticeable in the Eastern Province, both north and south of Puliyantivu. The total distance round the Island by the Coast road is 750 miles. Of this distance, 330 miles are formed, and either metalled or gravelled, leaving 420 miles of natural track. I estimate the average cost per mile at Rs. 3,000, and consider the extension south of Batticaloa to be at present the most promising in the public interests.

It cannot be said that Government lost the opportunity which the rising revenue afforded of devoting a large proportion of it to new roads and the improvement of existing roads. A sum of Rs. 369,152·78 was expended in this service, and with results which cannot but prove most beneficial to the country, both directly and indirectly. These works have not been confined to a few localities; they have been undertaken everywhere, and, so far as funds were available, where the greatest good could be effected.

The Sitawaka bridge was opened for traffic early in January. That over the Kelani-ganga, at Karawanella, was thrown open on October 11, and is a fine bridge, comparing favourably with any viaduct in the country. There are five spans of 60 feet each, and the roadway is 54 ft. above the bed of the river. The recurring floods at the bridge prolonged its construction and increased its cost and difficulties; the foundations required great care and attention, and so did the ironwork, as it is an adaptation of the old railway bridge at Kelani, near Colombo.

The Laxapana bridge over the Maskeliya river was also opened for traffic, and is found efficient and useful. I made a very careful investigation of the questions involved in the mistakes which occurred in erecting this bridge, and have no misgivings on the score of the efficiency of the structure for the ordinary traffic of the district which it serves. The Government having reprimanded the culpable officers, I do not think such mistakes are likely to recur; and it is expected that the question of departure from drawings, *which was actually*

the cause, will receive at the hands of all officers of the Department that careful consideration and attention which its great importance demands.

The Tebuwana bridge did not progress satisfactorily, but has since been completed. The Dikwella bridge, which was destroyed by a flood in 1887, was re-erected, and horse-bridges were constructed on the bridle road from Wilson's Bungalow to Haputale over the Elatota-oya and Kalupadiya-oya. The Kala-oya bridge, between Puttalam and Anuradhapura, was re-erected.

Compared with 1887, when the expenditure on bridges amounted to Rs. 100,924·57, the work done in 1888, when the expenditure was Rs. 84,093·99, has been satisfactory. In the former year many of the bridges were in progress, in the latter they were completed and opened to the public, and there has not been any case of failure or defect during the year.

I am glad to say that the utmost care has been taken during the year under review to ensure compliance with the details which are essential to the proper working of the existing system of road repair and maintenance, and it is most gratifying to observe the marked improvement in certain roads in the Colombo vicinity, where, during my absence in 1887, my original plan was not precisely followed. There is room for still greater diligence in some other districts on the part of certain officers in executing the necessary repairs in the manner prescribed, and I hope they will exercise it. I have no desire to keep the charges for maintenance lower than is consistent with complete efficiency, but as the funds provided are ample, it is expected that such efficiency will be secured and maintained.

The traffic has increased with the progressing prosperity visible everywhere, the tolls have realized a higher sale, the rates of cart hire ruling in 1887, then unusually low, were maintained during 1888. These circumstances of themselves speak more forcibly than I can write of the excellent condition of the roads, and place the so-called "starvation policy" of the Government in the category of groundless fabrications. Now that the system has been four years in operation and been found a success, it is expedient to record departmentally the saving of expenditure which the Colony has gained by it.

I might still further fairly lay claim to savings on the difference in mileage. The total mileage of the five years terminating in 1884 is 14,108, which gives an average of Rs. 484·08 per mile. The mileage of the five years ending in 1889 is 14,750, resulting in an average cost per mile of Rs. 280·95. The increase is therefore 642 miles, which at Rs. 484·08, the average cost prior to the introduction of my system, renders a product of Rs. 310,779·36, making a grand total of Rs. 2,986,306·36, or, in round numbers, *three million of rupees* nearly.

The comparison which I have made between the five years preceding the introduction of my road system and the same period of its practical operation is obviously a fair one, possessing as well the merit of candour, inasmuch as I beg to refer those who wish to verify the figures to published returns, and they are accessible to all. It is fortunate for the Colony that His Excellency the Governor did not share the apprehensions of those who have condemned *the system*, because the works of public utility, which have been undertaken and carried to completion through its results, could not have got beyond the stage of projection in any other way than by means of public loans with the interests thereon recurring yearly.

A few remarks on the charges for maintenance of grant-in-aid roads may not be out of place. In 1884 the planters paid a private contribution towards this service of Rs. 35,284·68; in 1888 they were assessed for Rs. 17,092·22, the road mileage being slightly greater. This information will serve to indicate the deep interest taken in mitigating the disadvantage under which private contributors to road maintenance appear to labour.

The principal roads generally are in very good order; and it is satisfactory to hear the opinions of strangers visiting Ceylon, who express their astonishment at finding the roads so well maintained, and so much better than those of other countries.

Irrigation Works.—The information with respect to the progress of works of irrigation which has usually heretofore appeared in this report will be found in that of the Central Irrigation Board.

Pay and Allowance of Irrigation Officers.

	Rs.	c.
Western Province..	4,773	97
Southern Province	4,308	26
North-Western Province	15,261	89
North-Central Province	10,047	2
Total	34,391	14

Total expenditure on irrigation works, Rs. 426,864·06.

Staff.—During the year under review the works generally have been carried out most satisfactorily by the officers of the Department, such works—*e.g.*, Kalawewa, the Karawanella, and Sitawaka bridges, the Walawe-ganga irrigation scheme—as are now undertaken by the Department need efficient officers, who take an interest in what they are doing. The staff is still numerically inadequate for the work of the Department, and it will be true economy when it is increased. It has been decided, in consequence of my urgent representations, to add three officers to the Provisional Establishment. This, although short of what I deemed necessary, will be a relief, and make an appreciable difference, especially in the consideration of leave applications.

The following officers joined the Department:—Mr. Waddell (from the Survey Department), Messrs. Skelton and Chapman appointed by the Secretary of State.

The retirements on pension were:—Mr. F. M. Templer (temporary), Mr. J. H. Fretsz, and Head Overseer Siegertsz. There were two deaths: Messrs. Johnstone and Gunn.

1889. The expenditure of the Department was Rs. 2,907,454, being an increase of Rs. 344,552 over that of the previous year.

The expenditure in each Province, including the cost of Establishment, was—

Province.	1889. Rs.	1888. Rs.	Increase. Rs.	Decrease. Rs.
Western	782,368	774,875	7,493	—
Central	414,570	391,790	22,780	—
Northern	261,836	186,978	74,858	—
Southern	254,493	277,201	—	22,708
Eastern	275,607	241,739	33,869	—
North-Western	242,722	223,601	19,121	—
North-Central	197,184	172,278	24,906	—
Uva..	273,918	294,440	—	20,523
Sabaragamuwa	204,756	—	204,756	—
Total	2,907,454	2,562,902	387,783	43,231

In this year the Province of Sabaragamuwa was created.

The total mileage of road maintained was—

	Miles.
Metalled	1,574·98
Gravelled	967·77
Natural	553·60
Total	3,096·35

at an average cost of Rs. 291·34 per mile.

Under heading New Works and Buildings the following were the more important :—

	Rs.	c.
Police station at Ragalla	5,357	16
Hospital at Mantota	6,815	5
Market at Summagam	5,000	0
Telegraph line, Galle to Matara	8,500	0
Resthouse, Trincomalee-Kandy road	5,644	15
Bungalow for District Engineer, Kalmunai	5,894	62
Cooly lines, North-Central Province	5,066	16
Cooly lines, Badulla-Batticaloa road	5,001	86
Market at Badulla	5,000	0

Under heading New Roads and Road Works the following important works were in hand :—

	Rs.	c.
Colombo Harbour foreshore reclamation	35,361	6
Restoration of the Punnalai causeway	32,817	50
Extension of the Rakwana road	10,534	75
Road from Wellawaya to Monaragala	25,879	10
Constructing the Crurie-Neboda-Matugama road	38,465	3
Ruanwella-Attanagalla road	20,576	38
Bathford Valley road extension	18,733	76
Causeway at Ondaatjemadam	10,182	84
Road from Maharigama on the Kurunegala-Giriulla road	14,253	80
Improving the Coast road, Eastern Province	15,493	95
Improving road from Panadure to Nambapana	18,453	59
Metalling North-Central road	12,605	47
Improvement of road from Galle to Udugama	13,048	76
Improvements to Padeniya-Siyambalagama road	9,998	70
Improving road from Giriulla to Dankotuwa	10,135	54
Metalling road from Mirisgoni-oya to Kikiriyawa	20,846	57
Rebuilding culverts and gravelling the Hindugala-ela road	10,570	20

Under heading New Bridges the following was the expenditure :—

	Rs.	c.
Construction of a rail pile bridge at Nambapana	698	66
Construction of the Beruwala bridge	633	91
Road approaches and ford at Ritigaha-oya	1,885	34
Bridge across the Karawita-ganga	327	67
Completing the Dikwella bridge	148	35
Culverting timber bridges on the Ratnapura road	6,962	17
Bridge over the Dik-oya at Castlereagh	12,494	0
Iron bridges on the North road	5,970	23
Repair of damage by flood to the Badulla and Bundala road, near Weligatta	3,514	0
Bridge across the Maha-oya at Toppu	71,240	42
Timber platform bridge on the Arasadi-Malkumpididi road	2,881	5
Reconstruction of three bridges on the road from Yatiyantota to Kitulgala	9,692	50
Over-expenditure for Sitawaka bridge	124	79
Completing the Mannar causeway extension	906	18
Reconstructing the Kala-oya bridge	1,745	25
Total ..	119,224	52

Mr. MacBride writes :—

New Bridges.—The principal operations under this head were the bridge over the Maha-oya at Toppu, and that over the Dik-oya at Castlereagh.

Toppu Bridge was originally constructed of timber in 1877. In 1883 it was damaged by a flood, which caused a destructive erosion of the river bed, but repairs were effected in the following year, and traffic was

resumed and continued until 1885, when a second high flood caused the previously injured spans to give way again, and eventually, in 1888, Government decided to abandon the existing wooden structure and replace it by an iron one. The following is a short description of the new bridge, which is just now approaching completion; Total length, 359 feet; height above bed of river, 30 feet. It consists of two bow-string girder spans of 144 feet 8 inches each and two short spans of 32 feet 8 inches each. The piers are cast iron cylinders, and the abutments are in brick. Its total estimated cost is Rs. 90,500, and Rs. 71,240·42 was expended during the year under review. The whole of the ironwork has been executed at the Factory, and reflects credit on that institution.

It is but within the past four years that iron bridges of large span have been built at the Factory. Previously they were procured from England, and it is worthy of note and of record that to Ceylon, through its Public Works Department, belongs the credit of the largest span iron bridges manufactured in the East.

The bridge over the Dik-oya, at Castlereagh, was completed and opened for traffic. Its opening was welcomed most heartily, and the Director begs to express his thanks for the support and encouragement which his Department received from the landed proprietors in the vicinity.

The other bridges executed during the year were, structurally speaking, of minor importance; many of them consisted of the reconstruction of bridges built not quite thirty years ago, and the conversion of timber piled structures into iron ones of a permanent character.

Irrigation Works.—The total expenditure under this head amounted to Rs. 410,270·68. A statement of the works undertaken is herein given, but full information regarding their progress will be found in the report of the Central Irrigation Board for 1889.

Road Maintenance.—It is extremely gratifying that in the present report the Director of Public Works is able to avoid all contentious matter. In former reports he was obliged to reply to the severe observations which were being made on all sides upon the altered system of road upkeep which he had introduced, and this naturally led to recrimination. The Director felt confident all through the controversy that time was on his side, that his system was assailed solely because it was not thoroughly understood; and he was sanguine in his hopes and expectations that, as soon as sufficient time had been given to his work to arrive at completion, no rational adverse opinion would continue, both as regards the large saving of expenditure and the stability and improved condition of the roads. He is not in the least surprised at the strong opposition which arose at first to his proposals.

There was a universal pride in the general condition of the roads of Ceylon, and no feeling of parsimony was ever manifested as regards the immense expenditure upon them. There was also a strong apprehension that the reduction of this expenditure would result in the deterioration of the roads, and consequently in increased cost of cartage and of delay. The Director cannot, therefore, on reviewing the whole matter, complain, of the natural disfavour which his proposals met with. Now, however, a remarkable change has arisen; some of the most determined opponents of the system have very handsomely confessed that their fears were unfounded, and that the roads were never, not merely in better condition than at present, but in as good. There are now nearly 3,100 miles of principal roads in Ceylon, and at certain periods, before repairs are undertaken, there will undoubtedly be left a few places in bad order, chiefly where the new system of repair has only recently been properly carried out and the permanent improvement has not yet had time to show itself; still the Director is confident that in his next report and in future reports he will annually be able to announce the completeness of his work, which so far involves a saving of no less than three and a half millions of rupees.

The Right Hon. Sir William Gregory, an *ex* Governor of Ceylon, who recently travelled over 600 miles of roads situate in six of its Provinces, remarks, in his notes which were published in the "Ceylon Observer," as follows;—

"I now turn to roads, to which during the time of my Government I applied constant attention. The enormous cost of their maintenance was ever to me a source of perplexity and dismay. Under the new system of the present Director of Public Works an immense reduction has been made in the cost of upkeep. At the beginning of 1880 there were under 2,600 miles of principal roads in Ceylon, the maintenance of which cost a million and three-quarter rupees; at the beginning of 1890 there were about 3,100 miles of principal roads, the upkeep of which cost something over three-quarters of a million of rupees. Thus, though the mileage of the principal roads increased by 500 miles, the saving on the whole upkeep amounts to a million rupees. Since my arrival in the Island last February I have driven over 600 miles, and I can say most conscientiously that, with the exception of a few miles of gravelled road, which had, owing to continued drought, broken up in the Eastern Province, I never at any period saw the roads of the Island in such perfect condition. I have been somewhat of a roadmaker myself, and should have instantly detected infirmities in the present system as compared with the past, but I saw none, and I heartily congratulate the Colony on the great saving which has been effected in upkeep, while the condition of the roads is fully maintained, as was testified by the recent statement of the Planting Member of the Legislative Council. I am more than ever convinced of the truth of an axiom constantly laid down by a late Director of Public Works, Mr. Mosse, who insisted that a road was not a road till it was metalled, and I remarked with pleasure and surprise the progress of metalling along the great Northern road. I hear that in about three years it will be metalled from Kandy to Jaffna. The same process is greatly required on the Trincomalee gravel road, which suffers both from drought and wet, and should be vigorously taken in hand."

The expenditure of the Department was Rs. 3,376,583·13, being 1890. Rs. 469,128·49 in excess of the previous year, or an increase of 13·89 per cent.

The expenditure in each Province, including the cost of Establishment, was—

Province.	1890. Rs.	1889. Rs.	Increase. Rs.	Decrease. Rs.
Western ..	912,662	782,368	130,294	—
Central ..	410,682	414,570	—	3,888
Northern ..	211,978	261,835	—	49,857
Southern ..	294,587	254,493	40,094	—
Eastern ..	294,861	275,608	19,253	—
North-Western ..	366,361	242,722	123,638	—
North-Central ..	207,136	197,184	9,952	—
Uva..	358,653	273,918	84,735	—
Sabaragamuwa ..	319,663	204,756	114,907	—
Total ..	3,376,583	2,907,454	522,873	53,745

The mileage of road maintained was—

	Miles.
Metalled ..	1,634·80
Gravelled ..	965·44
Natural ..	541·90
Total ..	3,142·14

at an average cost of Rs. 314·80 per mile.

Under heading New Works and Buildings the following were the more important :—

	Rs.	c.
Construction of a line of telegraph from Negombo to Puttalam ..	11,000	0
Clearing the Talpitiya flood outlet ..	24,721	91
Deepening the Kirillapone canal, &c. ..	24,150	71
Constructing a timber jetty on concrete piles alongside of the present export jetty, Colombo Customs ..	26,750	39
Building a new office for the Land Registrar, Jaffna ..	11,169	42
Erection of quarters for the Kachcheri clerks at Chilaw ..	11,528	88
Building a new hospital at Badulla ..	60,000	0
Supplying the town of Anuradhapura with water ..	9,096	90
Construction of a new Post Office, Ratnapura ..	6,969	34

Under heading New Roads and Improvements to Roads the following were the more important in progress :—

	Rs.	c.
Extending the Colombo Harbour foreshore reclamation and drainage works ..	12,310	53
Extending the Colombo Harbour foreshore reclamation works ..	28,343	0
Extending the Bathford Valley road from Blinkbonnie to Bon Accord estate ..	9,152	36
Completing the road beyond Castlereagh store to Claverton store ..	8,064	18
Extension of the Galmaloya-Bintenna road in Uda Dumbara ..	5,000	0
Proposed causeway at Ondachchimadam ..	18,194	76
Extension of the South Coast road from Sagamam towards Komari ..	8,492	87
Extension of the South Coast road from Akkaraipattu to Sagamam, Kalmunai ..	22,803	63
Improving the North Coast road, Eastern Province ..	10,739	43
Improvements of Coast road from Toppu to Mutur ..	10,952	94
Further extension of the Akkaraipattu road from the 8½ to the 13th milepost ..	12,222	42
Gravelling the road from Padeniya to Siyambalagama ..	11,007	64
Metalling 14 miles of the Central road from Kekirawa to Tirapane ..	25,816	53
Improvement of the Horawapotana-Vavuniya road ..	4,992	35
Constructing proposed road from Ella to Kumbalwella ..	26,000	0
Gravelling the Wellawaya-Monaragala road ..	4,999	40
Extending the Ruwanwella-Attanagalla road from the 2nd to the 4th mile ..	22,576	4
Additional works on the first 4 miles and the extension of a mile from the 5th to the 6th milepost of the Ruwanwella-Veyangoda road ..	18,691	49

Under heading New Bridges the following were the more important :—

	Rs.	c.
An iron bridge across the Maha-oya at Toppu ..	13,259	58
Erecting a new rail pile bridge at Digarolla ..	49,100	0
Construction of a rail pile bridge over the Bolgoda lake at Bolgoda ..	25,691	12
Erection of an 100 ft. span pile bridge at Kaduwela ..	9,896	76
Erecting a bridge over Kuru-ganga at Kurugammodara ..	32,537	50
Constructing two bridges on the road from Avissawella to Kitulgala ..	6,263	50

Mr. MacBride writes :—

Toppu Bridge—This bridge was formally opened for traffic in July by Sir E. Noel Walker (Lieutenant-Governor), who was accompanied by a distinguished party. The ceremony, which took place in the presence of a numerous gathering, passed off without a hitch and amidst manifestations of rejoicing at the completion of this much-felt want.

Digarolla Bridge.—An iron bridge with a buckled-plated roadway covered with concrete (length 596 feet, width 14 feet) was completed and opened early in February this year. The old timber structure cost Rs. 3,000 to Rs. 4,000 annually in repairs, and latterly had become so shaky and tottering that tampering with it by props and struts and primitive contrivances was attended with great risk to the constant flow of traffic passing over it.

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- | | |
|--|--|
| 1. Colonel J. E. Boyes, | 7. Mrs. S. Haughton, |
| 2. Lieut. F. H. Neish, | 8. Sir Edward Noel Walker |
| 3. Mr. H. W. Brodhurst, | 9. Mr. S. Haughton, |
| 4. Mr. R. K. MacBride, | 10. Major-General W. G. D. Massy, |
| 5. Lieut.-Colonel F. H. Bridgeman, | 11. Mr. E. C. Davies, |
| 6. Mr. (afterwards) Sir Walter Davidson, | 12. Lieut.- Colonel Mackenzie Churchill, |
| | 13. Mr. P. M. Bingham. |



S. G. O.
SALLY,
who faithfully guarded the Cash Box
during the construction of the Bridge.

OPENING OF THE "TOPPU BRIDGE"
Negombo District
1890.

Bolgoda Bridge.—The main road from Panadure to Ratnapura on the 6th mile is intersected by a narrow arm of the Bolgoda lake. It has now been spanned by an iron structure 316 feet in length with a 12 feet 6 inches roadway.

The other bridges completed in the Western Province during 1890 were the Kaduwela (100 feet), Tebuwana (147 feet), and Ranala (40 feet).

Wellawaya-Monaragala Road.—Throughout the dry season this road is now in capital order; in the rains it becomes heavy, the surface being merely gravelled. None of the bridges required have been built; 600 lineal feet of bridging are necessary, spread over seven separate bridges, of which the *Kirindi-oya* (150 feet), *Parape-oya* (100 feet), and *Kumbukkan-aar* (100 feet) are the most formidable. As constructed even without bridges, the road is very superior to what was asked for originally, when it was stated that merely a good fair-weather track was all that was needed, and I think if the approaches to the rivers and the fords were improved, the question of bridges may be suspended for the present. I recommend that a vote of Rs. 5,000 be allowed for the improvements suggested, and that advantage be taken of the Maduru-ketiya dam for the construction of a bridge over the Kumbukkan-aar in the event of the anticipated submergence of the roadway in consequence of the erection of the dam being realized. The cost of this bridge will, I presume, be met from Irrigation Funds.

Road Maintenance.—The principal roads of the country, of which there are 3,142·14 miles, have been maintained during the year under review in a highly satisfactory state. The system upon which the work of maintenance has been executed has now been in universal force (and the Municipalities and Minor Road Committees are adopting it) for six years. Ten years ago (in 1880) 2,762·72 miles of road cost Ceylon Rs. 1,656,689·71 to maintain, an average rate of Rs. 599·65 per mile. Last year (1890) 3,142·14 miles of road cost Ceylon Rs. 989,142·91 for maintenance, an average rate of Rs. 314·80 per mile.

I have below tabulated a statement which shows the actual saving to the Colony by the introduction of the present system of road maintenance:—

Prior to the Introduction of the "MacBride System."

Year.	Mileage.	Rate per Mile.		Expenditure.	
		Rs.	c.	Rs.	c.
1879 ..	2,761·28 ..	598	36	1,652,263	39½
1880 ..	2,762·72 ..	599	65	1,656,689	71
1881 ..	2,808·40 ..	519	5	1,457,708	63½
1882 ..	2,836·47 ..	491	33	1,393,649	57
1883 ..	2,834·44 ..	436	54	1,237,358	74
1884 ..	2,868·68 ..	376	86	1,081,093	37
Total ..				8,478,763 41¾	

After the Introduction of the "MacBride System."

Year.	Mileage.	Rate per Mile.		Expenditure.	
		Rs.	c.	Rs.	c.
1885 ..	2,869·67 ..	296	43	850,662	89
1886 ..	2,892·92 ..	273	35	789,823	52
1887 ..	2,892·08 ..	267	35	773,205	26
1888 ..	2,947·72 ..	282	94	834,048	34
1889 ..	3,096·35 ..	291	34	902,100	50
1890 ..	3,142·14 ..	314	80	989,142	91
Total ..				5,138,983 42	

Actual saving Rs. 3,339,779·99½.

The traffic on the roads is increasing, and, gauged by the notable improvements in the general revenue as published in the *Gazette*, the increase must be very great indeed.

The maximum revenue of Ceylon was in 1877 (Rs. 17,926,190), and the maintenance of 2,480·35 miles of principal roads then cost Rs. 1,598,891·60½ (Rs. 644·62 per mile).

The minimum revenue was in 1882 (Rs. 12,161,570), and the maintenance of 2,836·47 miles of principal roads cost Rs. 1,393,649·57 (Rs. 491·33 per mile).

Since 1877 the metalled road mileage has increased by 60 per cent. nearly, the gravelled by 33 per cent., and the natural diminished by 25 per cent.

Departmental : Deaths.—The Department lost by death in 1890 two officers : Mr. Prime died on reaching home in July, after a service of twenty-four years ; Mr. Koch died at Ambanpitiya in September, having completed fourteen years' service. The name of the former had principally been associated with building work in Jaffna and other parts of the Northern Province. Mr. Koch, who had received his early training in the Public Works Factory, had done a great deal of good when in the North-Western and North-Central Provinces.

Appointments.—The following appointments were made during the year :—By the Secretary of State : Mr. H. Bucknall, Mr. C. H. Romanes, Mr. A. E. Caldicott. By the Governor ; Mr. W. B. Gregson (a probationer of 1889), Mr. R. W. J. Crabbe (transferred from Survey Department), Mr. C. de Silva, and Mr. R. Nicholas. The following were appointed on probation ; Messrs. Norman Walker, W. C. Simmons, and H. N. Wetherall.

In this year Mr. MacBride received the honour of C.M.G.

1891. The expenditure of the Department was Rs. 3,316,111, being Rs. 60,472 less than that of the previous year.

The expenditure in each Province, including the cost of Establishment, was—

Province	1891. Rs.	1890. Rs.	Increase. Rs.	Decrease. Rs.
Western ..	836,196	912,661	—	76,465
Central ..	401,290	410,682	—	9,392
Northern ..	228,563	211,978	16,585	—
Southern ..	325,631	294,587	31,044	—
Eastern ..	250,711	294,860	—	44,149
North-Western ..	396,317	366,361	29,956	—
North-Central ..	192,453	207,136	—	14,683
Uva.. ..	377,425	358,653	18,772	—
Sabaragamuwa ..	307,525	319,663	—	12,138
Total ..	3,316,111	3,376,581	96,357	156,827

The mileage of road maintained was :—

	Miles.
Metalled	1,727·65
Gravelled	943·29
Natural	541·40
Total ..	3,212·34

at an average cost of Rs. 328·68 per mile.

Under heading New Works and Buildings the following were the more important :—

	Rs.	c.
Constructing a timber jetty on concrete piles alongside of the present export jetty, Colombo Customs	11,213	74
Building a new iron bridge over the Kirillapone canal at the 4th mile, Wellawatta road	14,606	7
Supplying materials for building lines for prison guards, Welikada Jail	7,896	84
Ward for females, Civil Hospital, Colombo	9,904	98
Temporary Telegraph and Money Order Offices on the ground opposite Messrs. Walker & Co.'s premises	6,324	97
Erecting Police Barracks and lock-up at Hatton	5,805	56
Erecting a permanent men's ward, &c., for the hospital at Nuwara Eliya	5,650	0
Erecting a hospital at Nawalapitiya	4,000	60
Construction of a new export jetty at Galle	19,690	10
Erection of quarters for the Kachcheri clerks at Chilaw	6,264	75
Construction of a new hospital at Anuradhapura	18,616	57
Building a new hospital at Badulla	26,800	0
Construction of the Badulla Kachcheri main building and one of the two annexes marked D on plan	19,453	43
Construction of a new Post Office at Ratnapura	6,029	98
Police barracks, Rakwana	4,995	68

Under heading New Roads and Additions to Roads the following were in progress :—

	Rs.	c.
Extending the Colombo Harbour foreshore reclamation works	24,094	91
Completing the Ruwanwella-Attanagala road	28,270	0
Opening out a roadway from Elahera to Pallegama, Matale District	3,236	61
Extension of the Galmaloya-Bintenna road in Uda Dumbara	5,000	0
Metalling the North-Central road in the Northern Province	8,376	2
Construction of a natural road from Pottuvil to Muppene, Eastern Province	9,999	99
Improvements of Coast road from Toppur to Muttur	5,533	18
Opening the road from the 6th milepost to the Verugal-ar, Trincomalee District	9,173	83
Completion of the opened portion of the South Coast road, Kalmunai District	5,000	0
Metalling a portion of the Kurunegala-Dambulla road	6,261	15
Further extension of the Akkaraipattu road	5,080	0
Certain improvements to part of Wariapola-Chilaw road	4,999	67
Metalling 3 miles of gravelled road on Kurunegala-Dambulla road	8,378	7
Deviating a part of the Padeniya-Anuradhapura road	6,191	55
Improvements to the Kurunegala-Puttalam road	4,996	48
Extending the road from Kompaspara towards Wariapola	4,987	40
Improvement of the Horawapotana-Vavuniya road	4,999	65
Constructing 4 miles of the Kalawewa-Galawella road	4,995	5
Constructing a portion of Habarana-Topawewa road	8,005	67
Metalling the road from the end of Anuradhapura bazaar towards Galkulam	9,316	53
Completing the gravelling of the Wellawaya-Monaragala road	4,999	98
Deviating the main road at Batgoda slip	18,181	21
Extending the Ruwanwella-Veyangoda road from the 6th to the 9th milepost	26,687	24
Improvements of the Rakwana-Morawaka road	4,000	0

Under heading New Bridges the following were in progress :—

	Rs.	c.
Erecting a rail iron pile bridge at Embulgama, 16th mile, Avissawella road	9,998	60
Construction of a Warren girder bridge of 100 ft. span across Attanagala-oya	45,469	49
Building a new bridge at 99th milepost on the Galle-Matara road	8,044	90

	Rs.	c.
Building bridges on Madampe, Dandugamuwa, and Narammulla roads	8,983	86
Replacing temporary bridges over the Toppu-Chilaw road with permanent structures	14,931	51
Erecting a bridge over Kuru-ganga at Kurugammodara	10,990	24
Malwatu-oya bridge	5,709	39

Mr. MacBride writes :—

There was a decrease of Rs. 124,114·87 in the expenditure upon New Roads and Additions to Roads. The only grant-in-aid proposal was not undertaken, because the private contribution towards its construction was not paid, and the Government moiety was locked up in consequence. This year there are three large votes for similar roads, but for the same reason nothing has been done. The private contribution is not yet paid, and the Government money cannot be applied to any other purpose until the year has lapsed.

Although there is a decrease in the expenditure upon New Bridges, there were many constructed, two only being over large rivers. The money spent upon Irrigation Works was also less than in 1890, which is due to the fact that no new large schemes were sanctioned, and that the votes were confined to advancing those in progress and to works of a minor character.

The planting of shade trees made, what may be considered, good progress, while in some Provinces the officers deserve great praise for their efforts. On December 31, 1891, there were 17,208 *ingasaman* trees actually growing that had been planted during the previous year and a half.

A design for a General Post and Telegraph Office on an estimate of Rs. 270,000 having been approved, tenders were invited for its erection, but the lowest formal tender amounted to nearly Rs. 100,000 over the estimate; whereupon it was decided to undertake the work departmentally, and the preliminaries were begun towards the end of the year. It is too early to anticipate the triumph of the designor and estimator (Mr. Tomalin) in the event of his bringing the work to a successful termination within the funds at my disposal, but I am confident that he will exert himself to do so, and I am hopeful that he will succeed.

Three new bridges were nearly completed at the end of 1891. The Imbulgama one near Giriulla and a Warren girder of a 100 feet span over the Attanagala-oya. The total expenditure on them was Rs. 59,706·03.

Artesian well-boring apparatus was ordered from the Pierce Artesian and Oil Well Supply Company, New York, at a cost of Rs. 11,195·44, but, though shipped on January 2, 1892, has not yet reached Colombo. It is intended to experiment in Negombo in the first instance.

With regard to this branch of engineering, which is new to Ceylon, I quote the following extract from my report to Government on the artesian well-boring experiments that I had seen in India, which induced the approval of the proposal to import an efficient boring apparatus :—

“There has been little published information on deep borings in alluvium, though I understand a work either has been or is soon likely to be published describing the practice in California, but there is no doubt that in such borings the difficulties are great, and so is the cost.

“I have alluded to the difficulties, not with a view of throwing cold water on experiments in Ceylon, but in order to put the discussion of the subject on as sound a basis as possible. My visit to India has made me qualified to advise the Government in respect of artesian boring, which has puzzled the engineering skill of several tropical countries, for

I have had many useful opportunities. A well-planned and properly executed scheme might lead to good results, but in determining the scale upon which it should be undertaken, I confess to a reluctance in advising expenditure on a large scale. In dealing with the untried question of success I am unable to give an assurance of it. Whatever is done will be experimental, and the Government here, as in India, must be satisfied with the results, whatever they may be.

"I have devoted much time to the inquiry for which I went to India, and, however disappointing the result may appear, my visits will, I have no doubt, save the Colony money.

"In Ceylon the only previous work to act as a guide in artesian borings is that at Mannar, begun upon my advice and recommendation. Events there have proved that the ordinary boring tools, notwithstanding the precautions taken, have been insufficient for the work.

"The result could not, of course, have been foreseen; the endeavour was to economize, and hopes were raised at one period of the borings (160 feet), as indications of rising water were reported, but they came from untubed strata, and I think the action of the tide was the cause. I have nothing more to add to this report except to advise the continuance of experiments, but on a much less pretentious scale than in India. There must be artesian water in Ceylon; the average rainfall is over 100 inches, and gives 4,000,000 gallons per square mile per day. The rivers, evaporation, and other sources take away most of this, but the water absorbed by the earth finds its way underground to the sea or remains stored up in some subterranean stratum, and it is this water which may be obtained."

Road Maintenance.—His Excellency the Governor having approved of my proposal to import a steam roller, one of 10 tons arrived in December. It is too soon to form an opinion of the relative cost of rolling by steam and animal power, as the former must be tried under various conditions. So far it is known that the cost is about the same, but in point of public convenience steam has the advantage, as consolidation is much more rapid and a better shaped road is obtained. It is further my opinion that by consolidating rapidly the surface will wear better, and that steam will thus be found economical.

Departmental.—The Department lost by death in January Mr. F. Armstrong, the District Engineer of Jaffna. Mr. Armstrong was a native of Jaffna, and I have no hesitation in saying that no officer of the Department, whether European or native, ever left a better record.

In June Mr. Finch died; he had been ailing for some time, and had put off too long the change which was essential to his recovery.

Mr. Spooner was seconded for service in a Native State under the protectorate of the Straits Government. I understand that he is not so hard worked as in Ceylon, and is better paid.

Mr. James Robertson, the veteran of the Department, and District Engineer of Nuwara Eliya, retired after a continuous service, with very little leave, of thirty-three years. As a road officer his name has been a household word—a name that has been associated for good with road work of every description and bridge construction. To mark the sense of their appreciation of his services and worth, the officers who knew him well presented him with a souvenir of the Department.

A reclassification of the District Engineers and their subordinates, dividing them into grades, having been approved by His Excellency the Governor and received the sanction of His Lordship the Secretary of State, came into operation. It involved no increase of expenditure; on the contrary, it effected a small saving.

The total expenditure of the Department was Rs. 4,028,602, 1892, being Rs. 712,490 in excess of that of the previous year, or an increase of 17.68 per cent.

The expenditure in each Province, including the cost of Establishment, was—

Province.	1891. Rs.	1892. Rs.	Decrease. Rs.	Increase. Rs.
Western ..	836,196	1,097,763	—	261,567
Central ..	401,290	589,176	—	187,886
Northern ..	228,563	259,461	—	30,898
Southern ..	325,631	329,075	—	3,444
Eastern ..	250,711	320,308	—	69,597
North-Western ..	396,318	451,126	—	54,808
North-Central ..	192,453	198,580	—	6,127
Uva.. ..	377,425	416,002	—	38,577
Sabaragamuwa ..	307,525	367,111	—	59,586
Total ..	3,316,112	4,028,602	—	712,490

The mileage of road maintained was—

	Miles.
Metalled ..	1,864·66
Gravelled ..	865·59
Natural ..	568·65
Total ..	3,298·90

at an average cost of Rs. 328 per mile.

In Mr. MacBride's report for the year details of expenditure under the usual headings are not given.

The principal works in progress were :—

WESTERN PROVINCE.

New General Post and Telegraph Office.
The Kelani bridge.
Kalutara District Hospital (on Culloden estate).
Flood outlets, Talpitiya, Kirillapone, and Dehiwala.

CENTRAL PROVINCE.

Nawalapitiya hospital and water supply to Nawalapitiya and Hatton.
Strathdon road.
Norwood-Upcot road.
Brownlow-Luccombe road.
Norton-Caroline road.

NORTH-CENTRAL PROVINCE.

Hospital at Anuradhapura and metalling north road.

PROVINCE OF UVA.

Madulsima District road.
New court-house, Badulla.
Circular Drive, Badulla.

PROVINCE OF SABARAGAMUWA.

Gurugoda-oya bridge.
Polatagama road.

Mr. MacBride writes:—

New General Post and Telegraph Office.—The progress made with the new General Post and Telegraph Office has, on the whole, been satisfactory. The actual building operations were begun on August 29 last, that is to say, it was then the foundation stone was laid. Considerable time was spent in the removal of boulders encountered in clearing the site; blasting operations were rendered tedious because

of the position, which is bounded on three sides by the principal and crowded streets of the Fort, and on the other by old buildings which are occupied as merchants' offices, whose gables crumbled down by vibration from the rock-blasting operations, which involved their substantial reconstruction. It is feared that the gentlemen who occupied the offices at the time were inconvenienced, but they are assured that no avoidable work of an unpleasant character (to them) was undertaken, and that the officers in charge regretted their inability to mitigate the inconvenience, and they are much obliged for the forbearance of those who suffered. The departmental estimate of the cost of this building is Rs. 270,000, which was considered high by many, and, as recorded in the report of 1891, was put to the test of tenders, when the lowest received was Rs. 100,000 over the estimate. The expenditure in 1892 was Rs. 74,775·61, and during the first four months of the present year Rs. 25,093·78, leaving an unexpended balance on May 1, 1893, of Rs. 190,130·61, which I think should be enough to complete the building, provided there is no chopping or changing or tampering with it as designed.

The Kelani Bridge (seven spans of 100 feet).—To the delay in acquiring the land for the approaches and construction of this bridge is to be attributed the fact that but little actual progress was made during 1892. The Director applied for the acquisition of the land required on May 31, 1892; he was authorized to enter upon it on October 31, 1892, and was then startled by being called upon to pay a sum of Rs. 50,000 (on account) for the purchase thereof. Rs. 50,000 means Rs. 2,941·18 per acre for property composed of waste land, grass land swamp, and a few buildings, but none of a really permanent character. The provision for the compensation in the estimate had originally been Rs. 8,000; but this was raised to Rs. 15,000 in the hope that the most exorbitant award of assessors would be covered by it, and that delay which might possibly occur from insufficient provision would be obviated. Exclusive of the Rs. 50,000 mentioned as paid for compensation, the expenditure amounted to Rs. 61,931·71, principally on cylinders imported from England and on locally purchased materials. Though the Director felt satisfied that the Public Works Factory was fully equal to constructing the ironwork, he deemed it prudent, as the Factory Engineer and his Assistant were already too busily occupied, to strongly recommend the Government to invite tenders in London and subsequently, to accept the lowest tender, which has been done.

Messrs. E. C. & J. Keay's tender of £9,659. 7s. 9d. has been accepted, the delivery in single spans to be from three to eight months.

New Roads in the Central Province.—The completion and opening of the Strathdon road and the undertaking of the Norwood-Upcot and the Brownlow-Luccombe roads were the most important events of the year from the departmental point of view in the Central Province. With regard to the Norton-Carolina road it is fourteen years since the original survey of it was made by a private surveyor under Mr. MacBride's direction—an instance of how slowly the grant-in-aid system progresses in certain localities. However, it is to be hoped that the private contribution will be made up this year, so that the vote may not be allowed to lapse, which is a consequence of a vote standing for two years without expenditure against it.

Hospital at Anuradhapura and Metalling North Road.—Mr. Hayes, the Provincial Engineer, has written at length. There is but little to add regarding the works, which were nearly all of an ordinary character, the principal among them during 1892 being the continuation of the metalling of the North road and the completion of the new hospital. The former progressed fairly well, throughout the year there was considerable clamour about scarcity of labour. The new hospital has been remarkably well planned, built, and finished alike creditable to designer and constructor (Mr. F. W. Johnson).

Madulsima District Road.—The principal operations of the year in the Province of Uva were the Madulsima road, which bifurcates from the main Badulla-Batticaloa road not far from Passara resthouse and terminates at Mahadova, a distance of $11\frac{1}{2}$ miles. Only 6 miles were sanctioned for 1892, and the progress made, considering that work was suspended for a short time, though for no departmental reason, was highly satisfactory. The road, though a branch to tea plantations, is not being constructed on the grant-in-aid principle, but considering that Madulsima has been without a district road ever since it became a planting centre, and that it has gone through many vicissitudes of fortune, it was not an instance in which that principle could well have been required, more especially as the object of making Passara its starting point will be attained when the railway traffic at Bandarawela is thereby benefited. The Director is now of opinion that a connection should be made with the Hindugala-Namunakuli road which is at present under construction, making it feasible for Madulsima traffic and the traffic of intervening properties to go direct to Bandarawela, a saving of 6 or 7 miles, and of the well-known and trying Debedda Pass.

Gurugoda-oya Bridge.—The Gurugoda-oya bridge, since opened to traffic (1893), and Polatagama road were the principal operations of the year in this Province (Sabaragamuwa). The former did not progress as well as it might have done had a little more energy been displayed. It was anticipated that the work in the foundations would be attended with delay and expense judging from their treacherous character as indicated by certain borings which had been taken prior to the preparation of the design; the contrary was however the case, the foundations were favourable. Although the bridge has been well constructed, the cost has been unusually high. A full report upon the whole subject has been submitted to Government.

Artesian Well-boring.—Boring for artesian water at Negombo was commenced on July 30, since when three experiments have been completed, but none of them can be said to have given satisfactory results.

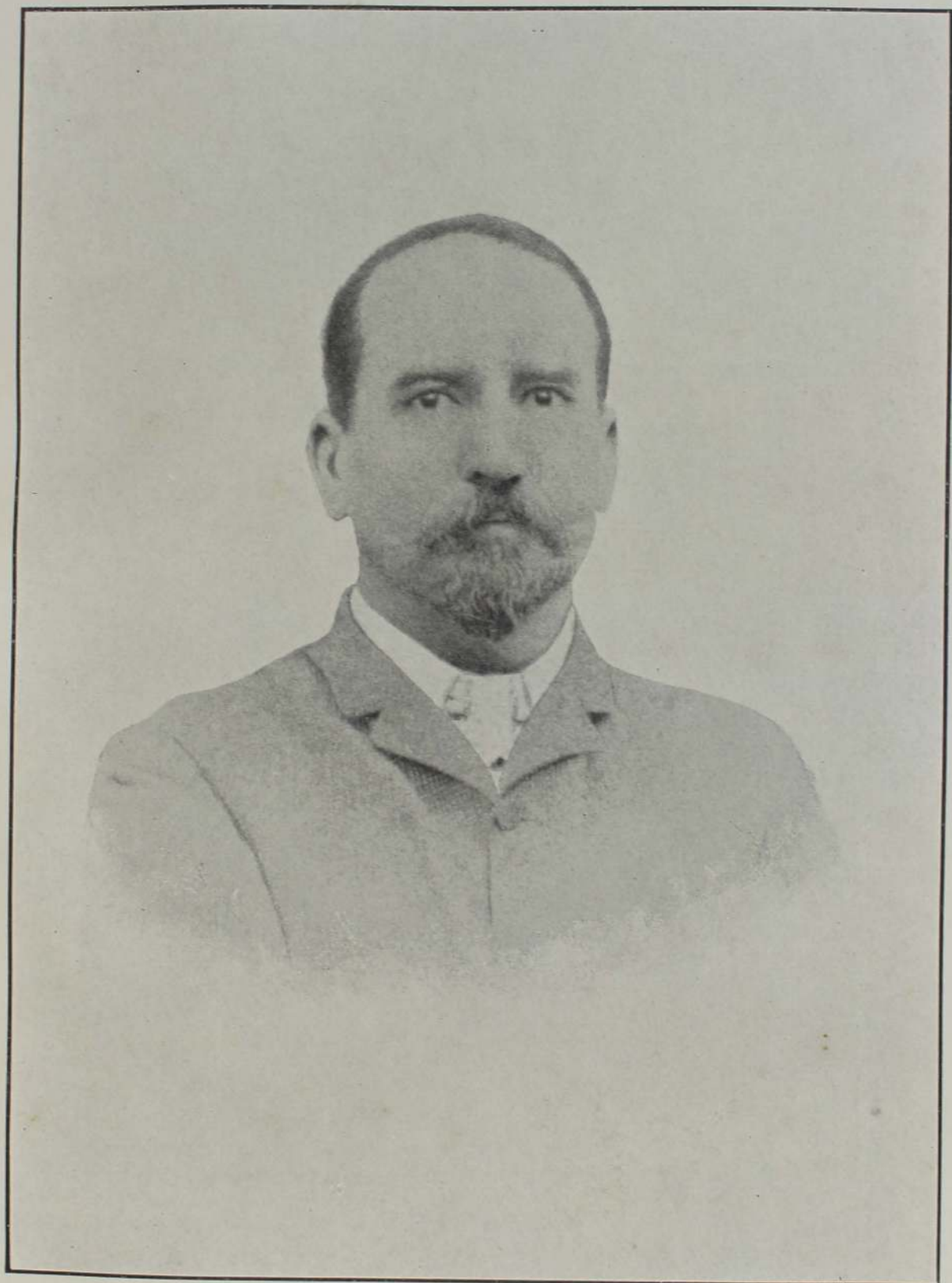
The first trial proved unsuccessful, though it was anticipated that before reaching the primary gneiss rock a sand stone bed would be encountered, in which case gushing water might have been tapped. No sand stone was met with, and the borings were stopped at 75 feet after piercing the gneiss a depth of 10 feet. The rise and fall of the tide was observed in the tubing, so that there is pervious strata between the site of the experiment and the lake. Salt water was present throughout. The cost was Rs. 775·63, less Rs. 116·60, for a shed, &c.; the actual rate per foot for boring was Rs. 8·80. The men were not accustomed to the machinery at the outset.

The second experiment was abandoned after 74 feet had been pierced, the gneiss rock being again encountered. The strata were similar to those of boring No. 1 (diagrams of them have been forwarded to Government) with this exception, the depth of each stratum was less and salt water was not present. The cost was Rs. 223·06, or Rs. 3·01 per foot.

In the third experiment, which was abandoned at 57 feet when the gneiss was again met, hopes of success were at first entertained. A spring was tapped, but as it did not rise in the tubing above the surface of the ground, it was found to be of no value towards the supply of Negombo by gravitation. The available quantity was limited to 345 gallons per hour, which would have been barely sufficient for drinking purposes and allow no margin for increase of population. The water was found to be good and clear, and not discoloured by pumping.

It has now been decided to resume experiments at Mannar.

The Steam Roller.—By the introduction of the steam roller the cost of consolidating road metal on the principal public streets in the town of Colombo has been reduced to one-fourth what it was previously rated at,



S. G. O.

FRANK VINE
Provincial Engineer
Service
1866 - 1892.

Living 1917 Aged 80.

and the time reduction has been in the same ratio. The consolidation is perfect, and the use of blinding material, which is so detrimental to the metal itself, is as unnecessary with the steam roller as with the other rollers in common use in the Department. Messrs. Aveling and Porter of Rochester supplied the machine, its cost being Rs. 5,634·74.

Under Departmental Mr. MacBride writes :—

Mr. Vine, Provincial Engineer of the Central Province, whose appointment to that position dates from 1885, retired pensioned on December 5, 1892. His service had extended over a period of twenty-six years, and with his name are associated the construction of the Museum and Custom-House, Colombo, and rail pile bridges, Mr. Vine being practically the inventor of the "rail pile." Mr. Ormsby succeeded to his appointment.

At the end of 1892 there were no less than four vacancies unfilled notwithstanding the fact that three new officers—Messrs. R. W. Smith, R. A. Powell, and A. R. Tocke—had arrived from England during that year.

The total expenditure was Rs. 4,347,765, being Rs. 319,163 in 1893. excess of that of the previous year, or an increase of 7·34 per cent.

The expenditure in each Province, including the cost of Establishment, was—

Province.	1892. Rs.	1893. Rs.	Decrease. Rs.	Increase. Rs.
Western ..	1,097,763	1,330,003	—	232,240
Central ..	589,176	518,727	70,449	—
Northern ..	259,462	273,948	—	14,486
Southern ..	329,075	346,563	—	17,488
Eastern ..	320,308	259,038	61,270	—
North-Western ..	451,126	495,800	—	44,674
North-Central ..	198,580	185,593	12,987	—
Uva ..	416,002	608,502	—	192,500
Sabaragamuwa ..	367,110	329,593	37,518	—
Total ..	4,028,602	4,347,765	182,224	501,387

The mileage of road maintained was—

	Miles.
Metalled ..	2,010·14
Gravelled ..	855·45
Natural ..	546·35
Total ..	3,411·94

at an average cost of Rs. 329·82 per mile.

No details are given in the annual report under the usual headings.

The Kelani Bridge.—Mr. C. V. Bellamy, the Engineer in charge, writes :—

The works in hand on January 1, 1893, included excavation and pile driving for foundation of north abutment, and the supply of earthwork for the approach roads. The amount spent out of the estimate was Rs. 63,526·42, of which Rs. 41,543·66 was for ironwork, cylinders, &c., on order. The quantity of actual work done at the site was represented by the sum of Rs. 3,659·59, the balance, Rs. 18,323·17, being expended in the collection of materials and the purchase of plant.

The sinking of the cylinders of the sixth pier (that on the southern bank) was suspended in June, after reaching a depth of about 40 feet, owing to want of an efficient crane, but operations re-commenced in October, and at the close of the year the upstream cylinder, sunk to a depth of 64 feet below ground level, was ready to receive the concrete, while the down stream cylinder, sunk to 68 feet below ground level

still showed signs of sinking. Much anxiety has arisen over this cylinder owing to the very large depression of soil around the cylinder which has taken place from time to time, due to the sand boiling up inside. As it has since, however, withstood a test of 100 tons, it is confidently expected that little or no further settlement will take place, and this cylinder will be completed probably early in March next. During October the cylinders of No. 4 pier were placed in position and the sinking commenced, so that by the end of the year each had reached a depth of over 40 feet.

The operations at this pier were noteworthy, owing to both cylinders having suddenly run a considerable distance. In the case of the upstream cylinder the run was about 12 feet, but in the downstream cylinder it was over 20 feet, causing the pier and the weights, 44 tons, to disappear suddenly, rapidly, and entirely below the level of the water. The downstream cylinder ran gradually, but upon removal of the weights of the upstream cylinder it was found that a fracture had occurred through five sections, a length of 20 feet.

The New General Post Office.—Mr. Tomalin, the designer and officer in charge of the new General Post Office, furnishes the following account of the work performed during 1893. His devotion to this building is almost a case of structure worship, while the considerable amount of work carried out departmentally is most creditable to him and to his chief, Mr. T. Smith :—

“Work on the new General Post and Telegraph Office during the year was confined chiefly to carrying up the walls from a few feet above foundation level to the level of the roof, where the work was temporarily stopped to allow of ironwork and the roof principals being fixed.

“A contract for casting the heavy columns was let to Messrs. Walker, Sons & Co., Limited, in May, and the work, which was one requiring considerable care and skill, was satisfactorily completed within the contract time. The heavy iron trusses were made in the Government Factory, the workmanship being excellent; the framing and fitting of the ironwork for floors, &c., was also performed in the Government Factory, besides numerous castings required for the work. The ironwork was fixed on the north side of the building during the latter half of November and early in December, and the woodwork of the roof of that part of the building was commenced on December 6, and progressed rapidly. The ironwork of the other part of the building was erected in January of the current year.

“The sawing of timber was pushed forward as rapidly as possible in the Government Factory, and the woodwork of the floors and partitions was well advanced. The whole of the doors and windows were completed and placed in store ready for fixing.

“The stone-flying staircases were completed during the year. The very large stones required were quarried at Panadure and transported to Colombo. A large quantity of cut stones for staircases was roughly dressed at Ruwanwella and Ratnapura and transported by boat to the Colombo lake, and removed thence to the site, this method being found cheaper than obtaining the stone nearer at hand and transporting by road.

“Some difficulty was experienced in obtaining a sufficient number of skilled bricklayers owing to the large number of public and private works in progress. The average daily number of men and women employed on the work throughout the year was 315, and of this number about 180 were skilled artificers.”

The Deduru-oya Bridge, North of Chilaw.—The progress made with this important work has been satisfactory in everything but cylinder sinking. The officer in charge (Mr. Gregson) has been ill, which would account for the lack of progress of this part of the work. The end of 1894 should see the bridge nearly completed. It is proposed to move Mr. Gregson to a healthier charge, and place a more robust officer at Deduru-oya.

In the several Provinces the most important works in progress were :—

WESTERN PROVINCE.

New Jail at Mutwal.
Wards for sick passengers, General Hospital.
Queen's House, Colombo (extensive improvements).
Kirillapone flood outlet (completed).
Dehiwala flood outlet.
Foreshore Reclamation.
Road from Badureliya towards Kukulegama (the erection of two bridges Muguru-oya and Pol-oya).

CENTRAL PROVINCE.

Post Office, Nuwara Eliya.
Quarters for European Nurses, Kandy Hospital.
The Kintyre-Luccombe road.
The Norwood-Upcot road.
Road from Carolina to Norton Bridge.

SOUTHERN PROVINCE.

New Passenger Jetty at Galle.
The Kepu-ela bridge, Matara-Hakmana road (completed).

EASTERN PROVINCE.

Obelisks at Kalkuda (completed).

NORTH-WESTERN PROVINCE.

Kimbulwana-oya bridge (completed).
Lunu-oya bridge (completed).
New Post Office at Polgahawela (completed).
The Deduru-oya bridge, north of Chilaw.

PROVINCE OF UVA.

Madulsima cart road, $11\frac{1}{4}$ miles (completed).
Naula-Spring Valley road.
Hindugala road.
Bridge over the Kumbukkan anicut, 200 lineal feet (completed).
Kumbukkan anicut (completed).

Under Departmental Mr. MacBride writes :—

The vacancies which existed at the end of 1892 were filled by the appointment of Messrs. Driberg, Goodman, Carte, and Court in March, October, November, and December, respectively.

The total expenditure of the Department was Rs. 3,822,446, 1894, being Rs. 525,319 less than that of the previous year, or a decrease of 13·74 per cent.

The expenditure in each Province, including the cost of Establishment, was—

Province.	1893. Rs.	1894. Rs.	Increase. Rs.	Decrease. Rs.
Western	1,330,003	1,140,280	—	189,723
Central	518,727	532,291	13,565	—
Northern	273,948	274,599	651	—
Southern	346,563	292,022	—	54,541
Eastern	259,038	246,355	—	12,682
North-Western	495,800	510,039	14,239	—
North-Central	185,593	177,072	—	8,521
Uva	608,502	359,278	—	249,224
Sabaragamuwa	329,593	290,511	—	39,082
Total	4,347,765	3,822,446	28,454	553,773

The mileage of road maintained was—

	Miles.
Metalled	2,122·06
Gravelled	744·03
Natural	541·82
Total	<u>3,407·91</u>

at an average cost of Rs. 331·14 per mile.

The principal works in progress were :—

WESTERN PROVINCE.

The Kelani-ganga bridge at Grandpass, in this year named the "Victoria" bridge. (Completed. Cost Rs. 503,272.)

The General Post Office.

Flood outlet at Dehiwala.

The extension of Chatham street.

The Cargill Ward, General Hospital.

The Grenier Memorial Ward, General Hospital.

CENTRAL PROVINCE.

Post Office, Nuwara Eliya (completed).

The Norton-Carolina road.

The Moray extension.

The Demodera bridge on the Elahera-Pallegama road.

NORTHERN PROVINCE.

The Mannar causeway.

Well boring for artesian water at Mannar.

SOUTHERN PROVINCE.

Works in connection with Galle Harbour. Removing patch of rock north-east of Kapperah reef.

NORTH-WESTERN PROVINCE.

The Deduru-oya bridge near Chilaw.

The Lunu-oya bridge (completed).

The hospital at Nikaweratiya (completed).

PROVINCE OF UVA.

The Parape-oya bridge.

Wellawaya-Moneragala road.

Spring Valley road (completed).

Hindagala-Namanakuli road (completed).

The Muppane-Potuvil road.

PROVINCE OF SABARAGAMUWA.

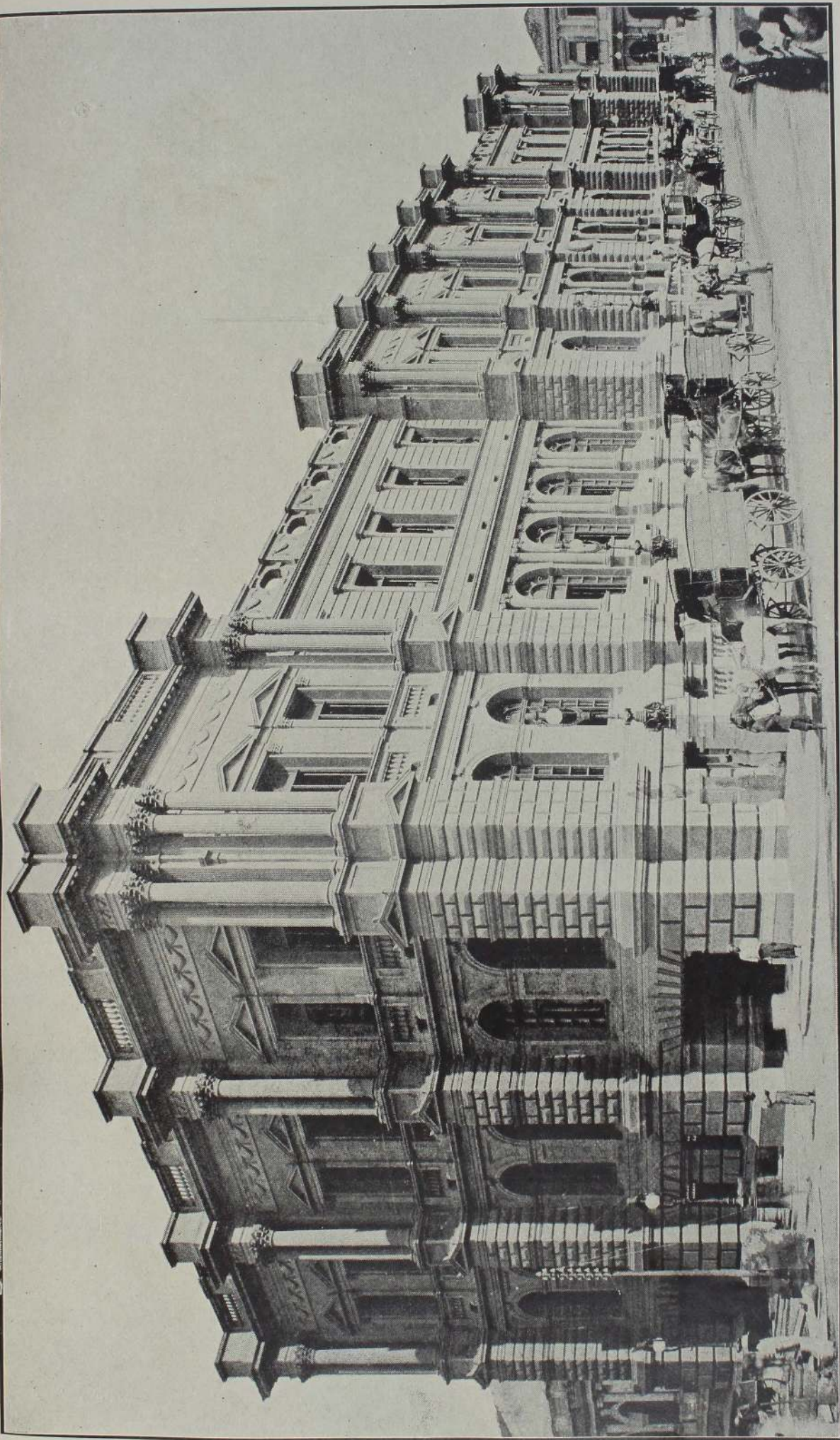
The Madampe-Hambantota road.

The Avissawella hospital.

Mr. MacBride writes :—

The following statement gives precisely the average expenditure per mile on road maintenance in Ceylon since 1876 :—

	Rs.	c.		Rs.	c.
1876	637	46	1886	273	35
1877	644	62	1887	267	35
1878	653	50	1888	294	14
1879	598	36	1889	303	41
1880	599	65	1890	314	80
1881	519	50	1891	328	68
1882	491	33	1892	328	0
1883	436	54	1893	329	82
1884	376	86	1894	331	14
1885	296	43	1895 (estimated)	338	18



S. G. O.

NEW GENERAL POST AND TELEGRAPH OFFICE

Colombo

1891 - 1895

Designed and built by Mr. H. F. TOMALIN

The reduction in the cost of maintenance from 1881 to 1884, inclusive, was principally in the Central Province, and became possible by certain economies introduced in 1881 and by diminished traffic during those years of financial depression. Since 1885 the savings have been made by reform. Notwithstanding the increasing traffic visible everywhere, the condition of the roads since that year has improved steadily; and at no time previously has so large a mileage of metalled roads been capable of sustaining so heavy a traffic, nor is it ever likely to be put to a test of traffic too severe; the metal now so evenly broken and well compacted and free from the old decomposing mixture will stand a heavier traffic than has yet been known on the roads of Ceylon.

The opening of the railway to Haputale has relieved 60 miles of important road between Haldummulla and Ratnapura; the maintenance estimate has been reduced from Rs. 84,464.75 to Rs. 62,180, but there is still considerable traffic on parts of this road, notably from Balangoda to Pelmadulla.

The bridge over the Kelani-ganga, near Grandpass, now named the "Victoria Bridge," ranks first in importance as a public work, supplying a long-felt want as a relief to flood discharges of the river by the removal of the bridge of boats, and as an engineering work of magnitude attended by difficulties from very treacherous foundations and obstruction to progress from floods. Mr. C. V. Bellamy, the Engineer in charge, overcame these difficulties by skill and watchfulness, and he has done the work admirably. It is a credit to the Colony and the Department. There has been a saving of Rs. 12,000 nearly effected on the estimated cost. The actual cost per lineal foot has been Rs. 680.17, which is satisfactory.

Mr. C. V. Bellamy, District Engineer, adds:—"The injuries to No. 4 pier, which occurred in November, 1893, necessitated the removal of all five of the sections which had been fractured, and which were replaced by sound ones, and the cylinder is now none the worse for the mishap. The other cylinder was also repaired in such a way as to preclude all doubt as to its stability, especially when it is borne in mind that each cylinder is calculated to sustain over eight times the dead weight to be placed upon it.

"The *modus operandi* in removing the injured cylinders, which extended 20 feet below water level, was briefly this. In the first instance, the four sides of the square surrounding the cylinder formed by the four guide piles were closed in with sheet piling driven 15 feet into the river bed, outside of which gunny bags filled with sand were deposited to prevent fine river silt from finding its way through the joints of the piling. A square shaft was thus sunk into the river bed inside, which the diver was able to work. A circular wooden *caisson*, or tube open at both ends, having a minimum internal diameter of 6 feet 9 inches, was also made and lowered down over the top of the uppermost sound section, a space of 4½ inches being thus provided between the cast iron cylinders and the *caisson*, down through which new sound sections were lowered and bolted on to the existing cylinder, and after a thorough examination of the whole cylinder from water level down to cutting edge by the writer sirking was allowed to proceed.

"The anticipated total depth of all cylinders has been greatly exceeded upwards of 400 feet having been sunk during the year under review. It is but natural, therefore, that this part of the work should have taken longer than expected."

Mr. MacBride continues:—

The *General Post Office* made fair progress, and part of it was occupied early in January, 1895. The embellishment of the exterior and interior has taken more time than anticipated. Ceylon workmen are unaccustomed to anything so elaborate. Though they have been slow, they have done their work well and creditably under Mr. Tomalin's instructions.

As there have been exaggerated ideas regarding the cost of this building, I desire to record a comparative statement of the cost of some of the principal buildings in Colombo :—

Museum	..	..	22½ cents per cubic foot
Surveyor-General's Office	..	..	22 do.
Custom House	..	..	24½ do.
General Post Office	..	..	25 do.

The last named is the cheapest building. There is much more interior detail than in any of the others, and it is a more imposing and attractive structure, both inside and outside, while for stability and permanence it leaves nothing to be desired. It will not be finished before July, 1895.

At Mannar well-boring for artesian water was continued till a depth of 200 feet nearly was reached, but without any satisfactory result. Work has since been stopped, and samples of the strata bored have been submitted to an expert as to the probability of ultimate success in reaching a water-bearing stratum.

The Deduru-oya bridge near Chilaw was the principal work of the year in the North-Western Province. The progress was somewhat slow, but the climate proved deadly to many engaged on the works and rendered better progress difficult. The officer who had been originally posted to the charge was removed, and Mr. W. C. Simmons succeeded to him. The change led to better results.

To my personal knowledge the question of a bridge over this river at or near the site now chosen has been under discussion for nearly thirty years, and has generally been shelved on grounds of expense. The structure so nearly approaching completion will cost Rs. 155,000, which is Rs. 265 per foot run, a very low rate for a buckled-plated bridge on cast iron and concrete cylinders.

The Colombo Waterworks were transferred to the Public Works Department in October, the change effecting an annual saving in salaries of Rs. 6,638·57.

Service Reservoir, Maligakanda.—Movements in the north and south walls occurred towards the end of November, and an examination of the asphalt lining involved the emptying of the reservoir. An indentation at the south-east corner disclosed evidence of movements of an unusual character. It was satisfactory, however, to find that the curved footings appeared intact, and that, with the exception of at two points (vertically 6 in. and 24 in. respectively) along the line of indentation, the contact between the asphalt and bitumen remained undisturbed. The damage was thoroughly repaired, and the reservoir re-filled in due time. For the satisfaction of all concerned I quote Sir John Fowler's most recent opinion on the stability of this structure :—

“ Looking at the reservoir in its present state as regards stability and freedom from excessive range of temperature, there cannot be any ground for anxiety.

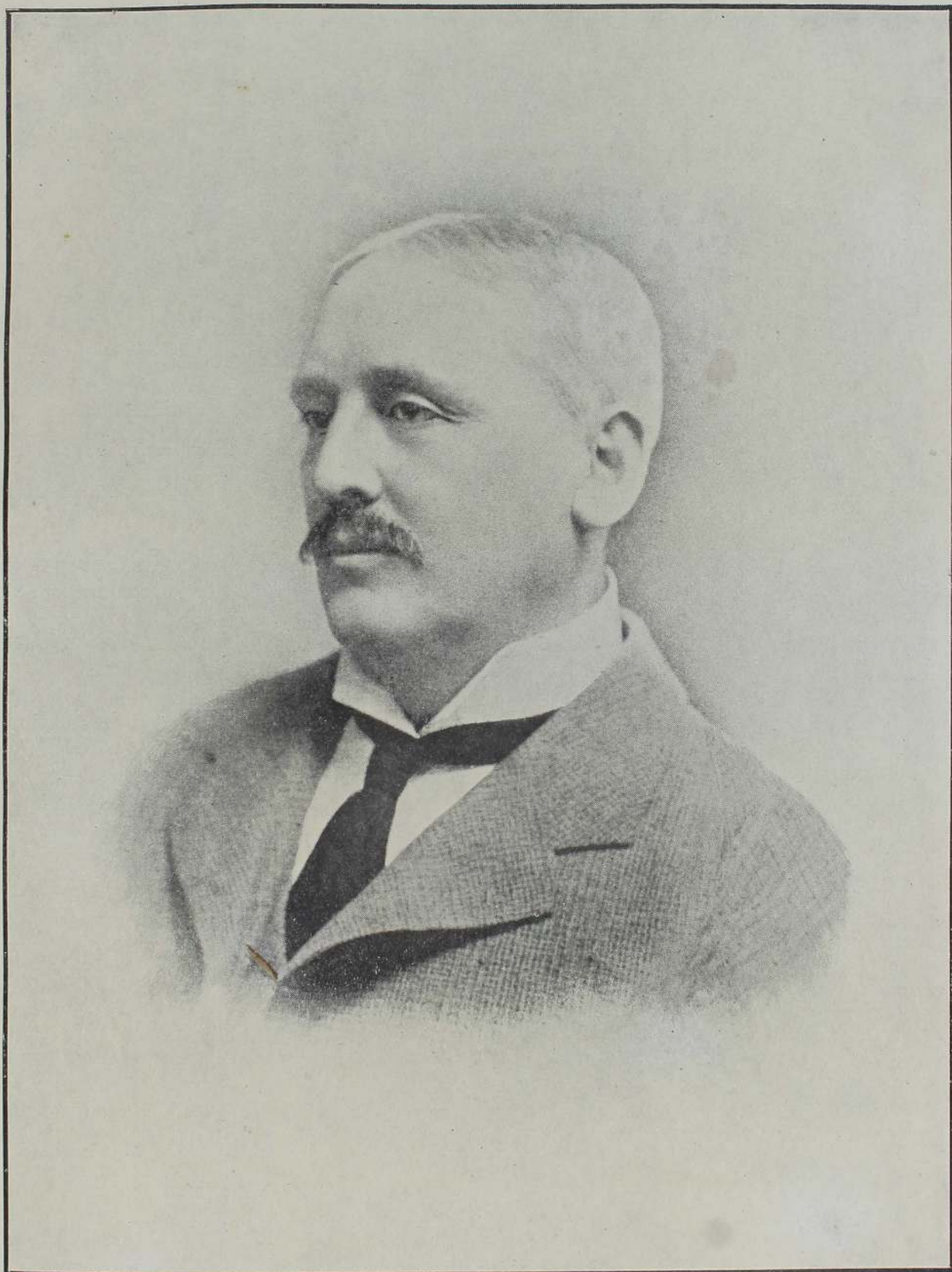
“ Some movements of a concrete mass so large must be expected, but they cannot affect security, and ought not to affect water tightness.”

Under Departmental Mr. MacBride writes :—

The Director of Public Works went on leave in March and returned in October. Mr. T. Smith acted as Director of Public Works during the period, and proceeded to England on twelve months' leave on October 25, 1894.

Mr. H. B. Harvey retired on pension on November 1, 1894.

Mr. Walsh Wrightson, Financial Assistant to the Director of Public Works, was appointed Provincial Engineer of the Eastern Province, and later on Director of Public Works of Trinidad.



THE HON. MR. WALSH WRIGHTSON C.M.G., M. Inst: C.E.
DIRECTOR OF PUBLIC WORKS
TRINIDAD.
1894 - 1907
SERVICE IN CEYLON 19 YEARS

S. G. O.

The total expenditure during the year was Rs. 3,455,589, being 1895. Rs. 366,857 less than that of the previous year, or a decrease of 9.06 per cent.

The expenditure in each Province, including the cost of Establishment, was—

Province.	1894. Rs.	1895. Rs.	Increase. Rs.	Decrease. Rs.
Western	1,140,280	1,016,119	—	124,161
Central	532,291	476,510	—	55,781
Northern	274,599	283,929	9,330	—
Southern	292,022	272,206	—	19,816
Eastern	246,355	282,077	35,722	—
North-Western	510,039	350,478	—	159,560
North-Central	177,072	155,290	—	21,781
Uva	359,278	313,522	—	45,756
Sabaragamuwa	290,511	305,457	14,946	—
Total	3,822,447	3,455,590	59,998	426,855

The mileage of road maintained was—

	Miles.
Metalled	2,221.45
Gravelled	699.68
Natural	508.70
Total	3,429.83

at an average cost of Rs. 327.94 per mile.

The most important works in progress were :—

WESTERN PROVINCE.

The General Post Office (completed ; cost Rs. 351,207).
 The Lady Havelock Hospital (commenced January 18).
 The Royal College (an additional schoolroom 150 feet by 35 feet).
 New boat house for Master Attendant.
 Negombo Jail (twenty additional cells).
 Badureliya road extended 4 miles. In this extension were two bridges 80 feet and 50 feet in length respectively over the Morapitiya-oya and Dangal-ela. The Atwel-oya bridge was commenced.
 Munamalwatta bridge completed.
 Chatham street extension.

CENTRAL PROVINCE.

Bungalow for Medical Officer, Rangala (completed).
 The " Baker " Ward, Nuwara Eliya hospital.
 The Carolina-Norton road (completed).
 The Laxapana-Moray road (completed).
 Extension of the Rangala-Nitre Cave road (completed to Ferndale estate).
 Improvement Naula-Elahera road (completed).
 The Wellampitiya bridge, Dambulla-Kurunegalla road (completed).
 Survey of line of railway from Nanu-oya to Nuwara Eliya 5.28 miles completed.

SOUTHERN PROVINCE.

The Magam river bridge.
 Galle Harbour (removal of the " Kapperah " reef to a depth of 30 feet).

EASTERN PROVINCE.

New Ward Kalmunai Hospital.

NORTH-WESTERN PROVINCE.

The Deduru-oya bridge, north of Chilaw (completed).

PROVINCE OF UVA.

Quarters for District Engineer, Koslanda (completed).
The Parape-oya bridge, Wellawaya-Moneragala road (completed).
The Kuda-aar bridge.

PROVINCE OF SABARAGAMUWA.

Hospital at Avissawella (completed).
Hospital at Rakwana (completed).
The Kegalla-Bulatkohopitiya road.
The Madampe-Hambantota road.
The Timbulketiya bridge.
The Weralapola bridge.

Mr. MacBride writes :—

The principal roads in the country were maintained in perfect order during 1895, and at the close of the year Ceylon was a gainer by saving in expenditure of Rs. 7,898,648 since 1885, when the present system of maintenance was introduced, which gives an average of Rs. 718,059 per annum, and this notwithstanding the prosperity of the country and consequent increasing traffic. The roads have been improving every year under this system, and have reached a condition never before attained. This is due to the increased care taken in accepting the materials used; as a matter of fact, to the use of clean, hard metal broken as nearly as possible to $1\frac{1}{2}$ inch cube, properly spread, where required only, and consolidated.

Bridge over the Deduru-oya, near Chilaw.—The Acting Provincial Engineer describes the bridge thus: "This work having been brought to a successful termination in December last, it may be well to give briefly a general account of it. It may be described as a lattice girder bridge, of nine spans of approximately 65 feet each, the total clear waterway between the faces of the abutments being 578 feet, and the total length over all 628 feet; the width of the roadway between girders is 14 feet.

"The bridge is built on cylinder foundations, filled with concrete *in situ*, and up to level of bed of river. Over this the columns (in groups of two to each pier) are carried up to girder level with concrete blocks (sections breaking joint in alternate courses) finished off with cast iron bed plates for girders and stayed transversely with the flood plates. The roadway is carried by cross girders and buckled plates (asphalted) and finished off in metalling. The abutments are in brick in cement mortar to low water level, and over this lime."

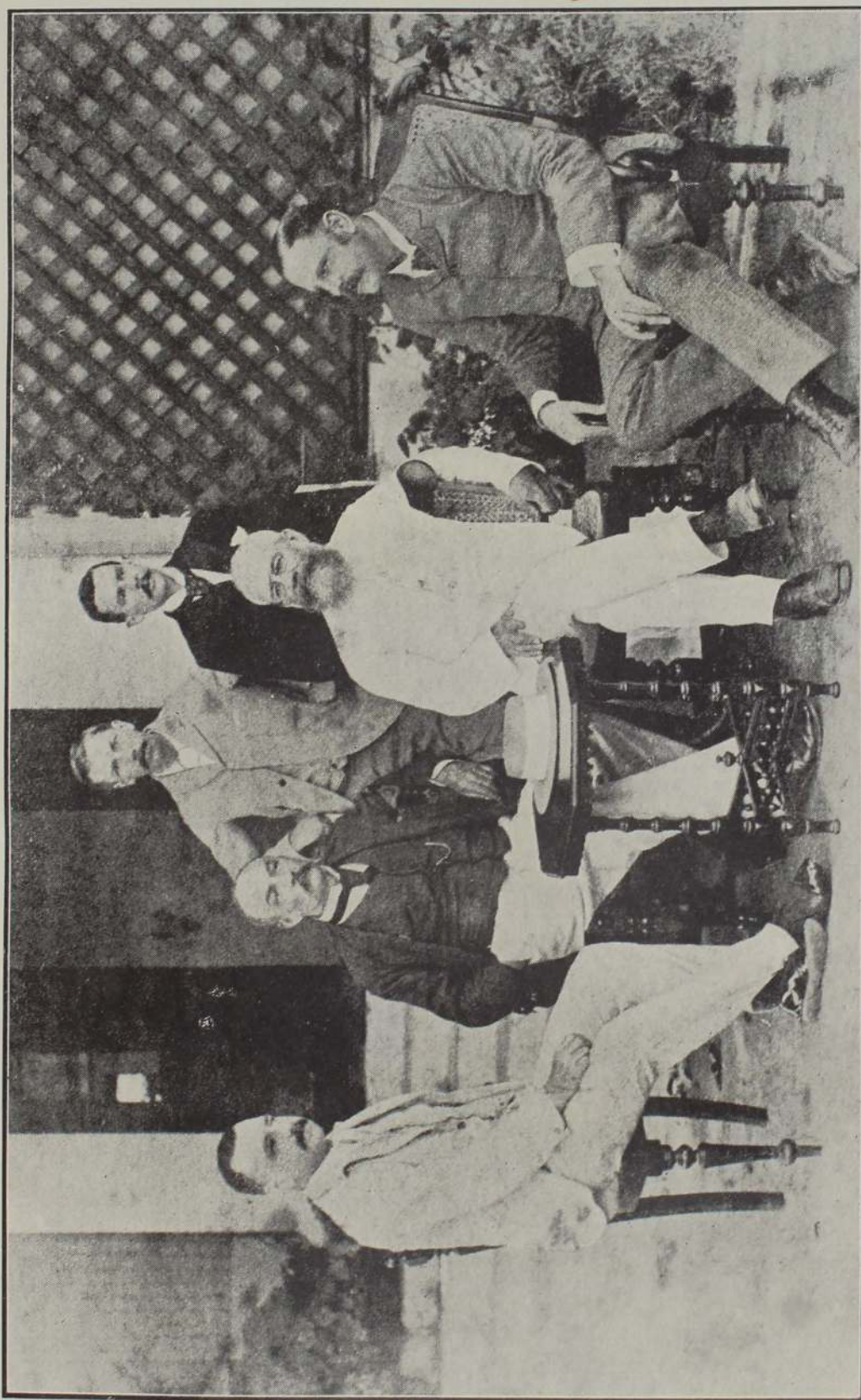
The cost of the bridge and its approaches has been Rs. 157,376·41; cost per foot run Rs. 250·60.

Labugama Reservoir.—The rainfall for the year was 162·85 inches, or 1·94 inches above the average of $16\frac{1}{2}$ years recorded.

The yield of water was equivalent to 73 per cent. of the rainfall on the drainage area of 2,380 acres.

Maligakanda Reservoir.—The reservoir was tested for water-tightness upon several occasions during the year and found satisfactory; the last test was on October 29. The wall movements still continue, but nothing occurred to cause alarm. It will before long be necessary to re-line the reservoir with asphalt; some of it is much decayed. I do not know of anything to arrest the decay, nor do I think there is anything.

Motor Cars, or Horseless Carriages.—It is said that "in the near future the clatter of the horse's hoof shall no longer be heard in the fashionable drives," and this is certainly an age in which it is not safe to question any forecast in mechanics. In nowhere in the world are there better roads than in Ceylon, where road maintenance has been reduced to a science.

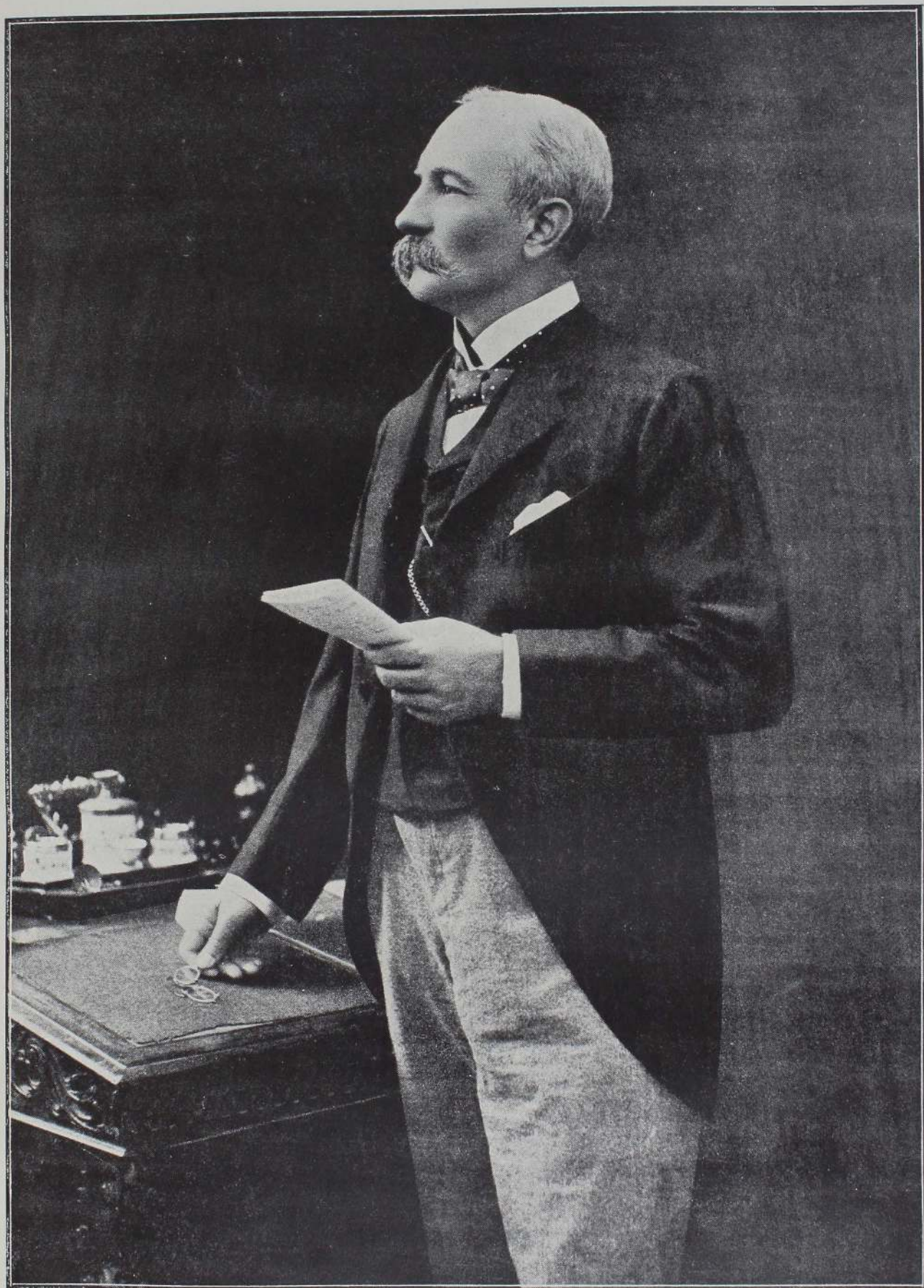


S. G. O.

Mr. BUCKNALL Mr. CALDICOTT
Mr. WADDELL Mr. ORMSBY Mr. DESLANDES Mr. MACPHERSON

Photograph taken at Malabar House
On retirement of Mr. H. J. DESLANDES

1895.



S. G. O.

The Hon: Mr. ROBERT DALY ORMSBY M. Inst: C.E.
Acting Director of Public Works, Ceylon
1887. 1891, 1896.
Director of Public Works, Hongkong
1897-1901
Service in Ceylon 31 years
Living 1918 aged 72

Digitized by Noolandam Foundation.
noolandam.org Ceylon 31 years

Within the last few years a great impetus has been given to the improvement of auto-motors and horseless vehicles. No less than sixty-six competed from Paris to Bordeaux and return, a distance of 727 miles, when the entire journey was made in two days and 53 minutes, or at a speed of $14\frac{9}{10}$ miles an hour. The tests for safety, ease of control, absence of noise vibration, heat or odour, cleanliness, and excellence of design and workmanship have been found most satisfactory.

The introduction of horseless carriages into Ceylon for the conveyance of passengers and mails from Matale to Anuradhapura and Jaffna, Kurunegala to Puttalam, Colombo to Puttalam, Colombo to Ratnapura, Kurunegala to Trincomalee, Badulla to Batticaloa, and Matara to Hambantota would be attended with immense convenience to the travelling public and residents at the outstations named. Moreover, the ill-treated coach horse, and rigid, badly built, uncomfortable coach would soon disappear, and be respectively seen and felt no more. Ceylon is not a horse-breeding country, and in consequence the natives know nothing about horses or how to treat them, hence a miserable life for the horse once he becomes the property of a coach contractor.

If horseless carriages are introduced, they should, I am of opinion, be under the direction of the Public Works Department, the Factory Engineer being appointed superintendent. At each important station a mechanic (a blacksmith), trained at the Government Factory in the adjustment of repair of oil motors, should be attached to the Department of works, and Government could, I think, without more risk than the railway service involves, convey the mails throughout the country and passengers as well.

Under Departmental Mr. MacBride writes :—

Officers who severed connection with the Department during 1895:—Mr. C. V. Bellamy appointed Colonial Engineer, Dominica; Mr. R. F. Court, resigned; Mr. H. J. Deslandes, retired; Mr. M. Macgregor, retired; Mr. E. Holland, retired; Head Overseer Velupulley, retired.

Officers who died during the Year 1895.—Messrs. E. Scott Barber, E. Holland, W. C. Perera. Messrs. Barber and Holland had served Government for many years, and their deaths so soon after retirement is greatly deplored.

I desire to place on record my sense of the loss which the Department has sustained by the sudden and premature death of Mr. W. C. Perera, the Assistant Factory Engineer. Mr. Perera entered the Department on April 10, 1885, and was one of the most efficient native officers I have ever known; his untimely death is deeply regretted.

In August of this year Mr. MacBride went on leave preparatory to 1896. retirement, and Mr. Robert Daly Ormsby, M.Inst.C.E., Provincial Engineer of the Central Province, was appointed to act as Director of Public Works. The expenditure during the year was Rs. 3,437,862.

The expenditure in each Province, including cost of Establishment, was—

Province.	Expenditure including Cost of Establishment.	
	Rs.	c.
Western	962,609	58
Central	479,184	4
Northern	303,436	90
Southern	294,488	12
Eastern	262,755	81
North-Western	307,897	11
North-Central	170,782	30
Uva	369,500	15
Sabaragamuwa	287,208	46
Total	3,437,862	47

The mileage of road maintained was—

			Miles.
Metalled	..	..	2,333·38
Gravelled	..	..	673·00
Natural	..	..	486·51
Total ..			<u>3,492·89</u>

at an average cost of Rs. 339·13 per mile.

The most important works in progress were :—

WESTERN PROVINCE.

- New ward for lepers, Hendala (completed).
- The Lady Havelock Hospital (completed).
- The Badureliya road connecting the Western Province with Sabaragamuwa. Completed as far as the Atwal-oya bridge.
- The Chatham street extension (completed).

CENTRAL PROVINCE.

- Dispensary, Gammaduwa.
- Police station, Galagedara.
- Ramboda hospital.

SOUTHERN PROVINCE.

- Galle Harbour Improvement Works were continued by divers "Sayers" in removal of rock and clearing foul ground.

EASTERN PROVINCE.

- Completion of road from Batticaloa to the Vergal-aar.

NORTH-WESTERN PROVINCE.

- Pallawela bridge on road from Kurunegala to Chilaw.
- Deduru-oya groynes.

PROVINCE OF UVA.

- Hulanda-oya bridge, 80 feet span.
- Kuda-aar bridge.

PROVINCE OF SABARAGAMUWA.

- Bulatkohopitiya road.
- Algoda ferry road.
- Police station, Ratnapura.
- Madampe-Hambantota road extension.
- Timbulketiya bridge.

Mr. Ormsby writes :—

The introduction of bicycles into Ceylon, and their rapidly increasing use, has resulted in a demand for yet more perfect roads, and in one Planters' Association meeting a member who attempted to defend the Public Works Department from the charge of rough and rutty roads was suppressed and told to come next time on a bicycle and he would know better! I make no complaint regarding this; it will tend to keep our District Engineers up to the mark, and I hope before long to see them all accomplished cyclists. There is no better way of inspecting and estimating the condition of a road, as I have proved by personal experience.

Mr. A. Murray, Acting Provincial Engineer, Central Province, writes :—

The introduction of oil motor road carriages to Ceylon must, I fear, be postponed until their cost is less prohibitive and the working of them is a more assured success than it is at present. During my recent stay in England I had exceptional opportunities of testing their capabilities at the frequent exhibitions at the Crystal Palace. They possess two serious defects; one is the severe vibration when the motor car is at rest or on the point of starting or slowing down, and the other the nauseating smell of oil. A trip on the ss. Lady Havelock in the face of the south-west monsoon is preferable to a journey on an oil motor car as at present constructed.

Mr. Ormsby continues :—

The system of what is called track metalling has been continued to a large extent during 1896, and with good results. To do this work effectively a gauge should be used, the metalled portion should be not less than 2 feet wide in each track, and the centre of these tracks should be the average width of Ceylon carts. The work has been exceedingly well done in the North-Western Province on the Coast road in the Chilaw District. I am having special rollers made for this class of work, in which the weight of from 30 to 35 cwt. will be concentrated on a width of 2 feet, the necessary width of the roller for stability being obtained by tapering the ends.

It has always seemed to me to be somewhat of an anomaly that there should be in Ceylon two distinct organizations for the opening and maintaining of roads and other public works working side by side. The Government have in the Public Works Department a trained body of Engineers, but many of the important, though so-called minor, thoroughfares, and in most cases the resthouses, are in charge of Road Committees, the executive officer being an untrained man, generally a native of the country, and working under little or no supervision, it being notoriously impossible even for the most active of Chairmen of the Road Committees to visit every road in the Province once a year. The consequence is, I fear, much waste and misapplication of money. I would gladly see every road or path in Ceylon, which is open to the public, placed in charge of this Department. A reduction in the size of districts and consequent increase in our staff would be necessary, and some amendment of the Road Ordinance. There would be many more openings for young Ceylonese trained in the Ceylon Technical College and the Government Factory, and I think both Government and the public would be gainers.

Under Departmental Mr. Ormsby writes :—

The year 1896 saw many great changes in the personnel of the Department. Mr. R. K. MacBride, C.M.G., who had been in failing health for some years, broke down entirely from the results of severe fever contracted during an arduous and prolonged tour of inspection in the Eastern, North-Central, and North-Western Provinces, and was obliged to proceed on leave in August preparatory to retirement from the service. A man of less energy and determination would have relinquished work years before. Mr. MacBride served Government for over thirty years, and administered the Department for twelve years, a longer period than any of his predecessors, except Major Skinner. His name is connected with many important public works, but will probably be chiefly remembered in connection with an improved and economical system of road maintenance.

Mr. L. Creasy proceeded on special service to the Seychelles in October.

The following officers were appointed by the Secretary of State during the year :—Messrs. R. J. K. MacBride, J. Jeffrey, A. de Courcy Carson, and F. Edge.

Mr. MacBride retired from the Department on January 1, 1897, at the age of 54 on a pension of Rs. 11,183. His salary at the time of retirement being Rs. 18,000. He resided principally in London after retirement, and died at the age of 63 on December 17, 1905, thus living to draw his pension for nine years.

Note.—Mr. MacBride's initial salary as Director of Public Works was Rs. 12,000, which was increased to Rs. 15,000 in 1888 and Rs. 18,000 in 1895.

Civil Engineers and Surveyor-Generals, 1802–1845.

J. Joinville, 1802–1805.

G. Atkinson, June 12, 1805, to 1811.

Captain G. Henderson (Acting), March 27, 1811.

Colonel Hayter (Acting), March 11, 1812.
 Captain Schneider, May 27, 1812.
 F. B. Norris, March 18, 1833, to 1845.
 Major T. Skinner (Acting), December, 1837.

*Civil Engineers, Commissioners of Roads, and Directors of
 Public Works, 1846-1896.*

F. B. Norris, Civil Engineer	..	1846 to 1850
Major T. Skinner, C.M.G., Civil Engineer and Commissioner of Roads (Commissioner of Roads, 1841)	..	1850 to July 1, 1867
H. A. Evatt (Acting Commissioner of Roads)	..	May, 1848, to Nov., 1849
H. A. Evatt (Acting Commissioner of Roads)	..	August, 1854, to July, 1856
J. F. Churchill (Acting Commissioner of Roads)	..	March, 1859 to June, 1861
Sir Guildford L. Molesworth, K.C.I.E., Director of Public Works and Director-General of Ceylon Railway (President of the Institution of Civil Engineers, 1904)	..	July 1, 1867, to June 25, 1871
Captain A. B. Fyers, R.E. (Acting Director of Public Works)	..	Feb. 10, 1870, to June 24, 1871
J. R. Mosse, Director of Public Works	..	June 25, 1871, to Oct. 1, 1882
J. F. Churchill, Director of Public Works	..	Oct. 1, 1882, to Oct. 4, 1885
R. K. MacBride, C.M.G., Director of Public Works	..	Oct. 4, 1885, to Jan. 1, 1897
R. D. Ormsby (Acting Director of Public Works)	..	May 8, 1887, to June, 1888
R. D. Ormsby (Acting Director of Public Works)	..	Oct. 19, 1891, to Feb. 26, 1892
T. Smith (Acting Director of Public Works)	..	March 5, 1894, to Oct. 18, 1894
R. D. Ormsby (Acting Director of Public Works)	..	Aug. 17, 1896, to May 7, 1897

*Assistant Civil Engineers, Provincial Assistants, and Provincial
 Engineers in Charge of Provinces, 1863-1896.*

(See Table annexed.)

Note.—The Provincial Engineers from 1833-1867 were designated Assistant Civil Engineers, and Provincial Assistants from 1867-1886, and were finally designated Provincial Engineers in 1886. The following statement shows the services of Assistant Civil Engineers, Provincial Assistants, and Provincial Engineers from 1841-1892. :—

	Service.	
H. Byrne, M.Inst.C.E. (nine consecutive years in charge of the Western Province, 1867-1875)	..	1841-1876 .. 35
P. Cummins 1842-1872 .. 30
H. A. Evatt 1842-1874 .. 32
J. A. Caley, F.G.S., M.Inst.C.E. 1845-1868 .. 23
W. G. Hall 1846-1878 .. 32
J. D. Young 1851-1878 .. 27
A. Campbell 1853-1868 .. 15
A. C. Folkard, M.Inst.C.E. 1856-1873 .. 17
J. F. Churchill, M.Inst.C.E. (Acting Director of Public Works, 1877-1882; Director of Public Works, 1882-1885; Assistant Civil Engineer and Provincial Assistant thirteen years; Acting Director of Public Works six years; Director of Public Works three years) 1856-1885 .. 29
R. A. Sperling, M.Inst.C.E. 1857-1871 .. 14

	Service.	
J. A. Arneil (seven consecutive years in charge of the Eastern Province, 1872-78, and five consecutive years in charge of the Southern Province, 1880-1884)	1859-1886	27
S. Fuller	1866-1885	19
C. Prime, M.Inst.C.E.	1866-1890	24
H. M. Finch (four years in the Survey Department, 1866-70)	1866-1891	25
F. Vine, M.S.E.	1866-1892	26
H. J. Deslandes	1866-1895	29
R. K. MacBride, C.M.G., M.Inst.C.E. (Director of Public Works, 1885-1896)	1866-1897	31
R. D. Ormsby, M.Inst.C.E. (Acting Director of Public Works, 1887, 1891, and 1896; Director of Public Works, Hong Kong, 1897-1901)	1866-1901	35
E. Holland	1868-1895	27
T. Smith, M.Inst.C.E. (Acting Director of Public Works, 1894)	1868-1897	29
H. B. Harvey, M.Inst.C.E.	1869-1894	25
W. H. Hawkes	1869-1897	28
M. MacGregor	1870-1895	25
H. B. Christie, Assoc.M.Inst.C.E.	1871-1904	33
Colonel A. Murray, V.D., M.Inst.C.E. (Colonial Engineer and Surveyor-General, Straits Settlements, January, 1898)	1871-1908	37
H. E. H. Hayes, Assoc.M.Inst.C.E.	1872-1904	32
E. Venning, Assoc.M.Inst.C.E.	1873-1901	28
L. Creasy, I.S.O., M.Inst.C.E.	1874-1905	31
Walsh Wrightson, C.M.G., M.Inst.C.E. (Director of Public Works, Trinidad, 1894)	1875-1907	32
H. T. S. Ward, M.Inst.C.E. (Director of Irrigation, Ceylon, May 15, 1900)	1876-1908	32
H. A. G. Grant	1876-1908	32
C. E. Spooner, C.M.G., M.Inst.C.E., C.E., T.C.D. (Survey Department, 1876-1877; Head of Public Works Department, Selangor, Malay Peninsula, 1891)	1876-1909	33
A. E. Williams	1877-1899	22
J. MacDonnell	1877-1902	25
F. W. Johnson, Assoc.M.Inst.C.E.	1877-1903	26
H. A. Ewart, M.Inst.C.E. (transferred from Colombo Waterworks, December, 1894)	1882-1897	15
W. Pole-Fletcher, Assoc.M.Inst.C.E.	1886-1910	24
H. F. Tomalin, M.Inst.C.E., F.R.I.B.A. (Conservator of Forests, Ceylon, October 1, 1914)	1886	—*
R. W. Smith, M.Inst.C.E., B.A., T.C.D. (Director of Irrigation, 1908)	1892-1913	21
—		
R. Tatham (Financial and Office Assistant, 1866-76)	1851-1877	26
J. G. Smither, F.R.I.B.A., Architect	1866-1883	17

Government Factory, Colombo.

H. A. Larkum, Foreman of the Civil Engineer, Factory, Colombo	1857-1876	19
E. Giles (Acting)	1869-1870	2
Walter Deed, (Acting) Engineer, Government Factory	1876-1877	2
Colonel E. C. Davies, I.S.O., Engineer, Government Factory	1878-1911	33

Record of Provincial Engineers, 1863-1896, compiled from Civil Lists.

Office.	Com- mence- ment of Civil List 1863.	Western Province created 1833.	Central Province created 1833.	Southern Province created 1833.	Northern Province created 1833.	Eastern Province created 1833.	North- Western Province created 1845.	North- Central Province created 1873.	Uva Province created 1886.	Sabaragamuwa Province created 1889.
Assistant Engineers in charge of Pro- vince	1863	H. Byrne <i>a</i>	J. A. Cayley	J. F. Churchill	A. C. Folkard <i>a</i>	—	—	—	—	—
Provincial Assist- ants	1864	J. A. Cayley	H. Byrne	do.	A. C. Folkard	—	—	—	—	—
	1865	do.	do.	do.	do.	—	—	—	—	—
	1866	H. Byrne	J. F. Churchill, C. P. North	J. D. Young	P. Cummins, Northern Pro- vinces <i>a</i>	—	—	—	—	—
	1867	do.	A. Campbell, C. P. South	do.	do.	P. Cummins, Northern and Eastern Pro- vinces <i>a</i>	R. A. Spar- ling <i>a</i>	—	—	—
	1868	do.	J. F. Churchill, C. P. North	do.	do.	do.	do.	—	—	—
	1869	do.	A. Campbell, H. A. Evatt	J. F. Churchill	P. Cummins	A. C. Folkard	do.	—	—	—
	1870	do.	do.	W. G. Hall <i>a</i>	J. D. Young	do.	do.	—	—	—
	1871	do.	do.	J. F. Churchill	W. G. Hall <i>a</i>	do.	do.	—	—	—
	1872	do.	do.	do.	J. D. Young	J. A. Arneil	do.	—	—	—
	1873	do.	do.	do.	do.	do.	do.	—	—	—
1874	do.	J. F. Churchill	W. G. Hall	do.	do.	do.	—	R. K. Mac Bride	—	—
1875	do.	do.	do.	do.	C. Prime	do.	—	do.	—	—
1876	F. Vine, Mari- time	do.	do.	do.	do.	do.	J. D. Young	do.	—	—
1877	R. D. Ormsby, Inland	do.	do.	do.	do.	do.	do.	do.	R. D. Ormsby	—
1878	F. Vine	R. K. Mac Bride <i>a</i>	R. K. Mac Bride	H. J. Des- landes <i>a</i>	do.	do.	T. Smith <i>a</i>	M. MacGregor <i>a</i>	E. Venning <i>a</i>	—
1879	do.	J. A. Arneil <i>a</i>	do.	do.	C. Prime <i>a</i>	H. B. Harvey <i>a</i>	H. M. Finch	H. B. Christie <i>a</i>	do.	—
1880	R. D. Ormsby <i>a</i>	R. K. Mac Bride	J. A. Arneil	J. A. Arneil	do.	T. Smith	do.	E. Venning <i>a</i>	R. D. Ormsby <i>a</i>	—
1881	F. Vine	do.	do.	do.	do.	do.	do.	do.	do.	—
1882	H. J. Des- landes	do.	do.	do.	do.	do.	do.	H. T. S. Ward <i>a</i>	do.	—
1882	F. Vine	do.	do.	do.	H. J. Des- landes	do.	do.	S. Fuller	do.	—

1883	F. Vine	R. D. Ormsby	J. A. Arneil	H. J. Deslandes	T. Smith	(Probably H. M. Finch was in charge of both Provinces N.C.P. & N.W.P.)	H. M. Finch	C. Prime	—
1884	do.	R. K. MacBride	do.	do.	do.	do.	do.	W. H. Hawkes	—
1885	H. J. Deslandes	C.E.Spooner ^a	T. Smith	H. B. Harvey	Edward Holland	do.	do.	C. Prime	—
1886	do.	do.	do.	do.	H. M. Finch	E. Holland	A. Murray	C. Prime	—
1887	do.	F. Vine	C. Prime ^a	W.H.Hawkes ^a	L. Creasy	do.	Walsh Wrightson	C.E.Spooner ^a	—
1888	T. Smith	do.	do.	do.	L. Creasy ^a	H. M. Finch	A. Murray	do.	—
1889	H. J. Deslandes	R. D. Ormsby	H. M. Finch	do.	Chas. Prime ^a	Walsh Wrightson	do.	do.	—
1890	do.	F. Vine	H. E. H. Hayes ^a	L. Creasy	H. M. Finch	do.	do.	H. B. Harvey ^a	H. T. S. Ward ^a
1891	Thomas Smith	do.	H. J. Deslandes	do.	A. Murray	do.	F. W. Johnson ^a	H. B. Harvey	do.
1892	do.	R. D. Ormsby	do.	do.	do.	H. B. Christie	H. E. H. Hayes	do.	do.
1893	do.	H. J. Deslandes	do.	do.	do.	do.	do.	do.	E. Venning
1894	L. Creasy	R. D. Ormsby	H. E. H. Hayes	H. T. S. Ward	H. B. Christie	H. A. G. Grant	A. E. Williams	A. Murray	do.
1895	T. Smith	R. D. Ormsby	F. W. Johnson	H. A. G. Grant	W. Pole	R. W. Smith	do.	L. Creasy	H. A. Ewart
1896	do.	A. Murray	H. E. H. Hayes ^a	H. F. Tomalin ^a	Fletcher	do.	do.	H. B. Christie	J. MacDonnell ^a

^a = Acting.

Note.—Records previous to 1863 do not give designation of office. Full records commence in Civil List, 1887.

CHAPTER VII.

THE PIONEER FORCE, 1821-1896.

IN 1821 a Military Corps of Pioneers was organized by Sir Edward Barnes for the construction of military roads in the Colony, notably the great military road from Colombo to Kandy, commenced about 1820, and completed, with exception to some of the bridges, in 1825, when Sir Edward Barnes drove Bishop Heber from Colombo to Kandy. (Extract from Heber's Journal.)

In 1822 the pontoon bridge over the Kelani river at Grandpass was constructed, and this bridge carried the whole of the Kandy road traffic for seventy-three years, till it was replaced in 1895 by the Victoria bridge.

In 1832 the Colombo-Kandy Mail Coach, the first mail coach in Asia, was started, and continued to run till the opening of the Railway in 1867.

Other military roads constructed about this time to connect forts and military posts were the road from the Kospotu-oya over the Galagedara Pass to Kandy, 1821; Colombo to Dambulla *viâ* Kurunegala, 1827; Kandy to Matale, 1831; Matale to Dambulla, 1832; Dambulla to Gantelawa, 1833 (boundary of the Eastern Province); Kandy to Nuwara Eliya, 1827-1837. Most of these roads were constructed with compulsory labour, which was not abolished till 1832. (Forbes' "Eleven Years in Ceylon.")

Captain William Francis Dawson, who was stationed in Colombo in 1819 as "Second Captain," R.E., had charge of the construction of the original road up the Kadugannawa Pass, which was roughly completed in 1822. He also made the road from the Kospotu-oya (on the boundary of the Seven Korales and the Central Province) over the Galagedara Pass in 1821, and probably constructed the Kandy road tunnel on this line of road completed in 1823. It was by this route that the first division of the British Army was sent against Kandy under Major Lionel Hook of the 2nd Ceylon Regiment, February, 1815 ("Tombstones and Monuments in Ceylon," by Mr. J. P. Lewis, page 425). The former bridle path up the Pass dates back to early in 1800, and there still exists a well on the 12th mile with a stone kerb bearing date 1805-15 (probably taken from the old Fort at Galagedera.)

At the time of his death, March 28, 1829, Captain Dawson was Commanding Royal Engineers, Ceylon: "Wherever he was known, he was dearly loved. Sir Edward Barnes, had, notwithstanding Dawson's junior rank, selected him for the position of Officer Commanding Royal Engineers, which was a Colonel's command" (Skinner, page 93). "The last time I passed this way in 1828 (Colombo to Kandy) the able officer, Captain Dawson of the Royal Engineers, who had traced and directed the formation of this road, was in rude health and buoyant spirits; now his lofty monumental column gleams on the summit of the Kadugannawa Pass, the most elevated part of the road, and 1,730 feet above the level of the sea; his intrepid spirit and iron frame had sunk beneath the severe trials he underwent in the zealous discharge of his public duties." (Forbes.)



S. G. O.

BRIDGE OF BOATS COLOMBO.

Built by

Lieut: General JOHN FRASER,

Asst: Quarter Master General.

1822.

Replaced by the Victoria Bridge
1895.

The military road from Colombo to Dambulla, *viâ* Ambepussa, Polgahawela, and Kurunegala, was opened as far as Dambulla in 1827, and "was then given up in consequence of the severe sickness which broke out amongst the labourers" (Forbes). It was continued later to "Gantelawa" (Kituluttu) on the boundary of the Eastern Province by Captain Atchison (Ceylon Regiment). The road from here to Trincomalee had probably been opened previously.

"In 1827 a road was traced from Nuwara Eliya to Kandy, it was afterwards made passable for horse, and by it I descended a stage of 15 miles through an unbroken forest, and with a descent of 3,000 feet to Ramboda" (Forbes).

Major Thomas Skinner, C.M.G., was seconded from the Ceylon Regiment in 1820 for road construction work, and was stationed at Ambanpitiya. He constructed 11 miles of the Kandy road from Ambanpitiya to Warakapola, where the road to Ruanwella branches off. He was then ordered to Alawwa, on the left bank of the Maha-oya, "where a large force was being concentrated under Colonel Brown, R.E. Then were stationed at Alawwa a physician to the force, Doctor Dwyer, and six or seven subalterns, some commanding Division of Pioneers, others superintending working parties of Kandians. We had not been there more than two weeks when jungle fever broke out amongst us, and three or four subalterns were removed to Colombo. Then Colonel Brown was attacked and hurried off; Doctor Dwyer followed him, and I found myself alone at the station. The pioneer hospitals were crowded; the men along the whole line of road from Veyangoda 25 miles, were similarly affected, and all the officers had been sent away. Sergeant Hooper of the 16th Regiment with his wife and family was stationed at Warakapola, and was seriously ill with fever, but afterwards recovered. I continued for some time the sole representative of authority at Alawwa, and thought I was proof against the malaria which had proved so fatal to all the other Europeans; but one morning at breakfast I was seized in my turn . . . and I became seriously ill . . . At Mahara, about 8 miles from Alawwa, I met "O'B" of the 83rd Regiment, who full of sympathy tried to persuade me from travelling further and told me sad tales from Alawwa, how one had died that morning, another buried yesterday, and a third as I knew had been carried off a week before . . . I started for my destination in a dhooly (a kind of palanquin carried on the shoulders of eight men and arrived at Colombo)" (Skinner).

Major Skinner soon afterwards sailed for England in the sailing ship "Globe," and did not return to Ceylon till 1825. The officer whom Major Skinner in his book calls "C" was probably Lieutenant John Clancy, 16th Regiment, who died December 30, 1823, and "O'B" Lieutenant Florence O'Brien, 83rd Regiment, died August 24, 1824 (Lewis).

Other officers of the Pioneer Corps also mentioned by Mr. Lewis in his book are John Mitchell, Corps of Royal Engineers, died April 25, 1824, aged 26. He was stationed at Kospotu-oya, seven Korales; Captain Edward Sanderson, 83rd Regiment, died August 22, 1826. He was in command of the Pioneer Corps from 1820 till his death; John Brahan, Ceylon Rifle Regiment, died December 4, 1828. He was Assistant Engineer, Pioneer Corps, and was killed in a duel with Lieutenant Samuel K. of the same Regiment; John Heyliger, Lieutenant, Ceylon Rifle Regiment, died September

16, 1838. He was in command of the 5th Division of Pioneers of the Civil Engineer's Department at Dambulla in July, 1838.

The Military Corps of Pioneers organized in 1821 was commanded by a Senior Officer and eight Assistant Engineers. The Senior Officers 1821-33 were Captain E. Sanderson, 1821-26; Captain G. MacDonald, 1826-29; Captain A. Brown, 1830-33. The records give no information regarding Captain G. MacDonald. Captain A. Brown was the designer and probably the builder of the King's Pavilion, Kandy, and of the Mawanella bridge on the Kandy road. He also erected the timber work of the satinwood bridge at Peradeniya. This wonderful arch bridge, which consisted of a single span of 205 feet, was designed by Lieutenant-General John Fraser of the 37th Regiment, Deputy Quartermaster-General. It was constructed entirely of satinwood without a bolt or nail of any kind, and sent up from Colombo in pieces to Peradeniya for erection in July, 1832. Work was completed and the bridge opened for traffic January, 1833. For seventy-two years this bridge carried the whole of the Colombo-Kandy road traffic till it was replaced by an iron structure in 1905. A model of this bridge is now in the South Kensington Museum.

In 1833 when the engineering works of the Colony were handed over by the Military to the Civil authorities on the formation of Civil Engineer's Department, this force ceased to be a Military Corps, but the rank and constitution of the divisions remained unaltered.

From 1834 to 1852 the force was commanded by Military Officers under the head of the Civil Engineer's Department and Commissioner of Roads appointed in 1841. It must have been a large force, as the records give the names of from six to ten Assistant Engineers. In 1853 the force was reduced to four divisions, and the records give the names of one Military Officer and three civilians commanding Pioneers: J. M. Sutherland, A. W. Bewes, G. C. Henry, R.A., H. E. Reyne. The records do not give any information regarding the first three names, but from "Lewis," page 364, we gather that Henry Edward Reyne was in charge of the construction of the Panwila-Kelebokka road, and that he died at Gampola, July 7, 1872, aged 40.

These four divisions continued till 1858, when they were increased to ten, and the following officers were in command.

S. Rehe, C. Petteperumal, C. Mason, H. E. Reyne, M. Wellopilly, J. Woodhull, W. B. Mathias, M. Sherman, E. Northam, F. Armstrong. S. Rehe was Superintending Officer at Batticaloa, 1867-69, and built the causeway and bridge connecting Puliyantivu with Koddaimunai in 1868 (see Report of Mr. A. Young Adams, Assistant Government Agent, Batticaloa, 1869). His name disappears from the records of the Department in 1877. C. Petteperumal was the first native officer appointed to command a Division of Pioneers in 1855. He died in 1870, and Captain A. B. Fyers, R.E., Acting Director of Public Works, writes in his Administration Report for that year: "During the year two of our oldest and most respected native officers died, viz., Mr. Petteperumal, Commanding the 9th Division of Pioneers, on September 5, after twenty-seven years' service; and Mr. Sherman, Commanding the 8th Division of Pioneers, on December 5, after eighteen years' service. Both these officers were universally and deservedly respected; they were always well spoken of by the officers under whom they served,



MONUMENT AT KADUGANNAWA
Erected to the Memory
of
CAPTAIN W. F. DAWSON
Commanding Royal Engineers
Ceylon
1825 - 1829.

S. G. O.

and were invariably considered most trustworthy and efficient." Clowderly Shovel Fitzroy Mason was in the Commissioner of Roads Department. The bridge over the Hulu-ganga at Teldeniya, Central Province, was erected by the 3rd Division of Pioneers under his supervision 1859-60. He died February 10, 1865 (Lewis, page 68). H. E. Reyne, as already mentioned, died in 1872, and a full record of M. Wellopilly will be found in Chapter VII. of Volume II. F. Armstrong commanded a Division of Pioneers from 1858-1876, when he was promoted Superintending Officer. He was Superintending Officer 1877-85 and District Engineer 1886-90. He was made a Mudaliyar in 1888, and for thirteen years held the post of Superintending Officer and District Engineer, Jaffna (1877-90). He died in harness in 1890, and Mr. MacBride writes regarding him : "The Department lost by death in January Mr. F. Armstrong, the District Engineer of Jaffna ; Mr. Armstrong was a native of Jaffna, and I have no hesitation in saying that no officer of the Department, whether European or native, ever left a better record." Of the others, I regret there is no record.

"In 1863 an experiment was made to get men from Northern India for the Pioneer Force, which proved an utter failure. A body of Sikhs were got down and attached to the 3rd Division of Pioneers under Captain Oldfield, an officer of some military experience. They refused to work, said they had been enlisted under false pretences, that they were ready to fight if required, but not to make roads. Captain Oldfield took a high hand at first, arrested the ringleaders, and marched them off to the nearest Police Station, but the men were firm, and Government was obliged to repatriate them" (Ormsby).

This incident happened in Kandy, and the Sikhs on resisting arrest took refuge in the Muhammadan mosque in Brownrigg street. The Military were called out, and they eventually gave in, and were taken before the Police Magistrate, Mr. Dickson, afterwards Sir John F. Dickson.

In 1864 Major Skinner gave the following evidence regarding the Pioneer Force before the Commission on the Public Works Department of that year :—

How many Divisions of Pioneers are there, and of what number of men and Native Officers were they originally composed?—Originally there were ten divisions, each 200 strong.

What is their present strength?—I am about 500 below my strength.

What is the rate of daily pay of Pioneers and Officers?—A Sergeant Major gets 2s. per day; a sergeant, 1s. 6d.; a Corporal, 1s. 4d.; a first class artificer, 2s.; a second class artificer, 1s. 6d.; a third class artificer, 1s.; a fourth class artificer, 9d.; a Pioneer, 8d.; a boy 4½d.; and a woman, 1d., as a family allowance. In addition to these wages, they are allowed 1½d. per day as batta under special sanction of Government at Nuwara Eliya, Dimbool, Ouvah, Badulla, and the Knuckles where the price of rice is beyond the usual average. I have recently applied to Government that all these rates of labour should be increased, and that a new schedule of pay should be sanctioned for the Pioneers.

Mr. Wall: You speak of Pioneer Sergeants, Corporals, &c. Is there any military discipline in the Corps?—They are a civil body.

What relevancy is there then, in these terms?—The ranks and constitution of the Divisions remain unaltered since they were first organized in 1821.

Were they then a Military Corps?—Yes.

When did they cease to be such?—In 1833.

Chairman : Are Pioneers paid on Sundays and on wet days — Yes, inasmuch as they work through the wet weather.

Mr. Capper : Do you find the pension allowed to the Pioneers of use in keeping the body together?—I am quite sure that there would not be a Pioneer in existence this moment, if not for the Pension Fund.

Are Pioneers paid during sickness?—They get half pay when they are sick; full pay during the whole time they are in hospital, if they are disabled during their work.

Chairman : In the districts where the Pioneers draw batta on account of the increased rate of rice, do the ordinary hired coolies also draw batta?—In most instances; not always. Women and youths never draw it.

Mr. Capper : What is the actual cost per diem of a Pioneer, including hospital charges, medicines, non-effective charges, clothing, &c.?—The pay of all classes has been revised since I last gave evidence on this subject in 1861. At present, supposing the divisions to be full of all ranks and classes, thus:—

	£.	s.	d.
Officer	0	12	11*
Clerk	0	2	2½†
Medical attendance..	0	4	6
1 Sergeant-Major, at 2s.	0	2	0
3 Serjeants, at 1s. 6d.	0	4	6
3 Corporals, at 1s. 4d.	0	4	0
5 First Class Artificers, at 2s.	0	10	0
5 Second Class Artificers, at 1s. 6d.	0	7	6
25 Third Class Artificers, at 1s.	1	5	0
45 Fourth Class Artificers, at 9d.	1	13	9
120 Pioneers, at 8d.	4	0	0
10 Boys, at 4½d.	0	3	9
50 Women, at 1d.	0	4	2
	9	14	3¼
Clothing	0	8	2¼
Daily cost	10	2	5½ by 7 = £70. 17s. 2¼d. per week

* The highest rate.

† As before calculated (exact cost I cannot give without some delay).

Exclusive of officers, clerks, non-commissioned officers, and women we have of working men—

80 Artificers of various grades
120 Pioneers
5 Men for 10 boys

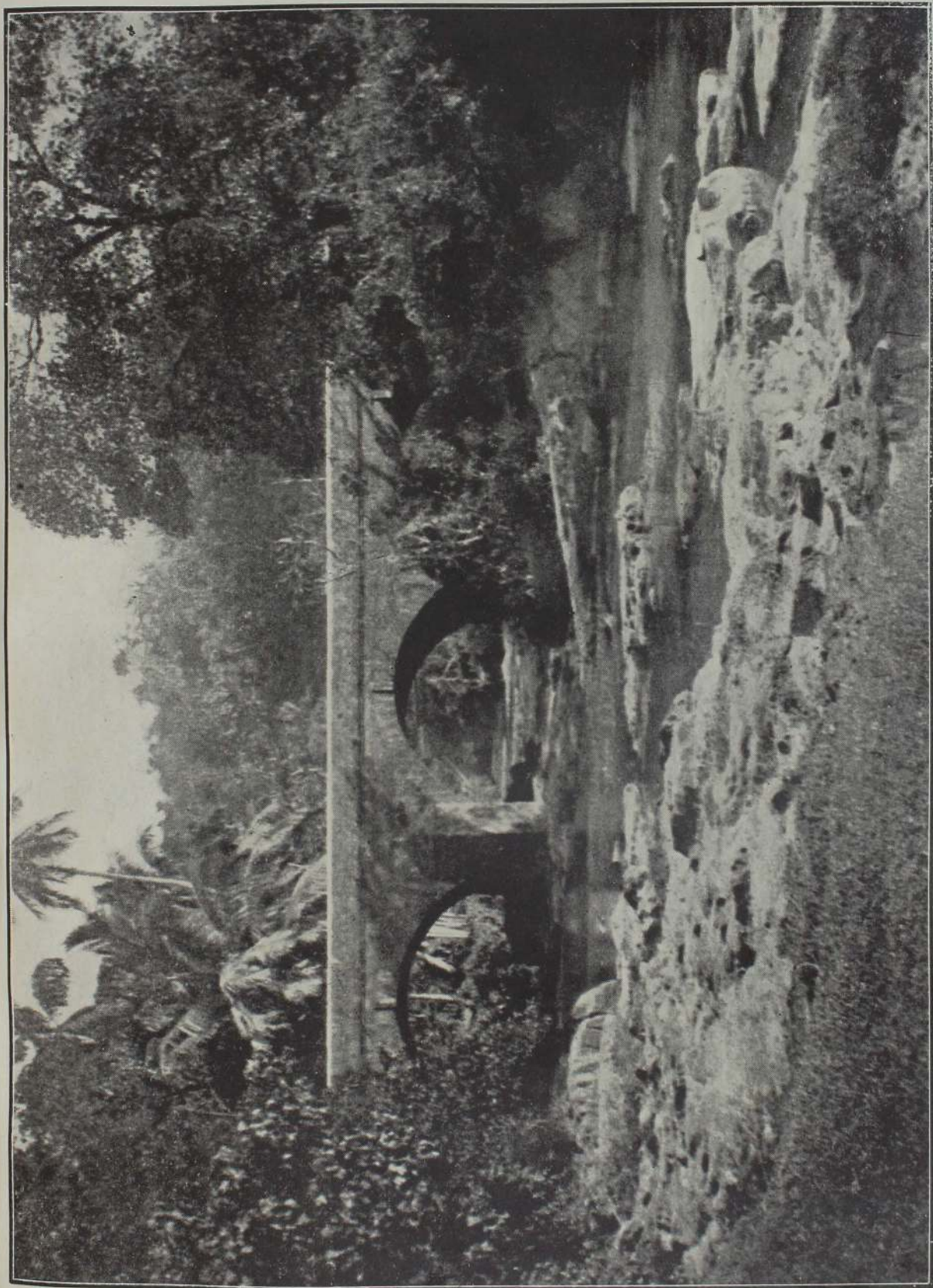
205 by 6 working days = 1,230 days, at 14d. or 1s. 2d. = £71. 15s. 0d.

I do not include in the above the loss from sickness, because it must vary according to the locality in which the men may be working; nor do I notice the trifling loss for sanctioned holidays, of which the men have very few. But this does not show the actual cost of a working Pioneer at present, because, in consequence of my deficiencies in the lower ranks, I have not filled up vacancies in the higher, and, therefore, calculating the cost of the whole force, they stand us at present in about a shilling a day for each working man.

Mr. Harrison, in his evidence before the Railway Committee, stated that he considered pioneer labour cost 1s. 6d. a day, do you think his calculation was too high?—I have never been able to understand how he worked out his figures. It is possible he may have had a very large proportion of sick at Oroobokke, but I do not know how to introduce, into a calculation of the kind, an element so fluctuating.

What proportionate value does ordinary pioneer labour bear to that of ordinary cooly labour on roads?—Two to one, at least.

NANU OYA BRIDGE
67th. Mile Kandy Road
3 Spans of 25 feet
Built by the Royal Engineers
1826



What means have you generally adopted for recruiting the Pioneer Force?—Formerly their enlistments in the country were sufficient to keep up the force; but of late years I have been obliged to import men. Of 450 Tamils I engaged last year, 317 deserted.

Chairman : Were those who deserted under advances?—Many of them were.

Mr. Capper : Can you explain the desertion of pioneers after contributing for some time to the Pension Fund?—They are tempted by higher pay, some of them make so much as from 3s. to 4s. per day elsewhere.

Do you consider the fund to be advantageous generally or otherwise?—The existence of the Pioneer Force is entirely dependent on it; had we not established it, I do not believe there would be a division left at the present time.

How long has the fund been established?—Since 1845.

How many pensioners are there at the present time?—154 who receive about £132 monthly, or £1,584 a year, being at the average rate of about 17s. 1½d. a month each.

Under whose management is the fund?—At my request the Government placed it, by Ordinance No. 3 of 1865, under trustees: the Colonial Secretary, the Auditor-General, and the Commissioner of Roads. The fund has been raised within the Department, and has never cost the Government a shilling.

What steps would you advise in order to bring the force to its full complement?—In the first place, a general increase of pay, which I have already recommended to the consideration of Government, and the importation of men from India.

Treasurer : From what part of India?—From Mysore, Tanjore, Trichinopoly, and Ganjam.

Mr. Capper : Can you furnish the Committee with the rates of pay of ordinary road coolies in the several Provinces?—By the Minute of December, 1837, cancelled in 1848, but again brought into force by the Governor's Minute of November, 1861, the Government Agents are now supposed to regulate the prices of labour and of materials in their respective Provinces. I have, on application to them, received price lists from some of the Agents, and the following are the rates of wages fixed by them, at the places indicated by figures entered in the columns. From the Northern Province and a few other districts I have not yet succeeded in obtaining the required information. We are supposed to be authorized to pay any rates which are thus approved by the Agents of Government. It will be found, however, in reference to my reply to a former question on the subject of labour, that I do not yet pay the extreme rates named as ruling in some districts, and I trust I never shall have to do so. I put in an extract of rates of wages prevailing at different stations, as given by the price lists furnished by the Government Agents of the several Provinces."

APPENDIX No. 11.

Paper delivered in by Major Skinner.

Return of the Pioneers at present serving in the Public Works Department showing the number who have served—

Less than 5 years	..	1,058
Upwards of 5 and less than 10	..	317
Upwards of 10 and less than 20	..	135
Upwards of 20 and less than 25	..	42
Upwards of 25 years	..	23
		<hr/>
		1,575

From 1858 to 1867, the year Major Skinner retired from the Department, the divisions rose in number from twelve to nineteen, but fell again to twelve in 1871, due no doubt to the fall of revenue and corresponding reduction in the expenditure of the Department. (The revenue fell from Rs. 3,300,000 in 1867 to Rs. 2,800,000 in 1871.) In his Administration Report for 1870, Captain Fyers, R.E., Acting Director of Public Works, states :—

I have had every reason to be satisfied with the officers of the Department generally. In so large a Department there must naturally be a few who are not so zealous and attentive to their duties as they ought to be ; but, as a rule, the officers are most painstaking and hardworking ; they take a pride in their work and in the roads entrusted to their care, and there is a wholesome emulation amongst them as to the relative condition of the roads in the different districts. The Pioneer Officers on the new road between Badulla and Batticaloa have suffered, and are still suffering, very much from fever ; yet they remain at their posts, and in the intervals between the attacks of fever look after their divisions and the works upon which they are employed.

The system of recruiting the Pioneer Force by means of agents in India did not work satisfactorily. The recruits who were sent to Ceylon were, generally speaking, useless, and most of them deserted shortly after joining the divisions to which they were appointed. There are twelve divisions of Pioneers, and the strength of each division is 237 men ; the total number ought therefore to be 2,844, whereas on December 30, the strength of the force was only 1,888, showing a deficiency of 956 men, equal to the full strength of upwards of four divisions.

The number of desertions during the year was 239 ; the number of deaths 73. The strongest division, viz., the 8th, stationed at Pelmadulla, contained 197 men, or 40 under strength. The weakest division, viz., the 3rd, contained 120 men, or 117 under strength. The greatest number of desertions during the year from any one division was 34, from the 7th ; and the greatest number of deaths, 15, from the 3rd, caused by a partial outbreak of cholera in August last, when the division was stationed at Lunugala.

As it is very important that our Pioneers should be kept up to their full strength, and as the system adopted last year for recruiting did not answer, Messrs. Oliver & Co. were informed that they would not be required to send any more men to Ceylon ; and Mr. Hansard, the Inspector of Pioneers, was authorized to proceed to Southern India, to endeavour to make more satisfactory arrangements for keeping up the supply of efficient recruits.

It is impossible to open out new roads without a force of trained Pioneers ; in sickly, out-of-the-way districts ordinary labourers will not work, and skilled labour for building bridges, &c., cannot be obtained at any price. It is essential, therefore, that the authorized force should be maintained in as complete and efficient a state as possible. Mr. Hansard has lately returned from India, and I hope that the result of his visit will be satisfactory, and that we may shortly see all our divisions raised to their full strength.

In 1871 Mr. Mosse writes in his report :—

An officer of Pioneers, on his first appointment at a salary of £236 per annum, is sent nominally to command a division, but practically to learn his duties. Subsequently he has to superintend the upkeep of roads, which affords but little professional experience ; his only opportunity for gaining knowledge is by private study during the early part of his service ; and when more advanced in life, he must either be promoted to a position for which his knowledge may be insufficient, or be apparently harshly passed over in favour of some officer who, having had a regular professional training, has more engineering

MAWANELLA BRIDGE
56th. Mile Kandy Road
4 Spans of 50 feet
Built by the Royal Engineers
1832



experience. It is impossible to expect that young men will incur a professional education at home, at a minimum cost of a thousand pounds, to obtain the small remuneration of Pioneer Officers in Ceylon (£236), while the junior ranks of similar appointments in India range at about £450 per annum, a salary which officers do not obtain in this Department under twelve or more years' service.

The only plan of remedying the evil (which increases yearly in proportion to the expenditure of the Department) is to appoint as Pioneer Officers only those who have served for three or four years in the office of a competent engineer in the United Kingdom, and to pay them a salary of £350 at least at starting.

The alteration would involve an annual additional expenditure of about £4,000, and there can be no doubt that it would be highly advantageous to the Department; but it is probably a subject which can only be dealt with by special application. Suffice it to say, that I find it very difficult to obtain men competent to make surveys for and take charge of the irrigation works in the Colony, especially since the uncertainty of their being carried out renders it unadvisable to obtain experienced engineers from England.

For the last six years the Pioneer Force has been decreasing, and is still deficient in strength. On December 31 last the return was as follows:—

Return of Pioneer Force on December 31, 1871.

	Number employed.	Nominal Strength.	Deficiency.	Excess.
Divisions ..	12 ..	12 ..	— ..	—
Sergeant-Majors ..	11 ..	12 ..	1 ..	—
Sergeants ..	37 ..	36 ..	— ..	1
Corporals ..	32 ..	36 ..	4 ..	—
First Class Artificers ..	75 ..	60 ..	— ..	15
Second Class Artificers ..	193 ..	120 ..	— ..	73
Third Class Artificers ..	615 ..	480 ..	— ..	135
First Class Pioneers ..	423 ..	720 ..	297 ..	—
Second Class Pioneers ..	154 ..	1,020 ..	866 ..	—
First Class Boys ..	106 ..	120 ..	14 ..	—
Second Class Boys ..	48 ..	120 ..	72 ..	—
Third Class Boys ..	22 ..	120 ..	98 ..	—
Total ..	1,728	2,856	1,352	224

This return shows an actual deficiency of 1,128 men below the nominal strength, or fully 39 per cent.; and the following are the comparative numbers on December 31, 1870 and 1871:—

	1871.	1870.	Decrease.	Decrease. Per Cent.
Strength of Force ..	1,716 ..	1,888 ..	172 ..	9·11
Enlisted ..	34 ..	354 ..	320 ..	90·40
Discharged ..	38 ..	79 ..	41 ..	51·90
Deserted ..	125 ..	239 ..	114 ..	47·70
Deaths ..	43 ..	73 ..	30 ..	41·09

In February of 1871 the Inspector of Pioneers visited Southern India in order to inaugurate, through the Madras and Mysore Governments, a system of recruiting, which would prove more satisfactory than that at present pursued; but the necessary arrangements have not yet been completed.

In my opinion it is desirable to maintain the twelve divisions of Pioneers at their full strength, especially as there is at present so great a deficiency in the number of first and second class Pioneers; but I would not recommend that the force should be extended beyond the twelve divisions.

In 1872 he states :—

In 1867 the strength of the Pioneer Force was nominally twenty divisions, each consisting of 237 non-commissioned officers and men ; but actually this number was not reached, and difficulty being found in employing profitably so large a body of men recruiting was stopped, and the divisions were at the end of 1868 reduced to twelve, the number which existed on my arrival in the Colony.

Return of Pioneer Force on December 31, 1872.

	Number employed.	Nominal Strength.	Deficiency.	Excess.
Divisions ..	12	12	—	—
Sergeant-Majors ..	10	12	2	—
Sergeants ..	30	36	6	—
Corporals ..	33	36	3	—
First Class Artificers ..	75	60	—	15
Second Class Artificers ..	188	120	—	68
Third Class Artificers ..	566	480	—	86
First Class Pioneers ..	346	720	374	—
Second Class Pioneers ..	138	1,020	882	—
First Class Boys ..	89	120	31	—
Second Class Boys ..	45	120	75	—
Third Class Boys ..	17	120	103	—
Total ..	1,549	2,856	1,476	169

The actual deficiency was 1,307, or 46 per cent. on the nominal strength ; and the following are the comparative numbers on December 31, 1871 and 1872 :—

	1872.	1871.	Increase.	Decrease.	Decrease. Per Cent.
Strength of Force ..	1,537	1,716	—	179	10·43
Enlisted and joined.	54	34	20	—	—
Discharged ..	77	38	39	—	—
Deserted ..	106	125	—	19	15·28
Deaths ..	37	43	—	6	14·00
Pensioned ..	13	—	13	—	—

In view of the decrease in the strength of these divisions, and of the increasing facilities for obtaining skilled labour in the Southern, Western, and Central Provinces, it has lately been determined to reduce the number of divisions to ten, and to make the Pioneer Force more an artificial Corps than formerly ; keeping with half of the divisions a large number of probationers for ordinary work, but supplementing the force as occasion may require by ordinary hired labour.

The divisions, ten in number, will be as follows:—Five divisions to be of the following strength :—

	Rs.	c.	Rs.	c.
1 Sergeant-Major ..	1	50	1	50
2 Sergeants ..	1	25	2	50
2 Corporals ..	1	12	2	24
10 First Class Artificers ..	1	0	10	0
15 Second Class Artificers ..	0	75	11	25
75 Third Class Artificers ..	0	63	47	25
25 Probationers not exceeding ..	0	42	10	50
Per day ..	85	24		

And five divisions are composed as follows :—

	Rs.	c.	Rs.	c.
1 Sergeant-Major	..	1 50	..	1 50
3 Sergeants	..	1 25	..	3 75
3 Corporals	..	1 12	..	3 36
10 First Class Artificers	..	1 0	..	10 0
15 Second Class Artificers	..	0 75	..	11 25
75 Third Class Artificers	..	0 63	..	47 25
100 Probationers not exceeding	..	0 42	..	42 0
			Per day	..119 11

The average cost of these divisions is nearly the same as that of a division at present.

In 1874 Mr. Mosse again writes :—

The yearly augmenting decrease in the Pioneer Force is a matter, not only of deep regret, but of serious apprehension.

The following shows the numbers of the force at the end of the last four years :—

	Nominal Strength.	Actual.	Decrease.	Decrease. Per cent.
December 31, 1870	.. 2,844	.. 1,888	.. 968	.. 33
Do. 1871	.. 2,856	.. 1,728	.. 1,128	.. 39
Do. 1872	.. 2,856	.. 1,549	.. 1,307	.. 46
Do. 1873	.. 1,685	.. 1,238	.. 447	.. 26
Do. 1874	.. 1,685	.. 1,084	.. 601	.. 36

From the above it appears that in four years the force has actually decreased in number 804, say at an average of 200 per annum, and that, if the decrease continue at this rate, the Force will not last more than five or six years longer.

In 1876 the office of "Officer Commanding Pioneers" was abolished, and the divisions were placed in direct charge of a Serjeant-Major under the Superintending Officers in charge of the district in which the division was working.

The last officers who in 1876 held the office of "Officer Commanding Pioneers" were :—1st Division, L. Creasy, Kekirawa ; 2nd Division, T. Johnston, Anuradhapura ; 3rd Division, P. Lynam, Puttalam ; 5th and 8th Divisions, H. T. S. Ward, Rakwana ; 6th Division, A. J. Winchester, Dikoya ; 7th Division, F. Armstrong, Galoya, Trincomalee road ; 9th Division, W. Wrightson, Hambantota ; 2nd and 10th Divisions, H. F. A. Robinson, Lindula.

In this year (1876) Mr. Mosse writes :—

The following figures show the number of the force at the end of the last five years :—

	Nominal Strength.	Actual.	Decrease.	Decrease. Per Cent.
December 31, 1871	.. 2,856	.. 1,728	.. 1,128	.. 39
Do. 1872	.. 2,856	.. 1,549	.. 1,307	.. 46
Do. 1873	.. 1,685	.. 1,238	.. 447	.. 26
Do. 1874	.. 1,685	.. 1,084	.. 601	.. 36
Do. 1875	.. 1,685	.. 1,183	.. 502	.. 30
Do. 1876	.. 1,685	.. 1,093	.. 592	.. 35

It will be noted with regret that the Pioneer Force still continues to decrease, the strength being 1,093 in 1876, as compared with 1,183 in 1875, or a decrease of 90.

During the past year negotiations for recruiting the force in the Madura, Tanjore, and Trichinopoly districts of Southern India have been carried on with the Madras Government, and arrangements have been made, which encourage the hope that when the new system commences in 1877, the difficulty of obtaining Pioneer recruits will be diminished.

The result is, however, uncertain, and considering the number of coolies who come from India to work on the estates, their disinclination to enlist in the Pioneers, where they are so much better off than elsewhere, is remarkable.

I can only account for it by a dislike for enlistment, involving prolonged service in unhealthy districts, and dislike for discipline conditions, however, which are essential for the existence of the Pioneer Force.

In 1879 Mr. J. F. Churchill, the Director of Public Works, writes:—

The Pioneer Force has been the great nursery for skilled labour in Ceylon, which is now becoming obtainable in all parts of the country, and the time has arrived when the Pioneer Force may be reduced. Its services have been invaluable to the Colony, being the only means whereby all the great public works and lines of roads could possibly have been carried out, and it is still necessary that a strong force should be maintained for the purpose of carrying out irrigation and other public works in unhealthy districts, where hired labour could not be induced to go, and where a superior class of work is required. Some lines of new roads and all public buildings are carried out by contractors or by prison convicts under the inspection of officers of this Department. The operations of the Pioneer Force in all parts of the country during the year have been very satisfactory.

In 1880 he states:—

The strength of the Pioneer Force was reduced to seven divisions of 100 men each, as authorized by Colonial Secretary's letter No. 275 of February 20, 1880. There were ten divisions in January and February, which were reduced to eight from March 1, and finally to seven from August 1, by amalgamation of three divisions with others.

The following figures show the number of the force at the end of the last five years:—

	Nominal Strength.	Actua .	Decrease.	Decrease. Per Cent.
December 31, 1875	.. 1,685	.. 1,183	.. 502	.. 30
Do. 1876	.. 1,685	.. 1,093	.. 592	.. 35
Do. 1877	.. 1,685	.. 1,102	.. 583	.. 34·60
Do. 1878	.. 1,685	.. 1,324	.. 361	.. 21·42
Do. 1879	.. 1,100	.. 979	.. 121	.. 11
Do. 1880	.. 700	.. 765	.. —	.. —

At the urgent request of the contractors, four divisions of Pioneers were lent to them towards the close of the year (after the completion of the new roads and irrigation works they were engaged upon) for the construction of the large masonry works on the Dimbula Railway, each division of Pioneers, with its officer, forming a nucleus, around which a body of hired labourers could be collected, and thus ensuring to the Government and to the contractors that the work done was of a good and substantial nature. So advantageous has this system proved, that the contractors, supported by the Government Inspecting Engineers, applied that more divisions of Pioneers with their officers should be lent to them for this purpose, as from their thorough training the work done by the Pioneers is superior and more substantial and cheaper than can be done by hired workmen.

Writing in 1881, Mr. Churchill states:—

As no recruiting was carried on, the strength of the force fell to 655 at the end of the year. With the exception of one detachment employed on irrigation works in the North-Central Province, all the Pioneers have been lent to the contractors for the construction of the railway from Nawalapitiya to Nanu-oya, where their work is favourably reported upon by the Chief Resident Engineer.

In 1882 Mr. Churchill again writes :—

The strength of the Pioneer Force being greater than what is now required for the public works of the Colony, owing to the extension of the system of having works executed on contract, and the abundance of skilled labour to be hired in the Island, all recruiting for the force has been stopped. The Pioneers will only hereafter be required as a nucleus, around which hired labour can be collected for works, or to be employed upon any special works that require exceptionally skilled workmen. Nearly the whole force was lent during the year to the contractors for the Nawalapitiya and Nanu-oya Railway, and employed upon the erection of the large viaducts and other difficult works of art that could not well be carried out by hired labour, and this work has been satisfactorily done under the supervision of officers of this Department, whose services were also lent to the contractors.

In 1887 Mr. MacBride gives the following information :—

PIONEERS.

Return of the Pioneer Force on December 31, 1887.

	Number employed	Nominal Strength of Division.	Deficiency.	Excess.
Divisions ..	5	5	—	—
Sergeant-Majors ..	5	5	—	—
Sergeants ..	10	10	—	—
Corporals ..	5	10	5	—
First Class Artificers ..	32	40	8	—
Second Class Artificers ..	69	60	—	9
Third Class Artificers ..	151	150	—	1
Pioneers and Boys ..	151	225	74	—
Total ..	428	505	87	10
Deficiency ..			87	
Deduct excess ..			10	
Actual deficiency ..			77	

	1887.	1886.	Increase.	Decrease.
Strength of Force ..	428	440	—	12
Enlisted and joined ..	34	63	—	29
Discharged ..	12	3	9	—
Deserted ..	15	31	—	16
Deaths ..	14	18	—	4
Pensioned ..	10	15	—	5

The following figures show the number of the force at the end of the last five years :—

	Nominal Strength.	Actual.	Decrease.	Decrease. Per Cent.	Increase.
1882 ..	500	583	—	—	83
1883 ..	500	511	—	—	11
1884 ..	500	492	8	1.6	—
1885 ..	500	444	56	11.2	—
1886 ..	500	440	60	12.0	—
1887 ..	505	428	77	15.4	—

which shows that at the end of 1887 the strength of the whole force had fallen to 423.

In 1888 Mr. MacBride writes :—

I regret to report that the force has considerably diminished in numbers during 1888 ; it fell off from 423 to 401. An offer was made to obtain recruits from the Coast, and was accepted by Government ;

but just at the time another offer of 100 recruits, chiefly experienced workmen, was temptingly put forward. The acceptance of the former was withheld, and the latter took its place, but has ended in disappointment, for of the 100 recruits promised, but two have been produced. Though greatly reduced in numerical strength, the works, especially those of irrigation, would have fared badly without the Pioneer Force. The men have been distributed throughout the Island, and no work situated in an unhealthy locality makes progress without them. I am, therefore, strongly in favour of restoring the strength of 500. In these days of competition for skilled labourers among the several existing Government Departments of Works, the security to my Department which 500 such men would afford is incalculable, while the existence of a strong force would tend to regulate the daily wages of ordinary skilled workmen.

In 1889 he adds :—

On the last day of the year under review the strength stood at 424 ; since then there has been a slight increase, and Government has lately been offered 100 Canarese recruits. Notwithstanding the facilities, which are undoubtedly yearly increasing, for obtaining skilled labour in Ceylon, the Director is of opinion that it is sound policy to maintain a force of Pioneers. There are still unhealthy districts to be opened up by the civilizing influence of public works, and in the future, as in the past, it is mainly to this admirable force that we must look, especially in the unpopulated parts of the country.

Mr. MacBride, writing in 1890, states :—

Railway Construction by the Public Works Department.—The profitable employment of Public Works Officers and Pioneers on railway works has until the last few years been looked upon as problematical, but doubt regarding it cannot longer exist, because contractors who look to large profits have been glad of their services. The most important works—viaducts, bridges, &c.—on the Nanu-oya Extension were executed by officers of my Department and men trained on public works, who were lent to Messrs. Nowell Brothers, the contractors. The works themselves are the strongest proof of the competency of the Department in this respect, and nothing that I can urge could possibly carry more weight. The position of the officers, too, was not an enviable one ; they were public servants desirous of doing good work for the Government, and at the same time the servants of the contractors, who required work done cheaply ; yet they gave general satisfaction.

Any officer who is fit to project and execute irrigation schemes of magnitude, embracing the work of arresting, diverting, or impounding large volumes of water and surveys of a most minute and, of necessity, comprehensive character, often under circumstances that involve isolation from sources of supply, materials, food, and labour, in an unhealthy locality, encountering engineering difficulties as the works proceed, and for long intervals without the opportunity of personal consultation and advice, is surely fit to be entrusted in his own Department with surveys and construction of railways in a country he knows so well, and in which he has already given proof positive of his unqualified fitness.

It would be in the public interests that the practice of railway works should be afforded to officers of the Public Works Department of the Colony, and I for one believe that had this course been adopted years ago, there would have been many more miles of railway at present in operation, and that where roads have been made, cheaply constructed, efficient, and suitable railways would have taken their place. Depriving my Department of this practice has had, in my opinion, as much to do with the very poor railway mileage of to-day as with the costliness of the existing railways themselves.

Finally, at the close of 1894, there were but 295 of all grades in the Pioneer Force of the Colony, 50 per cent. of these being mere boys, and Mr. MacBride writes :—

There is sufficient skilled labour in the country to meet its requirements. The only difficulty encountered at present is to induce this labour to work in unhealthy localities. But for this the abolition of the Pioneer Force would be possible without prejudice to public interests.

A full list of names of Officers Commanding Pioneers from 1821 to 1876 will be found in Appendix to Volume II. But for this force, which did such good work for the Colony for over seventy years, it is doubtful whether roads and irrigation works situated in unhealthy parts of the Island could have been carried out. Wherever the Pioneers were sent, they formed the nucleus of a labour force, which gradually attracted other labour, and to them is due the magnificent and unrivalled road system which exists to-day throughout the Colony.

NOTE.

The Pioneer Corps owes its origin to the necessity which was felt for organizing a body of trained artificers in connection with it ; and as all public works were up to 1833 in charge of the Quartermaster-General and the Royal Engineers, and the Pioneer Corps had to execute the works resolved upon by Government, it may not be uninteresting to notice that the Corps consisted, from 1820 to 1833, of six divisions, each in charge of a subaltern, and the whole under a Captain Commanding. During the period there were engaged on the public works of the Royal Engineers and Royal Staff Corps Captains Dawson, Moore, Duvernett, Brown, Mann, Pringle, and Ward, and Lieutenants Dixon, Dillon, Forbes, and Oldershaw ; in the Quartermaster-General's Department Colonel Hardy, 19th Regiment ; Major J. Fraser, Ceylon Rifles ; Lieutenant Moore, Royal Staff ; and Lieutenants Auber, Skinner, and Atchison, Ceylon Rifles ; and as Assistant Engineers in charge of Divisions of Pioneers, under Captains E. Sanderson, 83rd, G. MacDonald, 16th, and A. Brown, Superintending Royal Engineer, successive Captains Commanding the Corps ; Lieutenants J. Bell, M. H. Fagan, J. H. Summerfield, John Brahan, W. H. Smith, John Harrison, J. S. Rodney, Theodore Mylius, J. L. Fenwick, James Stewart, T. P. Fenwick, and G. M. Parsons, of the Ceylon Rifles ; H. Forbes, W. H. Butler, W. G. Marsh, Hans S. Marsh, Richard Perham, William Richardson, and Ensigns John Harrison and John McIntyre of the 45th ; Lieutenants John Clancy and John M. Dalzell, and Ensigns M. Henley and George M. Archer of the 16th ; Lieutenant D. Wentworth of the 73rd ; Lieutenants W. Hamilton and C. C. McIntyre of the 78th Highlanders ; Lieutenants F. Irwin, W. Mayne, T. Desbrisay, Henry Hough, and G. Rogers of the Royal Artillery ; and Lieutenants F. O'Brien, R. Dwyer, Aretas S. Young, John Harrison, R. Colquhoun, and H. F. Ainsley, of the 83rd. (Note copied from "The Knuckles and Other Poems," by William Skeen, 1867.)

CHAPTER VIII.

BRIDGE CONSTRUCTION, 1822-1896.

The Satinwood Bridge, Peradeniya, 1826-1833.

SIR EDWARD BARNES having decided upon crossing the Mahaweli-ganga, near Peradeniya, by a bridge of single span, its construction was entrusted to Colonel Fraser. The superb structure was commenced in December, 1826, and completed on October 1, 1833. It consists of a single arch of satinwood and millila, 205 feet in length and 22 feet in width, and in the opinion of competent judges is "an achievement in bridge building of the highest merit." "It is formed of four treble ribs transversely distant from each other 5 feet from centre to centre. The sum of the depths of these ribs is 4 feet, which, with the intervals of 2 feet each, makes the entire depth of the arch 8 feet. The height of the carriage way is 67, and of the soffit of the arch $57\frac{1}{2}$ feet above low water mark, and it is so designed (on an improved application of the American wedge principle) that any part may be removed and replaced without injury to the arch or impediment to traffic. The masonry abutments as well as the centering were separately constructed by the Royal Engineers under command of Captain Brown." ("The Knuckles and Other Poems," by William Skeen, 1867.)

"With masonry abutments now erecting at Peradeniya over the river Mahawilla-ganga bearing S.W. distant 4 miles from Kandy on the new road from Kandy to Colombo.

"The abutments of this bridge have been planned by Captain Brown of the Royal Engineers, and executed under his orders by Lieutenant Oldershaw, Royal Engineer.

"The timber part of the bridge was executed by the Quartermaster-General at Colombo, and was carried up to Peradeniya, a distance of 68 miles. The centering was planned by Captain Brown and Lieutenant Oldershaw, Royal Engineers, who are now erecting it." (Note taken from an old plan.)

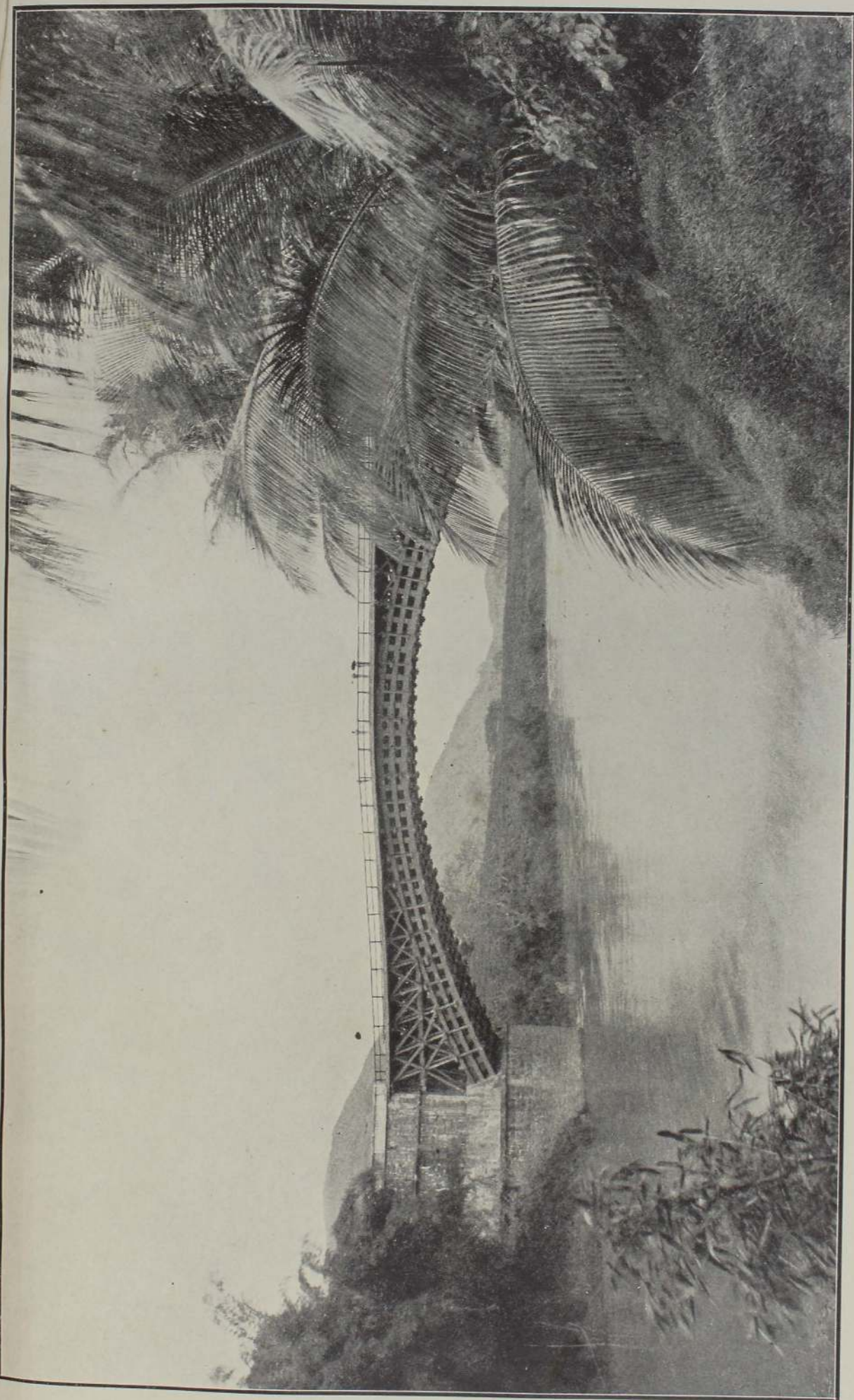
Note.—Captain (afterwards) Colonel Brown designed the Mawarella bridge and probably the Nanu-oya bridge on the 67th mile of the Kandy road, the latter is one of the oldest bridges on this road, and has a stone inscription bearing date 1826.

The Peradeniya bridge was renewed in Sir H. Ward's time (1855-60) by Captain Donald Graham. A model of this bridge is now in the South Kensington Museum.

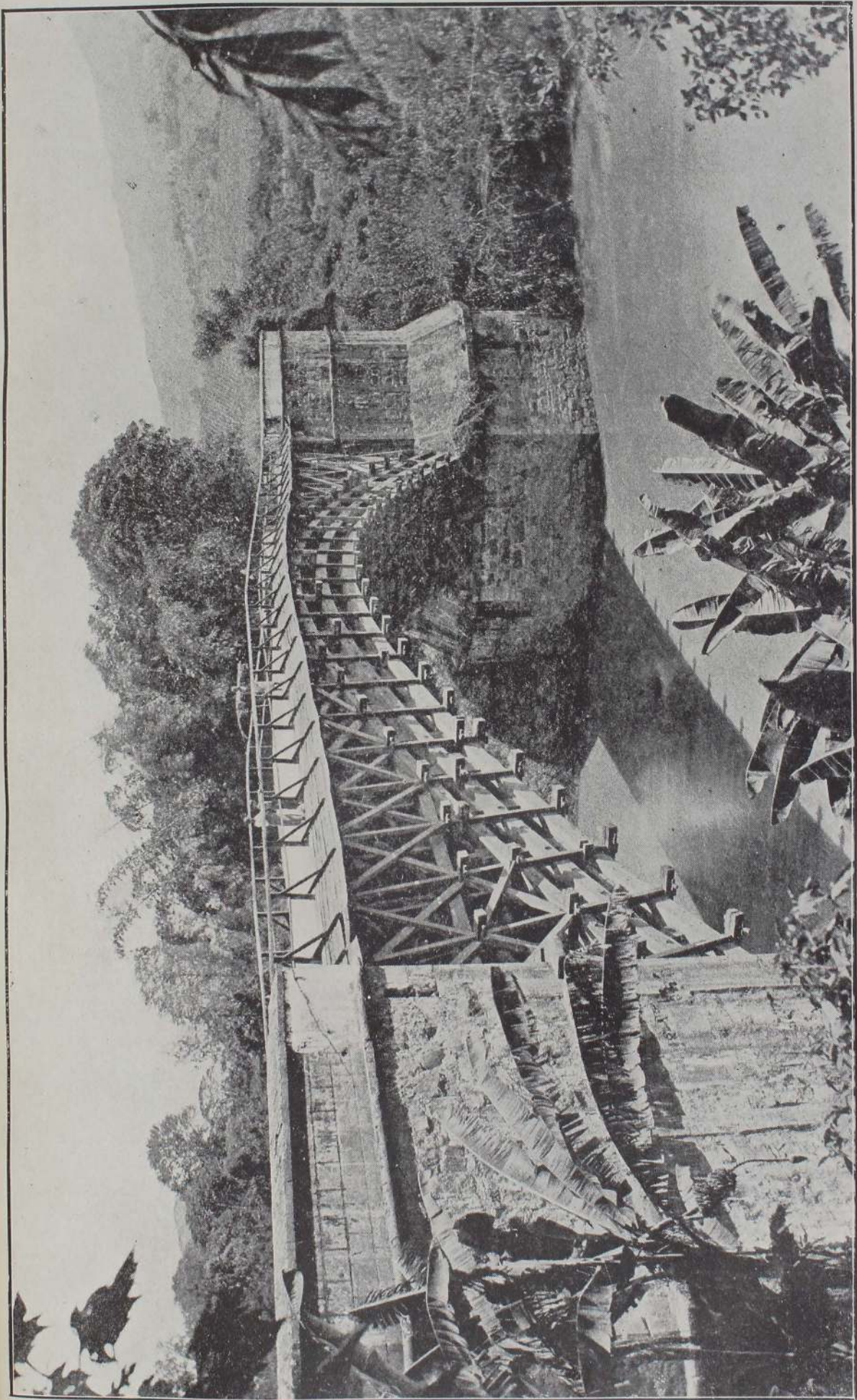
Gampola Bridge (Span 205 Feet), 1856-59.

Minutes of Sir H. Ward.

My first excursion, after reaching Kandy, where I was detained some days by heavy rains, was to inspect the bridge at Gampolle, the slow progress and heavy cost of which had given me much uneasiness. No doubt there was a grievous error in the original calculations, both Captain Graham and Mr. Kershaw, having estimated at £4,000 and £5,000, respectively, the probable outlay upon a work, which will not be completed under £12,124. But this error was shared by the highest authorities then in the Colony. Captain Sim, R.E., to whom Captain Graham's estimate was referred, saw no reason to question its accuracy, and it was only after the work was commenced that the difficulties attending it became apparent. The failure of stone on the Pussilawa side of the river, and the necessity of bringing it by tramways, and a viaduct, from a quarry three-quarters of a mile distant, the



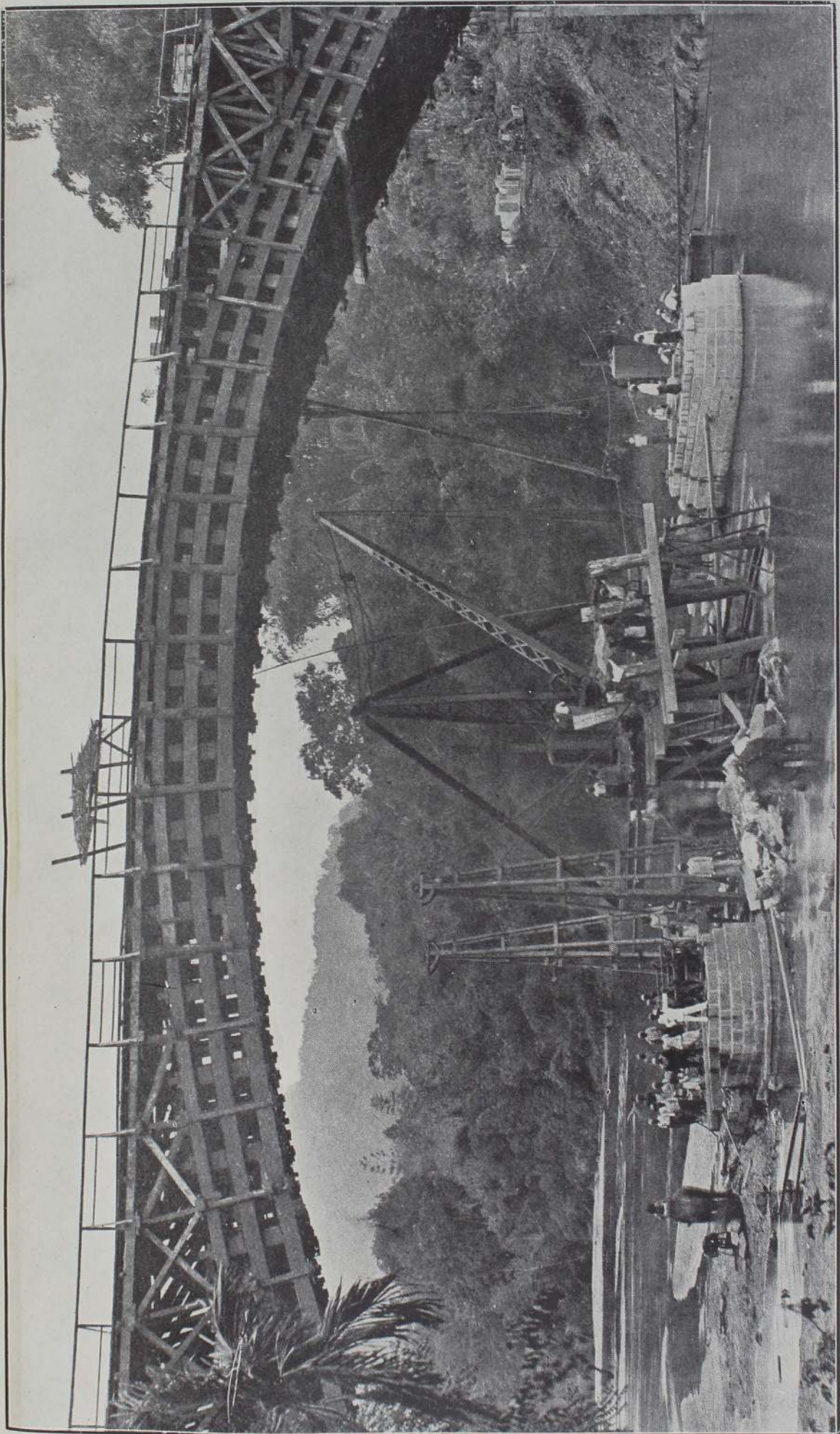
THE SATINWOOD BRIDGE PERADENIYA
Built by
Lieut. General JOHN R. ...



THE SATINWOOD BRIDGE.

Peradeniya.

Another View.



THE SATINWOOD BRIDGE PERADENIYA

One Span of 205 feet
Built by the Royal Engineers 1833
Replaced 1905

additional height given to the abutments after the great flood of 1857, and the heavy masonry required for the foundations, have nearly trebled the original estimates. But the work has been well and substantially executed. The bridge will be opened on January 1, 1859; and Mr. Churchill's able and impartial report will satisfy the most sceptical, that the public has received full value for its money; and that in a Colony, where undertakings upon so large a scale are rare, and where there are few professional men accustomed to deal with them, provided the object be attained, and the work honestly done, we must make some allowance for errors in the estimates. I may add that I look forward to a considerable off-set against the total cost of the Gampolle bridge, as given in Mr. Churchill's Report, Captain Graham having informed me that a large portion of the timber now in use in the tramways, and scaffolding, may be sawn up, and employed in building a lattice bridge at Navellepittia, upon an improved model of that at Badulla, the success of which I have had the pleasure of witnessing. Should this proposal be adopted, and it will be submitted to the Council with the Estimates for 1859, there will be two bridges across the Mahawilla-ganga, in lieu of one, within a distance of 12 miles; and a small additional expenditure will secure an important public benefit.

Opening of the Gampola Suspension Bridge.

On the 1st of January, of the present year (1859), I had the great pleasure of being present at the opening of the Gampolla suspension bridge, which has been completed, with its approaches, some days previously. Most of you have now seen that very remarkable structure. All ought to see it; for it is difficult to combine more beauty, with more usefulness. It is a work of which the Colony, and the Architect, Captain Graham, may be equally proud; and the large body of gentlemen interested in the neighbouring districts, who were brought together in honour of the occasion, showed their sense of the benefits, which they anticipate from the change, by the hearty reception which they gave to all concerned in effecting it. It is strange that the means of accomplishing this change should have been in the Colony for more than thirty years, without any proposal being made for taking advantage of them. Indeed, I believe that the bridge, though nearly perfect in all its parts, had been altogether forgotten in the Commissariat Stores, until I caused it to be put together, and ascertained that out of the whole mass of iron sent out in 1829, only two links were wanting, which were easily supplied from England. It will be a pleasure to me hereafter to remember that from that moment I never lost sight of the work until it was completed. I assisted in selecting the site, which is singularly picturesque; and when after many delays, and much unlooked for increase of cost, in consequence of the failure of the quarries, upon the proximity of which the first estimates were founded, I saw the successful result of Captain Graham's labours, I felt that the new year had commenced auspiciously for both of us; and that when my connection with this Island terminates, some useful things will remain, to recall me to its recollection.

Note.—Total cost £12,083. 11s. 5d.

Report on the Gampolle Suspension Bridge, by J. F. Churchill, Esq., Assistant Civil Engineer and Commissioner of Roads.

The COMMISSIONER OF ROADS AND CIVIL ENGINEER, Colombo.

No. 31.

Gampolle, March 1. 1858.

SIR,—WITH reference to your letter No. 471 of the 11th ultimo, and the instructions contained in the Hon. the Colonial Secretary's letter No. 76 of the 6th ultimo, I have the honour to enclose a general map, showing the site of the proposed Gampolle Suspension Bridge; the

approaches to it from the town of Gampolle and the Pussilawe Road ; the rocks from which the stones for the abutments and piers are quarried ; the inclined plane and tramway, down which the stones are conveyed to the works ; with a drawing of the bridge, showing, coloured in red, the masonry that has been built, which was not included in the estimates. The uncoloured portion shows the masonry that was included in the first estimate. That coloured blue shows the masonry that was provided for in the supplementary estimate.

1st.—I have to report, that upon the south, or the Pussilawe bank of the Mahavilla-ganga, the pier has been built up to a height of 30 feet, and the abutment to a height of 41 feet above the line of low water, both together containing 4,080 cubic yards of solid masonry ; leaving 699 cubic yards more masonry to be built, to complete them to their proper height of 50 feet above low water line.

Upon the north bank the pier has been built up to a height of 35 feet, and three-fourths of the abutment to a height of 37 feet, and the remainder of the abutment to a height of 22 feet above the line of the low water, both together containing 3,047 cubic yards of solid masonry, leaving 1,400 cubic yards more masonry to be built, to complete them up to the height of 50 feet above low water line. The green dotted line across the piers and abutments shows their relative heights.

A viaduct, 320 feet in length, connecting the north and south banks of the river, has been erected, over the site of the piers and abutments, at a height of 52 feet above the line of the low water, along which, upon a line of rails, waggons convey materials for the works upon the south bank of the river.

A tramway, half a mile in length, of 3 feet 6 inches gauge, has been made, leading up to the quarries. At a short distance from the site of the bridge, it is carried upon a timber viaduct 400 feet along, 9 feet in height ; then enters a cutting of 600 feet in length, 15 feet deep ; and it passes over the town and streets of Gampolle upon a timber viaduct 600 feet in length, 15 feet in height. From the upper end of the tramway an inclined plane has been laid up the hill, 500 feet in length, down which the stones from the quarries slide to the tramway, where they are put into trucks, which are propelled by their own weight along the tramway to the bridge.

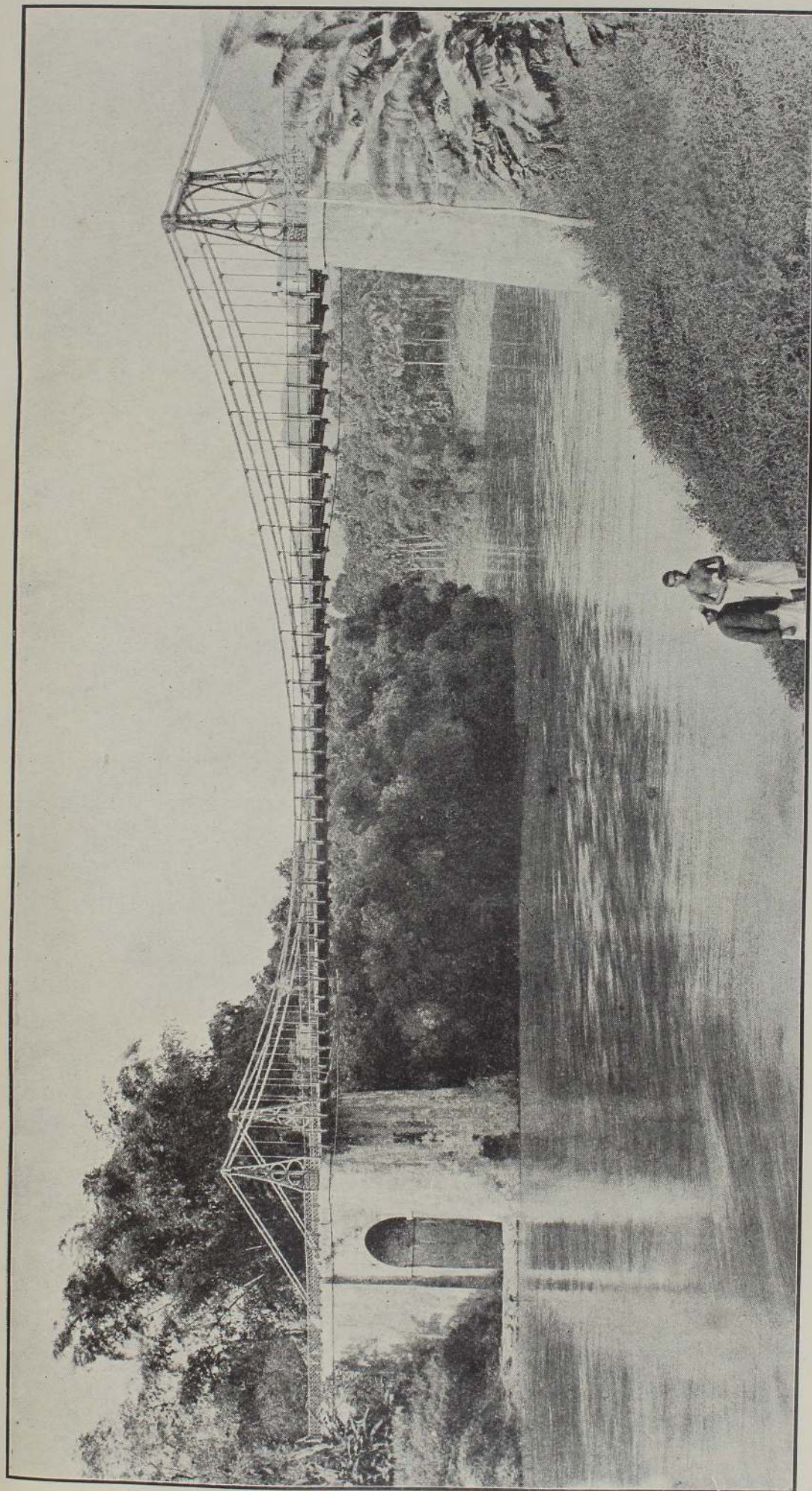
Barracks for 250 pioneers and labourers were built near the bridge. These were accidentally burnt down, but have again been rebuilt. A blacksmiths' shop, store, hospital, and stables for five elephants have been erected.

2nd.—The foundations for the pier and abutment upon the south bank are laid at a depth of 12 feet below low water line upon a bed of coarse gravel. Upon the north bank the pier is built upon rock stepped to receive the courses of masonry. The foundations for the abutment are laid to a depth of 9 feet below the low water line, upon a bed of disintegrated stone, having its south foot stepped into the solid rock. These I consider to be the least depths that could with safety have been adopted for laying the foundations to ensure the stability of the work, and to prevent the foundations being undermined by the scour of the river in floods.

The masonry of the piers and abutments is of coarsed rough-dressed gneiss, rubble work, of the most substantial and permanent nature, and well adapted for this description of building. I consider that the abutments and piers are being built upon a good and judicious plan.

The anchors for holding the suspension chains are well bedded into the abutments, and have iron girders laid transversely across them, to give them additional holding power. A reference to the drawing will show the details of construction.

The viaduct connecting both banks of the river is a fine piece of scaffolding. The best proof of the strength with which it is put together is that it withstood the flood of 1857, which rose to a height of 35 feet



GAMPOLA SUSPENSION BRIDGE.

205 feet Span

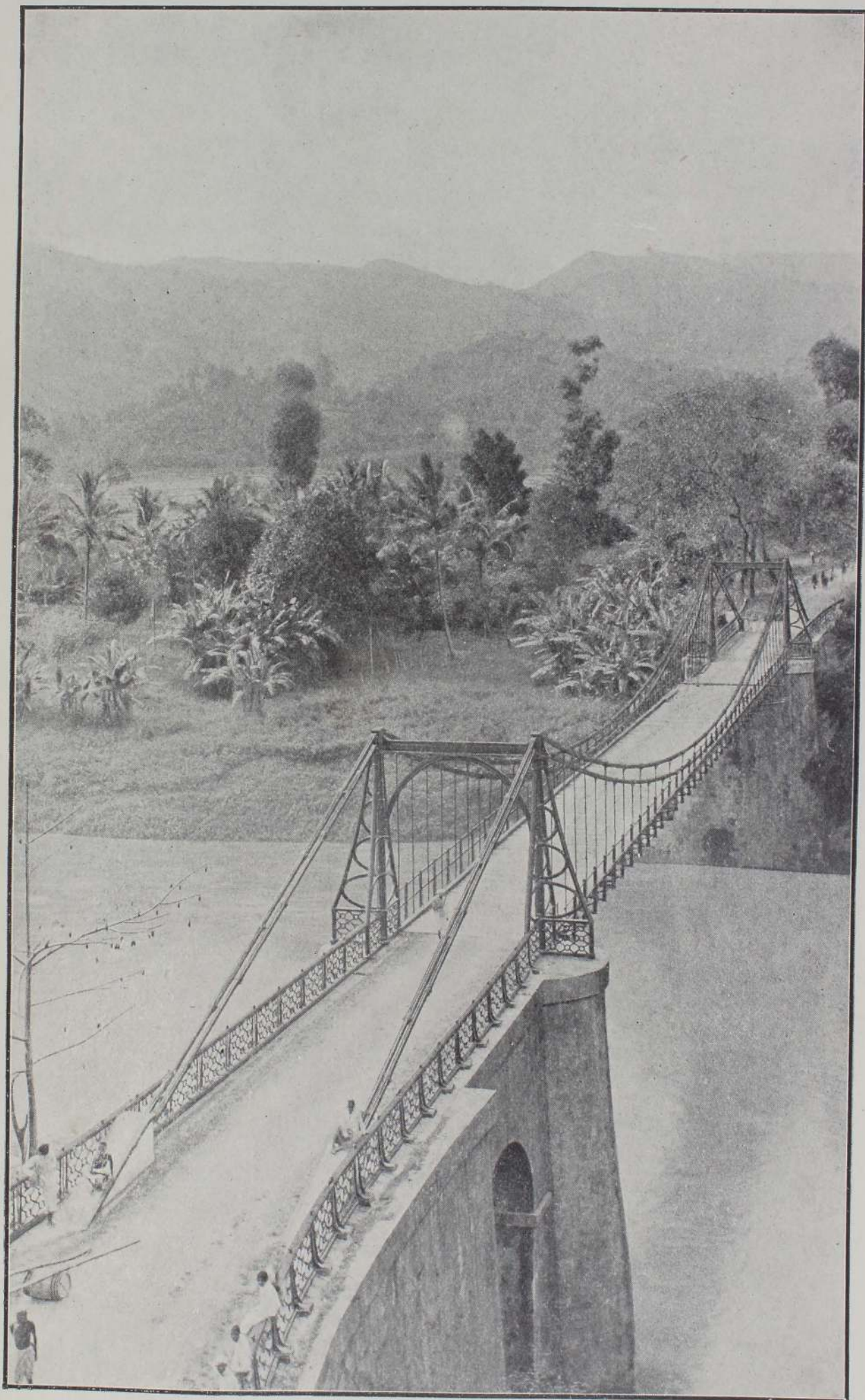
Erected by Captain DONALD GRAHAM

Ceylon Rifle Regiment.

1856-1859.

S. G. O.

Ironwork obtained from England in 1856.



GAMPOLA SUSPENSION BRIDGE

S. G. O.

(Another View.)
Digitized by Noolaham Foundation.
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above the low-water line without receiving any serious damage from the trees dashed against it as they were swept down the river by the flood.

The tramway is well and carefully laid, having a rise at the end of the curve in the town of Gampolle, to break the velocity with which the wagons travel down the upper portion of the line, and then a gentle incline leading down to the bridge.

The timber viaducts for the tramway are of equally good construction as the viaduct across the river.

The inclined plane is laid with planks, upon which are fastened five iron rails leading up to the quarries.

The stones are brought by elephants to the top of the incline, down which their own weight makes them slide at a great speed to the platform at the head of the tramway. The wear and tear upon this incline is, of course, considerable, but is made in the best manner that could be adopted for the purpose.

3rd.—The works for this bridge were commenced upon the supposition that solid rock would be found upon the north and south banks of the river, as shown by the coloured lines upon the drawing. But, upon excavating for the foundations, the supposed rocks were found to consist of only a bed of large boulders cropping out upon the surface.

Upon the north bank the rock dipped inshore from the bed of the river, while upon the south bank no rock was found. Upon this being fully ascertained, it became necessary to sink the foundations to the additional depth, as shown upon the drawings, and also to have additional lengths of chain to bed the anchors deeper into the abutments, the original intention having been to bed them in the natural rock.

After all the boulders had been used for the building, and no rock having been found in the river banks, it became necessary to look for other sources from whence stones could be procured for the works. The nearest available spot found was that shown upon the general plan, at a distance of nearly three-quarters of a mile from the bridge. To convey the stone from this place down to the works it was necessary to lay down an inclined plane—a tramway—and to build a viaduct across the river. To the time expended in erecting the works, and the time occupied in building the additional masonry required, is to be attributed the delay in the completion of the work.

4th.—The original estimate No. 151 for putting up the Gampolle bridge amounted to £3,911. 5s. 1d., the supplementary estimate No. 307 was £3,713. 10s. 0d., making a total amount of £7,624. 15s. 1d. as the cost of the bridge up to this date. The viaduct across the river and the tramway cost together £1,768. 12s. 3½d. The transport up from Colombo of the ironwork for the bridge cost £500. Deducting these two sums from the total amount of the two estimates, we have £5,356. 2s. 9¾d. as the cost of 7,127 cubic yards of masonry built up to this day, being at the rate of 15s. 0¼d. per cubic yard of masonry. This cost of 15s. 0¼d. includes the quarrying of the stone, the working of the tramway and the inclined plane, the cost of keeping all the scaffolding, tramway, and inclined plane in working order, erecting the barracks, blacksmiths' shop, hospital, store, and elephant stables. This I consider to be a moderate cost for work of this description, taking into consideration the distance which the stone has to be carried to the works, and the cost of lime being 10d. per bushel.

In my estimate for the completion of the bridge I have estimated the masonry at 16s. per cubic yard.

The original estimate was framed upon the supposition that a sufficient quantity of stone for the whole of the work could be procured close to the site of the bridge. And it also provided for the use of brickwork and concrete. But it was found impracticable to introduce them into the work. The supplementary estimate was made out for additional work required, before the original estimate was expended,

and it was not intended to cover any deficiency that might arise in the original estimate. 2,560 cubic yards of masonry have been built that were not provided for in either of these estimates, which, at the rate of 15s. 0½d., cost £1,923. 13s. 8d.

5th.—To complete the masonry 2,099 cubic yards more have to be added to it. The standards have to be erected on the piers, and the chains to be raised over them; the wood for the roadway has to be sawn, and to be sent up from Colombo, and fitted upon the spot; and the approaches to the bridge from the Gampolle and the Pussilawe sides, being nearly half a mile in length, have to be made.

I estimate that the works can be completed, and the bridge may be opened for traffic, on the 1st of January, 1859.

6th.—The cost of completing the Gampolle suspension bridge will be :—

	£.	s.	d.
The masonry	1,679	4	0
Erecting the standards, raising the chains, and forming the roadway	1,430	5	4
Making 34 chains of approaches to the bridge	1,050	0	0
	<hr/>		
	4,159	9	4
Contingencies	340	10	8
	<hr/>		
	4,500	0	0

Attached to this report are plans of the whole of the work to be completed, with a detailed estimate of the cost.

I have, &c.,

J. F. CHURCHILL,

Assistant Civil Engineer and Commissioner of Roads.

(*Minutes of Sir H. Ward, 1858-59, pages 253, 347, and 277.*)

Kalutara Bridge, 1876.

The DIRECTOR OF PUBLIC WORKS to the Hon. the COLONIAL
SECRETARY.

Colombo, November 27, 1876.

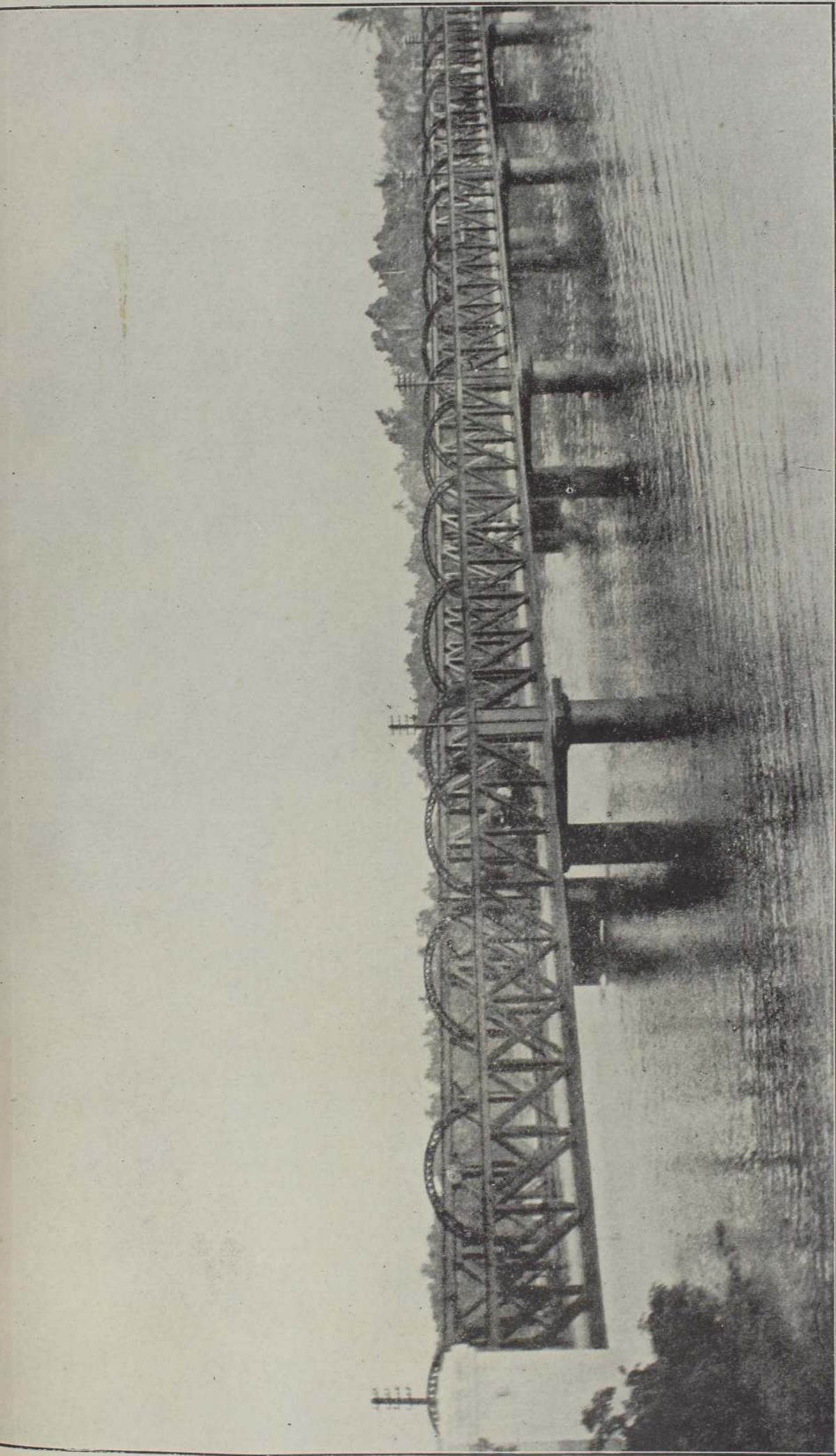
SIR,—I HAVE the satisfaction of reporting that during the last month the progress of this work has been more marked; in other words, the difficulties previously encountered have to a great extent been overcome.

2. On the south bridge only one cylinder, the depth of which is now 70 feet below water, requires to be sunk about one foot more to reach the rock; and in about a fortnight two more spans will be ready for the bridge work.

3. On the north bridge the foundations of the first abutment, which, owing to the depth of mud and to the water rising through the sand, have proved very troublesome, are now nearly ready for the masonry; and as the two cylinders of the adjacent pier require to be sunk only 2 feet more to reach the rock, another span—making seven in all—will by the middle of December be ready for the bridge work.

Although it was found necessary to sink some of these cylinders from 50 to 70 feet below water, or some 30 feet lower than was anticipated when the estimate was framed, I have the satisfaction of reporting that, being down to the solid rock, they are beyond the contingencies, which frequently occur when cylinders rest upon an insecure foundation. The reasons which prompted this course are as follows :—

With reference to the depth to which for safety it is necessary to sink cylinders resting on sand, a Committee of Engineers appointed by the Government of India reported that a “depth of from 65 to 75



KALUTARA BRIDGE
Combined Road and Railway
12 Spans of 100 feet
1874 - 1878



S. G. O.

KALUTARA BRIDGE
(Another View)

feet is so far removed from scour as to be practically safe," but they considered that nothing but flooring the bed of the river to prevent erosion "will render the piers *absolutely* safe." Numerous instances of the destruction of bridges in India from the under scouring of foundations are on record, the following being some of them : "The Jumna bridge consists of twenty-four spans of 100 feet each, the Sutlej bridge of fifty-nine such spans, and the Beas bridge of thirty-four spans. During the floods of 1871 the *fall of several of the piers* which had been exposed to severe scour rendered it necessary to take precautionary measures to arrest further destruction of these cylinders." As regards the Sutlej bridge, three spans were carried away on July 9, 1872, the bed of the river at pier No. 17 being scoured out 37 feet deep in twenty-four hours.

The "Times of India," September 23, reports as follows :—

"We have had most awful floods on the Bombay, Baroda, and Central India Railway ; one large bridge built on screw piles entirely swept away ; eight spans of an iron girder bridge on masonry piers swept away ; eight spans of another bridge on screw piles swept away, and banks and culverts damaged."

Alluding to these floods, the "Pall Mall Budget" states that "through traffic on the Bombay and Baroda and Central India Railway had been almost suspended. The iron bridge of twelve spans over the Par was carried away, eight spans of the Damanu Ganja bridge were destroyed, and several other bridges on the line were rendered unsafe."

A telegram from Madras (October 28, 1874) reports :—"A great flood has occurred at Sellore ; the Cheyar, Panpugee, Chuttiaivutty, and Pelar Pennair bridges have been breached." The destruction by the flood of September, 1872, of the railway bridge near Colombo is too well known to require comment. In September last some twenty-five spans of the Nerbudda bridge were destroyed by a flood, the cause of the accident being *under-scouring*.

In view of these failures, I consider it my duty to protect the Ceylon Government from a similar disaster by sinking even at increased cost the cylinders of the Kalutara bridge down to the solid rock. Sinking cylinders in deep water, whatever may be the method, is always expensive, especially when shelving rock, roots of trees, &c., are met with, as in the case of the Kalutara bridge. As regards the mode of sinking the cylinders, the following appliances have been used : an improved Jham ; Bull's and Molesworth's dredgers ; Ive's excavator, and Stoney's helical excavator ; the latter, a very recent invention, having proved the most serviceable. After as much sand as possible has been excavated by these appliances, the divers remove any hard material which cannot be brought up by these machines, and they also cut away the rock and bed the cylinder on a fairly even surface. This work is necessarily very difficult, tedious, and expensive, but under the circumstances I think it the best method that could have been adopted. On this subject Mr. Molesworth reports as follows :—

"In the boulder stratum of the Jhelum the dredger is useless, and the action of the sand pump very slow, though it has brought up stones of 23 lb. weight ; an endeavour was made, and with some success, to sink the wells by pumping them nearly dry and getting out the materials by hand ; but I have thought that more satisfactory progress can be effected by means of divers in diving dresses, and experiments with the view of testing this method of sinking have been attended, with good results, so that I have every reason to believe that the use of divers will accelerate the progress of these piers." From four to six divers have thus been employed at the Kalutara bridge. Had this depth of foundation (70 feet) been originally known, the plenum process might, perhaps, have been the best means of sinking the cylinders, but this method would have required special and expensive appliances, as well as skilled workmen to use it. Unprofessional men

have no idea of the difficulty of working in small cylinders under 70 feet of water ; and though greater depths are on record, the instances are rare. The greatest depth sunk for foundations was, I imagine, at St. Louis bridge over the Mississippi, where after working for only *forty-five minutes twice a day*, under a pressure of 100 feet of water, the men were on each shift carried to a hospital boat for medical restoratives ! The scour of this river bed reached a depth of 55 feet.

Cost.—The length of the Kalutara bridge, including the embankment over the island embraced in the estimate (Rs. 624,000) is about 1,800 feet, and the cost is therefore Rs. 347 per lineal foot. A comparison with some other similar bridges shows this amount to be very reasonable and moderate. The Grand River viaduct in Mauritius having piers of iron cylinders some 40 feet higher than those of the Kalutara bridge, but built on *dry ground*, cost £50 per foot lineal, the bridge work being for a railway only, and not as is the case at Kalutara for a railway and roadway combined. The cost of the large bridges on the Punjab Northern Railway has been estimated at £66 per foot lineal ; and the cost of the Gorai bridge, including the land arches, has been actually £113 per foot lineal. It should, however, be added that the latter was one of great difficulty, the cylinders having been sunk from 80 to 95 feet below water. It is, therefore, evident that, as compared with these bridges, the cost of the Kalutara bridge, say £25 per foot lineal, is very moderate.

Considering that the stability of this bridge as far as completed has been placed beyond doubt, I regard the estimated cost as very satisfactory. The question is not one of under- or over-estimating ; it depends upon the quantity and description of work which it was found necessary to do ; work which it was impossible accurately to ascertain when the estimate was framed. Had the difficulties been originally known, the estimate would have been £62,000 in the first instance. This is really the only difference. In any case a new iron bridge is an imperative necessity, the present timber structure being now beyond repair and scarcely safe.

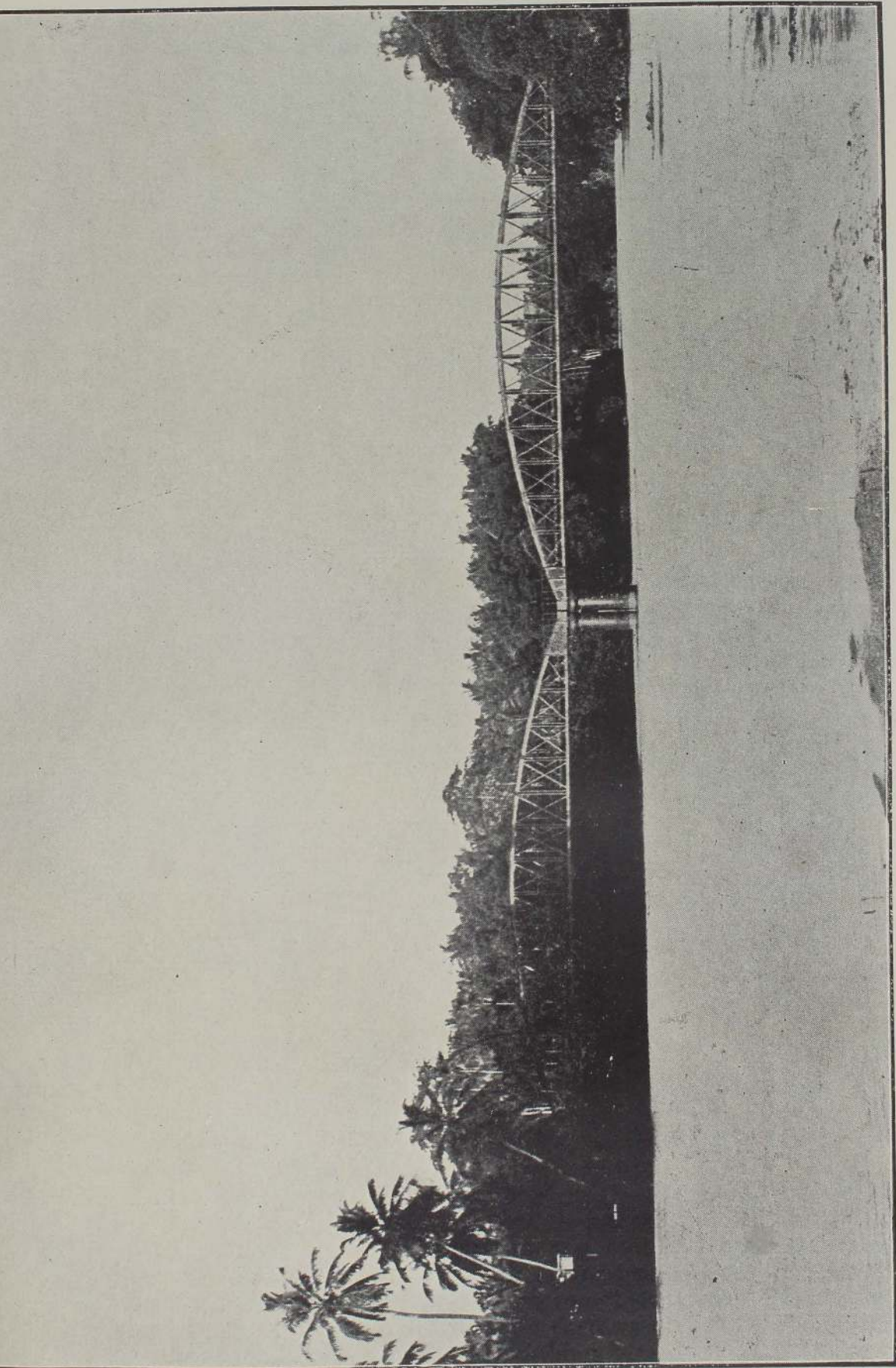
I regret, Sir, that the few hours at my disposal since this letter was called for have not enabled me to go so fully into this subject as I should wish, nor quote more authorities as to cost of similar bridges. Suffice it to add that if the Government entertain any doubt as to the manner in which this work has been carried on, or as to the reasonableness of its cost, considering the difficulties, I beg that the matter may be referred to the Consulting Engineer of the Government, to Sir John Hawkshaw, or to the President of the Institute of Civil Engineers. This request is made because I consider it unfair to the Public Works Department that a work of this nature should be criticized by unprofessional men.

I have, &c.,

J. R. MOSSE,
Director of Public Works.

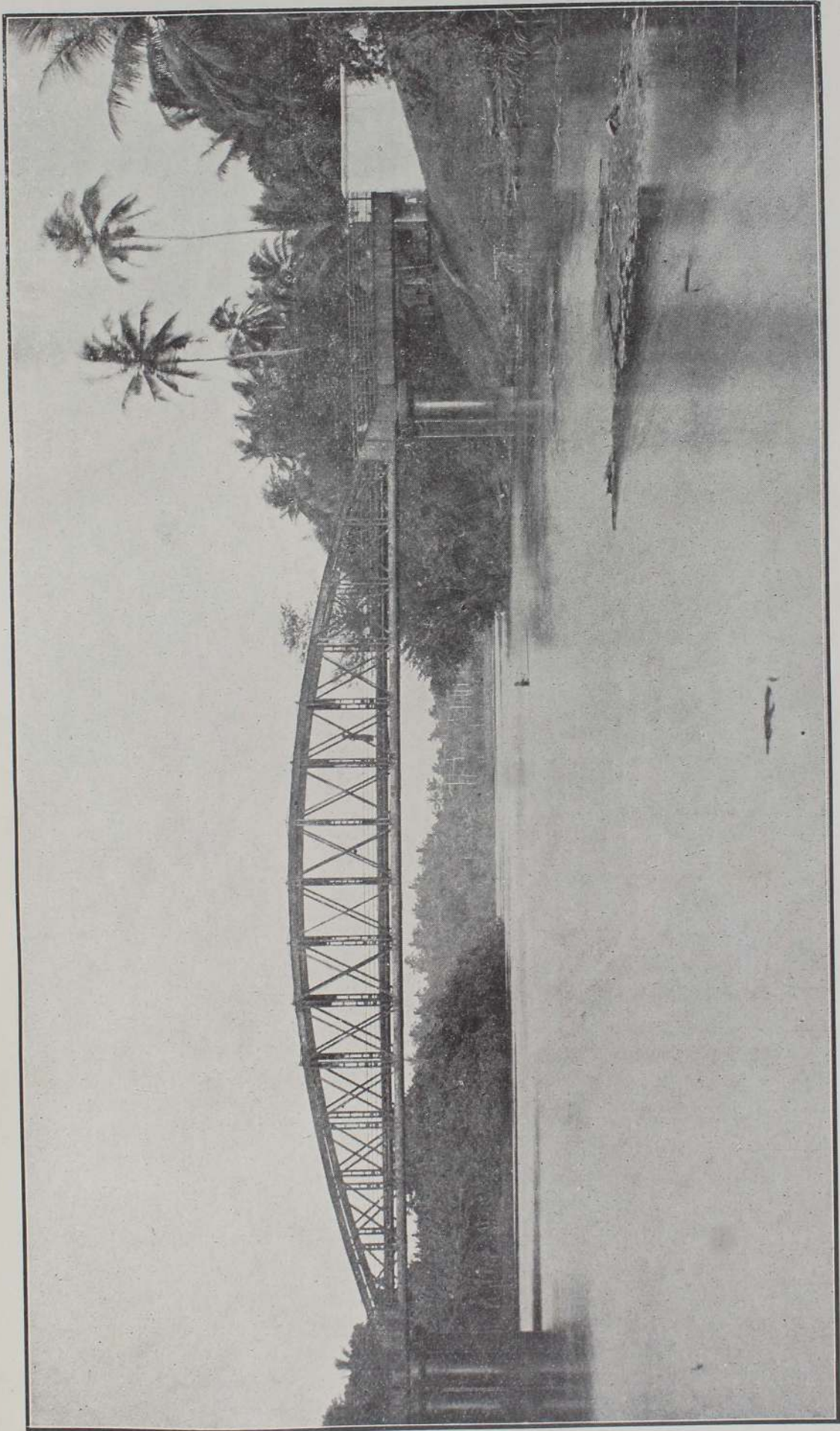
Panadure and Kalutara Railway Bridges.

Kalutara Railway.—Following the seashore this railway is chiefly a surface line, and, with the exception of two large bridges, there are no heavy works. The Panadure bridge has ten spans of lattice girders, each 60 feet in the clear ; each pier consists of two cast iron cylinders, 5 feet in diameter, filled with concrete. The Kalutara bridge, designed and built by the author as Director of the Public Works Department in Ceylon, is the longest structure in the Colony. It consists of two bridges, each containing six spans of lattice girders 100 feet in the clear, separated by an island in the middle of the river, upon which an embankment is raised. There are, therefore, four brick abutments



S. G. O.

TOPPU BRIDGE
27th. Mile
Colombo-Chilaw Road
Two Spans of 144 feet



S. C. O.

TOPPU BRIDGE
View of One Span and Centre Pier

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and ten piers, each pier being formed of two cast iron cylinders, each 6 feet in diameter, shipped in segments of three to the circle and 6 feet in height. The ironwork consists of strong single lattice girders, having a flooring of corrugated iron, on which is laid cement concrete 6 inches thick. The preliminary borings having shown that a bed of gravel existed at about 30 feet below ordinary water level, no pneumatic process was deemed necessary for the work, the excavation being performed by the ordinary methods, with the assistance in deep water of divers. The cylinders were weighted in the usual manner, and when sunk to the rock they were fitted to the bedplates with cement concrete.

After reaching the gravel, which unfortunately proved to be only about 2 feet in thickness, the cylinders were sunk through a bed of soft sand, until the solid rock was reached, at depths of from 50 to 70 feet below the ordinary water level. This entailed great delay and expense, but in view of the numerous failures from the under scouring of bridges in India, the author did not feel justified in subjecting the Government to the risk which a less secure foundation would have involved. One of the abutments was on rock; the other three were founded on piles driven 3 feet apart from centre to centre, the intermediate spaces being filled with cement concrete; on the piles large longitudinal pieces were laid, upon which cross planking, 3 inches thick, was spiked, and on this planking the abutments were built of brickwork in cement. The abutments were encased by sheet piling (subsequently cut off at high water), and cement concrete was rammed between the brickwork and piling.

The following appliances were tried in the excavation of these abutments and piers:—An improved scoop or Jham worked by tackle; the ordinary sand pump; Bull's dredger; Molesworth's dredger; Ives's excavator; Stoney's helical excavator. Of these, the last was the most effectual, although at great depths it required strong vertical rods and a great deal of manual labour to work it. Had the Kalutara bridge been a larger work, and had it been known that the foundations would have proved so deep, more effectual appliances might have been used in the first instance; but as the anticipated depth of foundation was only 40 feet, and the length 1,200 feet, it did not seem advisable to import costly apparatus, especially as the more complicated the appliances the more difficult it would have been to work them with the Sinhalese and Tamil labour available. This bridge, designed and opened in August, 1877, for the turnpike road traffic from Colombo to Galle, included provision for the single line of rails which is now laid in the middle of it. The total length of the Kalutara bridge, with about 450 feet of embankment on the island, is 1,800 feet, and the total cost was Rs. 624,000, or Rs. 347 per lineal foot.

(Extract of Paper read before the Institution of Civil Engineers by Mr. J. R. Mosse, M.Inst.C.E., 1880, Vol. LXIII., page 65.)

Opening of the Toppu Bridge, July 18, 1890, the longest Span ever built in the East.

(1889-90; Cost Rs. 90,480.)

The formal opening of the Toppu iron bridge took place yesterday, the ceremony being performed by the Hon. the Colonial Secretary, who was accompanied by General Massy, C.B., Colonels Boyes, Bridgman, and Churchill, and Adjutant Naish, the Director of Public Works (Mr. MacBride, C.M.G.), and the District Judge of Negombo. The party arrived at Toppu at 10.30 A.M. in a special coach, and there met the Assistant Government Agents of Negombo and Chilaw, Mrs. Haughton, and the Mudaliyars of the two districts. Sir Edward Walker, K.C.M.G., drove over the bridge and declared it open, after which the party was photographed by Mr. Seowen of Colombo. The

Hon. the Colonial Secretary, wishing success to the undertaking, congratulated the Director of Public Works and the Factory Engineer (Mr. Davies) on turning out such a magnificent structure, and at the same time drawing attention to its being the longest span ever constructed in the East. Sir Edward also congratulated Messrs. Bingham and Jackson for successfully erecting the same, particularly as it had been done without the loss of life and without accidents. The party returned to the resthouse for breakfast, afterwards visited the jail; and left for Colombo at two o'clock ("Ceylon Observer").

Note.—The Toppu bridge spans the Maha-oya on the 27th mile of the road from Colombo to Chilaw. It consists of two bowstring girder main spans of 144 feet clear resting on 6 foot diameter cast iron cylinders; two short shore spans connect the main spans with shore abutments. The cast iron cylinders' supports are eight in number, four in central pier and two at each end of main spans sunk to sand stone rock foundation 20 to 25 feet below river bed.

Victoria Bridge, Colombo, 1892–95.

(Seven Spans of 100 feet; Cost Rs. 503,272.)

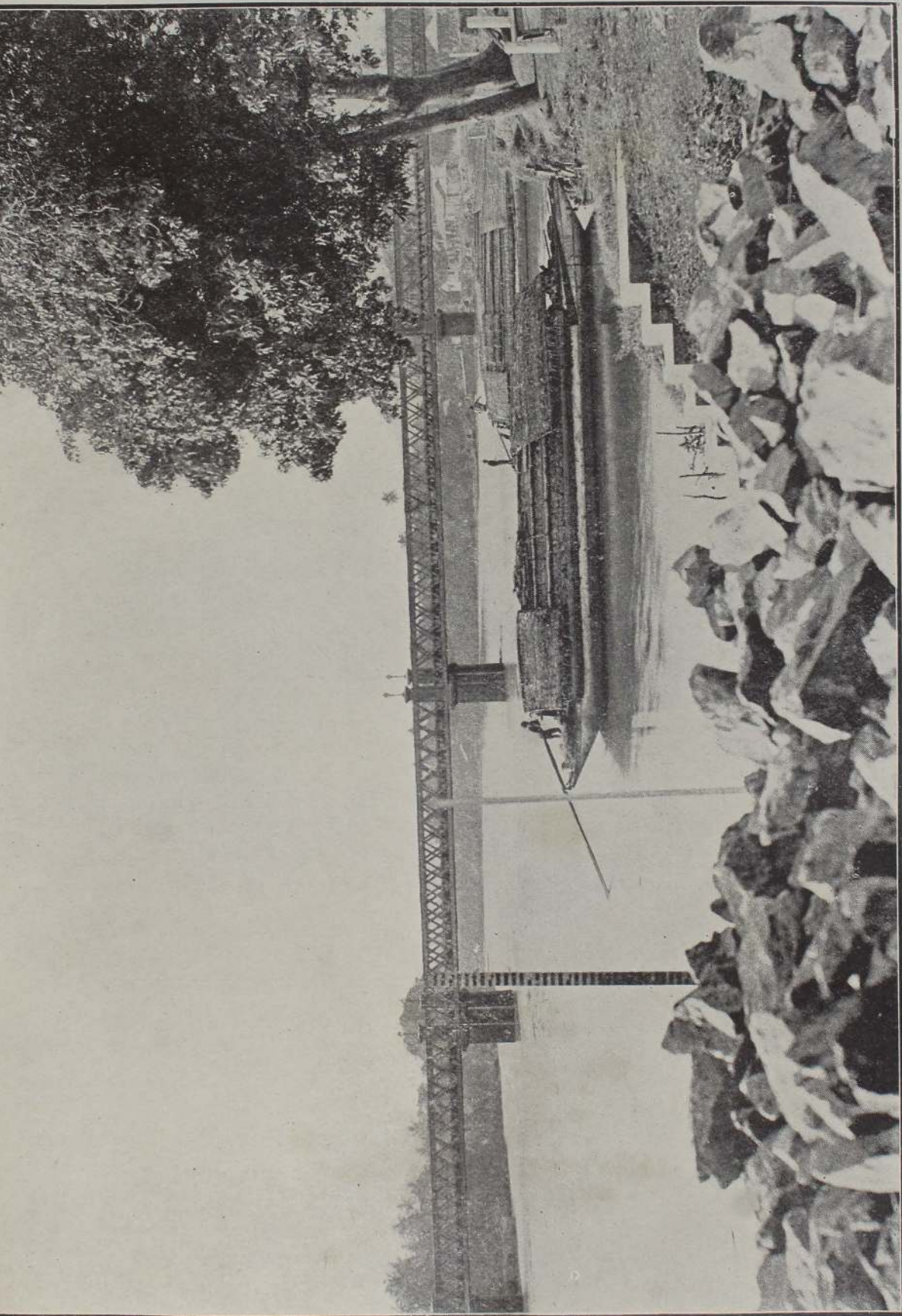
The trunk road between Colombo and Kandy has hitherto been carried over the river Kelani by a pontoon bridge, known as the bridge-of-boats, situated at Grandpass, about 3 miles north of the port of Colombo. This was completed in 1825, and for forty-two years the whole of the traffic between Colombo and the important planting districts passed over it, until road transportation was to a great extent superseded by the opening of the Ceylon Government Railway in 1867.

The bridge consists of seven spans, each 100 feet in the clear. The abutments are of brickwork on concrete foundations 4 feet thick, laid over a timber grillage resting on piles driven into the soil. The dressings and mouldings of the abutments are in "Soorkhee," a composition of five parts of brick dust to one of fine sand to two of cement. It was found that without the addition of fine sand the plaster cracked in all directions, not sufficiently to interfere with its adhesion to the brickwork, but enough to render the appearance unsightly. The piers, except in two cases, consist of two cast iron cylinders, 6 feet in outside diameter, with internal flanges bolted together with $1\frac{1}{8}$ inch bolts, twenty-four to each joint. The superstructure is composed of wrought iron lattice girders supporting a corrugated steel floor or decking, over which is laid concrete and road metal for the carriageway and cement rendering for the footways.

It was not originally intended to sink the cylinders into or below the kabook; but during the progress of the work it was thought desirable to penetrate it until rock was reached, consequently the estimated depth was much exceeded. Excavation was conducted by means of a circular grab or digger suspended on a slip hook and single chain.

The test of 100 tons was imposed on each cylinder, with certain exceptions enumerated (in paper), and since the ratio between the resistances when the cylinder is empty and full is as 1: 16.25, each when filled will sustain a weight of 1,625 tons, or each pier 3,250 tons; thus placing their capacity to sustain the superstructure beyond all question.

Cylinder.	Extreme Length. Ft. in.	Remarks.
No. 1 pier upstream ..	69 6 ..	Sunk to rock.
Do. downstream	69 9 ..	do.
No. 2 upstream ..	66 4 ..	do.
Do. downstream ..	64 11 ..	do.
No. 3 upstream ..	71 1 ..	do.
Do. centre ..	46 0 ..	Penetrating kabook a depth of 3 feet 9 inches; fixed in keeping with No. 4 pier.
Do. downstream ..	74 11 ..	Sunk to rock.
No. 4 upstream ..	77 4½ ..	do.



S. G. O.

THE VICTORIA BRIDGE

Colombo

Seven Spans of 100 feet.

Cylinder.	Extreme Length. Ft. In.	Remarks.
No. 4 centre	.. 56 0 ..	Penetrating kabook 8 feet and tested with 70 tons on empty cylinder for 10 days.
No. 4 downstream	.. 70 2 $\frac{3}{4}$..	Sunk to indurated sand ; tested previous to discovery of injuries with 100 tons.
No. 5 upstream	.. 78 0 ..	Sunk to rock.
Do. downstream	.. 80 4 $\frac{1}{2}$..	do.
No. 6 upstream	.. 73 6 ..	Sunk into 7 feet of indurated sand, and tested for twenty days with 100 tons on empty cylinder.
Do. downstream	.. 79 6 ..	Sunk into 9 feet 9 inches of indurated sand, above which was a layer of 2 ft. 9 inches of running sand, which finding its way inside cylinder caused large depression around the outside at ground level.

The estimated cost of the bridge was Rs. 429,072, extra work found necessary in the progress of construction necessitated a supplementary vote of Rs. 74,200, of which Rs. 6,000 remained unspent upon completion. The whole work, bridge, approaches, &c., was executed for somewhat less than Rs. 670 per lineal foot of span, and occupied from start to finish 2 $\frac{1}{2}$ years in building.

The Victoria bridge was constructed by the Public Works Department, Ceylon. Plans and estimates were prepared departmentally under the direction of Mr. R. K. MacBride, C.M.G., M.Inst.C.E., Director of Public Works; Mr. T. Smith, Assoc.M.Inst.C.E., being Provincial Engineer; and the author Executive Engineer.

(Extract of Paper read before the Institution of Civil Engineers by Mr. C. V. Bellamy, Assoc.M.Inst.C.E., 1896, Vol. CXXVII. page 315.)

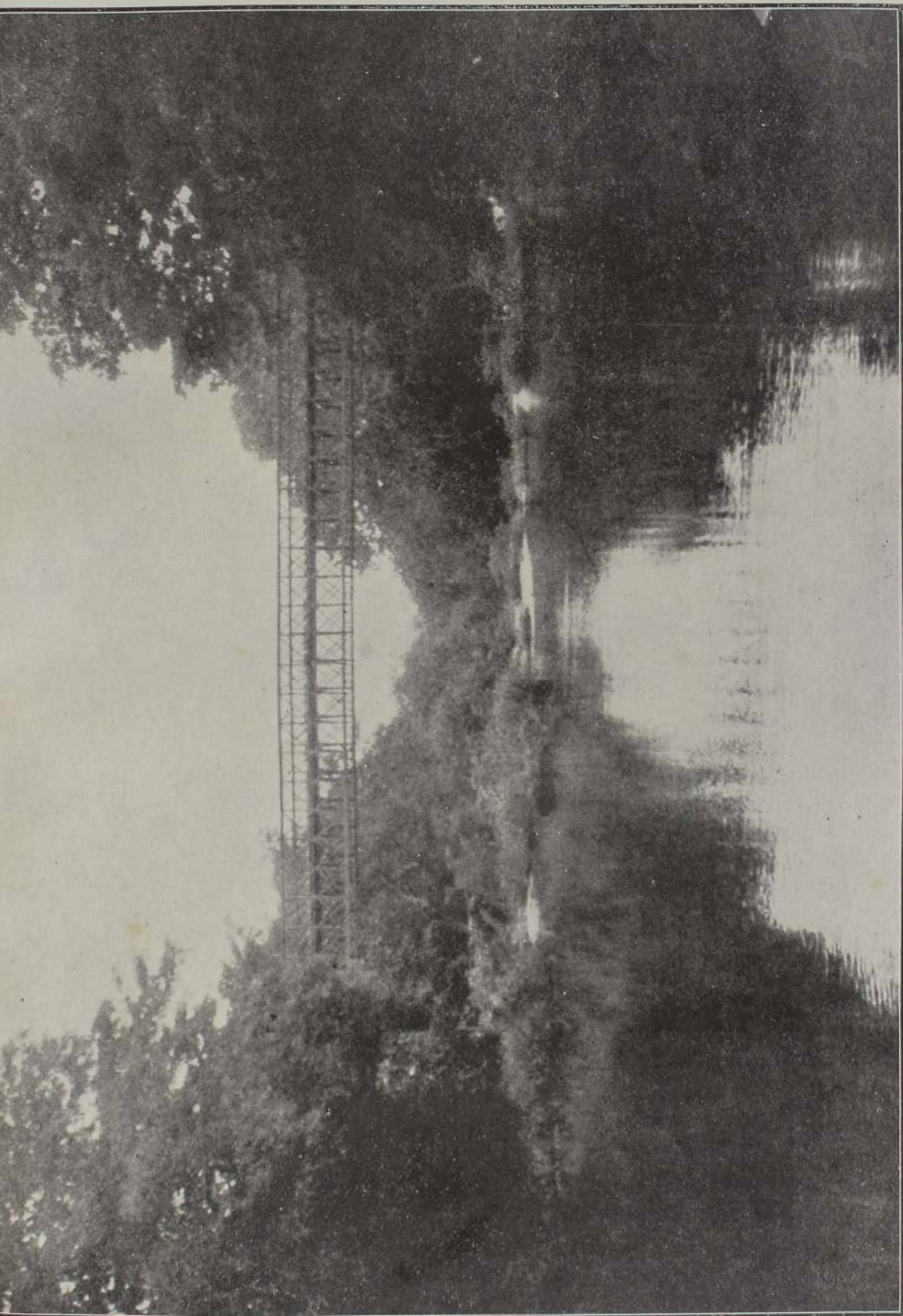
Bridge Construction, 1822-1896.

Span.	Where erected.	When com- menced.	When com- pleted.	Cost. Rs.	Built by.
800 ft. length	.. Bridge-of-Boats, lombo	Co- .. —	.. 1822 ..	—	.. Lieut.-General John Fraser
2 of 30 ft.	.. "Gordon's" bridge, 59th mile, Kandy road	—	.. 1822 ..	—	.. Captain Gordon, Commandant, Fort King
3 of 25 ft.	.. Nanu-oya, 67th mile, Kandy road (brick arches)	.. —	.. 1826 ..	—	.. Captain A. Brown, R.E.
4 of 50 ft.	.. Mawanella, 56th mile, Kandy road (brick arches)	.. —	.. 1832 ..	—	.. Captain A. Brown, R.E.
205 ft.	.. Peradeniya Satinwood bridge	.. 1826 ..	.. 1833 ..	—	.. Lieut. - General John Fraser & Capt. A. Brown, R.E.
2 of 35 ft.	.. Kershaw's bridge, 5th mile, Kandy-Hara- gama road (brick arches)	.. —	.. 1847 ..	—	.. Durand Kershaw
—	.. Badulla-oya	.. —	.. 1855 ..	4,000	.. P. Cummins
—	.. Puwakpitiya, Avissa- well road	.. —	.. 1856 ..	2,600	.. —
—	.. Drawbridge, Grandpass.	.. —	.. 1856 ..	6,000	.. —
—	.. Gindera, Galle road	.. —	.. 1856 ..	2,000	.. —
—	.. Mahamodera, Galle road	.. —	.. 1856 ..	2,000	.. —
—	.. Urugodawatta	.. —	.. 1857 ..	3,000	.. —
—	.. Galle Esplanade bridge	.. —	.. 1858 ..	4,500	.. —
—	.. Kalutara	.. —	.. 1858 ..	33,000	.. M. de Fonseka

Span.	Where erected.	When com- menced.	When com- pleted.	Cost. Rs.	Built by.
50 ft.	..Kospotu-oya, Kandy- Puttalam road	..1857..	1858	} 34,000	} P. Cummins. (First large iron bridges erected in the Island)
50 ft.	..Tiripitchan-ela, Kandy- Puttalam road	..1857..	1858		
100 ft.	..Maguru-oya, Kandy- Puttalam road	..1857..	1858		
40 ft.	..Tallacola-Hena, Kandy- Puttalam road	..1858..	1858..	3,000..	Capt. A. Oldfield
257 ft. length	..Pol-oya, Polwatta and Goiyapana bridges, Galle-Matara road	.. — ..	1859..	25,000..	F. Roosmalecocq
—	..Dandagama	.. — ..	1859..	3,000..	—
206 ft.	..Gampola suspension bridge	..1856..	1859..	120,000..	Captain Donald Graham
100 ft.	..Ramboda-oya	..1858..	1859..	20,000..	J. A. Caley
80 ft.	..Sudu-ganga, Rattota road	..1858..	1859	} 38,000..	} J. A. Caley
50 ft.	..Kuru-ganga, Rattota road	..1858..	1859		
40 ft.	..Hulu-ganga (Bambara- ela road)	..1859..	1859..	4,000..	J. A. Caley
70 ft.	..Ratnapura	..1859..	1859..	8,000..	—
142 ft.	..Mahaweli-ganga, Na- walapitiya	..1859..	1859..	38,000..	B. W. Mathias
40 ft.	..Ramboda (Nuwara Eliya road)	..1858..	1859..	5,000..	J. A. Caley
—	..Digarolla, Galle road	.. — ..	1860..	2,000..	G. Pettitt
420 ft.	..Katugastota	..1858..	1860	} 207,000	} J. A. Caley J. Robertson M. Wellopilly
120 ft.	..Pinga-oya, Katugastota	1858..	1860		
50 ft.	..Pussel-oya	..1860..	1860		
140 ft.	..Hulu-ganga, Teldeniya	1858..	1860..	52,000..	C. Mason
110 ft. length	..Maha-oya, Maturata	..1859..	1860..	23,000..	J. A. Caley
120 ft.	..Kitulgala	..1859..	1860..	33,000..	H. E. Reyne
108 ft.	..Bibile-oya, Bibile-Alut- nuwara road	.. — ..	1860..	6,000..	—
54 ft.	..Kaymal canal (Ne- gombo)	..1859..	1860..	886..	—
125 ft.	..Mahaweli-ganga, Kot- malie-Dimbularoad	1859..	1860..	4,000..	B. W. Mathias
80 ft.	..Maha-oya, Hanguran- keta	..1859..	1860..	28,000..	J. A. Caley
80 ft.	..Galmal-oya (Teldeniya- Nugatenna gap)	..1862..	1862..	16,000..	J. A. Caley
104 ft.	..Kanagarayan-aar, North road	..1861..	1862..	15,000..	—
50 ft.	..Leanagala-oya, Bam- bara-ela road	..1862..	1863..	11,400..	J. A. Caley
100 ft.	..Nalanda-oya, North road	..1863..	1864..	27,000..	J. Robertson
120 ft.	..Mahatel-ela, Badulla road	..1863..	1864..	9,000..	W. G. Hall
80 ft.	..Daluk-oya, Bambara- ela road	..1862..	1864..	12,000..	J. A. Caley
80 ft.	..Gattehetta, Ratnapura road	..1863..	1865..	18,000..	W. G. Hall
50 ft.	..Seenimodara, Matara- Tangalla road	..1864..	1865..	7,000..	J. F. Churchill
100 ft.	..Rattota-oya, Opalgalla Estate road	..1864..	1865..	26,000..	J. Robertson
88 ft.	..Wariapola, Matale (es- tate road)	..1866..	1866..	6,000..	H. Byrne
140 ft.	..Kuruganga, Ratnapura	1866..	1867..	42,000..	H. Byrne
2 of 60 ft.	..Malwatta-ganga, Ratna- pura-Rakwana road	1866..	1867..	58,000..	H. Byrne

Span.	Where erected.	When com- menced.	When com- pleted.	Cost. Rs.	Built by.
80 ft.	.. Warakadeniya-ela, Ratnapura	.. 1867..	1867..	9 000..	H. Byrne
3 of 25 ft. 20 ft., and 25 ft.	.. Ambalangoda, Galle road (brick arches)	.. 1865..	1867..	9,000..	J. D. Young
80 ft.	.. Bope, Galle	.. 1866..	1867..	10,000..	J. D. Young
80 ft.	.. Dambul-oya, North road	1863..	1867..	31,000..	J. Robertson
140 ft.	.. Badulla-oya	.. 1866..	1867..	54,000..	P. Cummins
50 ft.	.. Ramboda-oya	.. 1866..	1867..	5,000..	H. E. Reyne
140 ft.	.. Wey-oya, Yatiyantota	1867..	1868..	55,000..	H. Byrne
3 of 140 ft.	.. Kalu-ganga, Ratnapura	1866..	1868..	150,000..	R. Carey M. Wellopilly M. Sherman
100 ft.	.. Dikwella, Matara	.. 1867..	1868..	18,000..	J. D. Young
150 ft.	.. Mahamodera, Galle road	1868..	1868..	32,000..	C. Prime
50 ft.	.. Kodaimunai, Batticaloa	1868..	1868..	12,000..	S. Rehe
3 of 120 ft.	.. Maha-oya, Kegalla- Polgahawela road	.. 1868..	1869..	79,000..	H. Byrne
50 ft.	.. Subsidiary bridge at Kahawatta	.. 1868..	1869..		
120 ft.	.. Palampodaar, Kandy- Trincomalee road	.. 1867..	1869..	31,000..	R. K. MacBride
120 ft.	.. Mirisgoni-oya, North road	.. 1867..	1869..	43,000..	J. Robertson
140 ft.	.. Nikapota, Koslanda- Wellawaya road	.. 1867..	1869..	40,000..	M. Sherman
100 ft.	.. Lemastota, Koslanda- Wellawaya road	.. 1867..	1869..	40,000..	M. Sherman.
290 ft. length	.. Bentota, Galle road	.. 1868..	1870..	60,000..	C. Prime
2 of 35 ft.	.. Gal-oya, Bibile (stem arches)	.. 1869..	1870..	19,000..	J. Amerasekara
3 of 120 ft.	.. Deduru-oya, Kandy- Puttalam road	.. 1868..	1870..	102,000..	T. Ashton R. D. Ormsby
3 of 20 ft.	.. Badulla-oya, Badulla- Batticaloa road	.. 1869..	1870..	2,200..	H. S. Potger, R. D. Ormsby
585 ft. length	.. Digarolla, Galle road	.. 1871..	1871..	19,000..	H. Byrne
340 ft. length	.. Matara (washed away by flood and re-con- structed 1871)	.. 1868..	1871..	89,000..	J. F. Churchill
120 ft.	.. Additional bridge at Bentota	.. 1870..	1871..	31,000..	H. Byrne
3 of 30 ft.	.. Bilihul-oya, Maturata (stem arches)	.. 1870..	1871..	15,000..	J. Amerasekara
2 of 30 ft.	.. Madura-oya, Badulla- Batticaloa road	.. 1870..	1872..	24,000..	J. A. Arneil H. S. Potger R. D. Ormsby
2 of 30 ft.	.. Kulampitiya, Badulla- Batticaloa road	.. 1871..	1872..	21,000..	J. A. Arneil E. R. Templer R. D. Ormsby
100 ft.	.. Kallodai, Badulla-Batti- caloa road	.. 1872..	1872..	24,000..	W. H. Hawkes
354 ft.	.. Gintota, Galle road	.. 1872..	1873..	86,000..	C. Prime
10 of 30 ft.	.. Mundini-aar, Badulla- Batticaloa road	.. 1872..	1873..	22,000..	J. A. Arneil
2 of 150 ft.	.. Maha-oya, Badulla- Batticaloa road	.. 1872..	1873..	133,000	J. A. Arneil Fisher
2 of 30 ft.	.. Karandale-ela, Badulla- Batticaloa road	.. 1872..	1873..		
80 ft.	.. Kotmalie-ganga (Dim- bula)	.. 1872..	1873..		
2 of 30 ft.	.. 5th mile, Kandy road	.. 1873..	1874..	13,000..	H. A. Evatt H. Byrne

Span.	Where erected.	When com- menced.	When com- pleted.	Cost. Rs.	Built by.
4 of 30 ft.	5th mile, Negombo road	1873.	1874.	24,000.	H. Byrne
2 of 30 ft.	8th mile, Kandy road	1873.	1874.	14,000.	H. Byrne
50 ft.	Talakolahena, Puttalam-Trincomalee road	1873.	1874.	17,000.	J. D. Young
80 ft.	Kahawatura, Amba-gamuwa	1873.	1874.	10,000.	J. F. Churchill
60 ft.	Malwatu-oya, 72nd mile, North road	—	1874.	—	M. Wellopilly
240 ft. length	Chilaw bridge	1874.	1875.	6,000.	J. D. Young
152 ft.	Kanankere, Galle-Akuressa road	1874.	1875.	60,000.	H. C. Christopher (Largest span Brotherhood girder bridge)
2 of 27 ft.	Paravi-Punjan-aar	1874.	1875.	18,000.	—
60 ft.	Mannal-aar, North road	1873.	1875.	41,000.	M. Wellopilly
60 ft.	Galkandamadu, North road	1873.	1875.	24,000.	M. Wellopilly
2 of 100 ft.					
1 of 20 ft.	Gal-oya, Kandy-Trincomalee road	1873.	1875.	59,000.	J. D. Young
100 ft.	Alut-oya, Kandy-Trincomalee road	1874.	1876.	31,000.	J. D. Young
60 ft.	Mahaveti-oya, North road	1873.	1876.	21,000.	C. Prime
100 ft.	Kal-aar, Mannar-Madawachchi road	1875.	1876.	30,000.	C. Prime
3 of 30 ft.	Ja-ela, Negombo road	1875.	1877.	21,000.	H. M. Finch
360 ft. length	Maha-oya, Colombo-Puttalam road	1875.	1877.	48,000.	H. M. Finch
90 ft.	Toppu-oya	1875.	1877.		
50 ft.	Yan-oya, Puttalam-Anuradhapura road	1876.	1877.		
2 of 150 ft.	Gintota	1876.	1877.	14,000.	C. Prime
12 of 100 ft.	Kalutara (combined road and railway bridge)	1874.	1878.	605,000.	F. Vine A. G. Burleigh
180 ft.	Gin-oya (minor road Toppu to Madampe)	1877.	1878.	25,000.	E. Holland
150 ft.	Deduru-oya, 6th mile, Kurunegala-Trincomalee road	1876.	1878.	47,000.	R. K. MacBride
1 of 50 ft.,					
1 of 60 ft.	Per-arua, Mullaitivu road	1876.	1878.	26,000.	F. Armstrong
2 of 60 ft.,					
8 of 16 ft.	Kanagarayan-aar, Mullaitivu road	1877.	1878.	51,000.	F. Armstrong
1 of 150 ft.,					
2 of 30 ft.	Kala-oya, Puttalam-Trincomalee road	1876.	1878.	61,000.	R. K. MacBride F. Armstrong
2 of 30 ft.	Ambegaha-oya, Taldena, Lower Badulla road	1877.	1878.	7,000.	W. Burton
100 ft.	Mabola, Negombo road	1878.	1879.	38,000.	F. Vine
100 ft.	Mi-oya, Puttalam-Anuradhapura road	1876.	1879.	44,000.	C. Prime
120 ft.	Nilawalaganga, Akuressa road	1877.	1879.	42,000.	W. Wrightson
60 ft.	Pankulam, North road	1877.	1879.	23,000.	C. Prime
2 of 60 ft.	Yan-oya, Puttalam-Trincomalee road	1878.	1879.	31,000.	C. Prime
3 of 113 ft.	Giriulla	1880.	1881.	57,000.	W. H. Gratiaen F. Vine



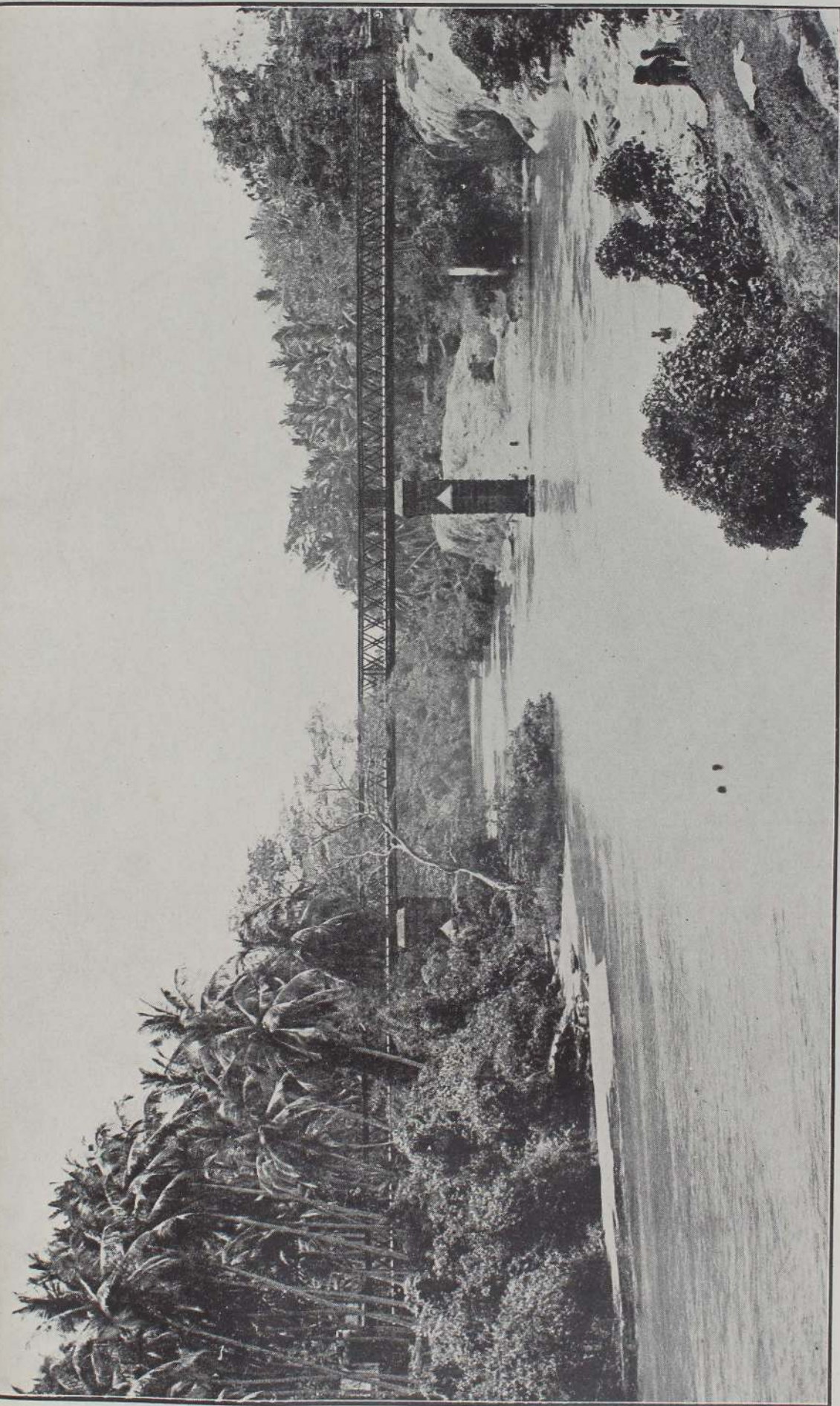
S. G. O.

KALA OYA BRIDGE

150 feet Span

Puttalam Trincomalee Road

1876 - 78



S. G. O.
One of the first Lattice Girder
Bridges constructed entirely
of old Railway Rails.

BRIDGE OVER THE MAHA - OYA
at
Giriulla
3 Spans of 113 feet
Built by Mr. W. H. GRATIAEN
1880 - 1881

Span.	Where erected.	When com- menced.	When com- pleted.	Cost. Rs.	Built by.
1 of 120 ft.	Kuda-oya, Wellawaya- Hambantota road	..1880..	1882..	—	H. P. Mayes E. H. Bouchier E. Venning R. D. Ormsby
—	Elephant Pass	..1881..	1882..	53,000..	C. Prime
35 ft.	Badulla-oya, North road	1883..	1884..	7,000..	—
58 ft.	Ratnapura road	..1885..	1885..	4,000..	H. E. H. Hayes
88 ft.	Yatiantota road	..1886..	1886..	5,000..	J. MacDonnell
7 of 22 ft.	Horse bridge, Bilihul- oya, Lower Badulla road	..1886..	1887..	6,000..	F. Vine C. E. Spooner
4 of 24 ft.	Kurunduoya, Lower Badulla road	..1886..	1887..	5,000..	C. E. Spooner
100 ft.	Kehelgama-oya	..1886..	1887..	24,000..	—
28 ft.	Dikpitiya and Lemas- tota	..1887..	1887..	5,000..	A. W. Butlin
285 ft.	Sitawaka	..1886..	1887..	58,000..	H. J. Deslandes J. L. Hendrie
1 of 150 ft.	Re-erection, Kala-oya bridge	} 1886..	1887..	20,000..	L. N. Jackson
2 of 30 ft.	Puttalam - Anuradha- pura road				
5 of 60 ft.	Karawanella	..1886..	1888..	76,000..	H. J. Deslande J. L. Hendrie
70 ft.	Tebuwana	..1888..	1888..	7,000..	G. Fernando
144 ft.	Maskeliya-ganga	..1887..	1888..	20,000..	H. B. Christie
100 ft.	Dikwella	..1887..	1888..	39,000..	R. Macpherson
57 ft.	Horse bridge, Eltotaoya	1888..	1888..	3,000..	—
70 ft.	Nambapana	..1888..	1889..	10,000..	W. C. Price
30 ft.	Beruwala	..1888..	1889..	3,000..	J. L. Hendrie
85 ft.	Castlereigh	..1889..	1889..	12,000..	H. B. Christie
80 ft.	Ambatale (Kaduwela)	..1889..	1889..	8,000..	H. J. Deslandes
359 ft.,	Toppu, Negombo Dis- trict	..1889..	1890..	90,000..	L. N. Jackson P. M. Bingham
20 of 30 ft.	Digarolla	..1890..	1890..	52,000..	J. L. Hendrie
7 of 21 ft.	Tebuana	..1890..	1890..	9,000..	J. L. Hendrie
2 of 50 ft.	Horse bridge, Maha- that-ela	..1890..	1890..	5,000..	—
100 ft.	Kaduwella	..1890..	1890..	10,000..	H. J. Deslandes
10 of 32 ft.	Bolgoda Lake	..1890..	1891..	26,000..	P. M. Bingham
84 ft.	Horse bridge, Uma-oya, Lower Badulla road	..1891..	1891..	5,000..	H. E. H. Hayes
150 ft.	Konon-ganga	..1890..	1891..	45,000..	H. E. H. Hayes
140 ft.	Gurugoda-oya	..1891..	1891..	60,000..	C. H. Romanes W. C. Simmons A. E. Mayes
4 of 30 ft.	Kaluwamodera	..1892..	1892..	8,000..	W. C. Price
50 ft.	Ruanwella-Attanagala road (14th mile)	..1892..	1892..	9,000..	C. H. Romanes
4 of 24 ft.	Toppu road (26½ mile)	..1893..	1893..	6,000..	A. E. Caldicott
3 of 21 ft.	Dodangoda-ela, Nagoda- Kalawellawa road	..1893..	1893..	4,000..	—
3 of 32 ft.	Kepu-ela	..1892..	1893..	15,000..	—
3 of 32 ft.	Tudawa (Matara)	..1893..	1893..	14,000..	W. C. Simmons
2 of 20 ft.	Utumulla, Udugama road	..1893..	1894..	7,000..	E. Holland
5 of 30 ft.	Lunu-oya, Colombo- Puttalam road	..1893..	1894..	22,000..	H. B. Christie
9 of 65 ft.	Deduru-oya, 52nd mile, Colombo-Puttalam road	..1893..	1895..	158,000..	W. C. Simmons
3 of 30 ft.	Rakwana-ganga	..1895..	1895..	10,000..	J. MacDonnell
7 of 100 ft.	"Victoria bridge," Co- lombo	..1892..	1895..	504,000..	T. Smith C. V. Bellamy

CHAPTER IX.

IRRIGATION WORKS, 1825-1896.

THE most important step taken in 1825 was the construction of the "Kirama" dam on one of the tributaries of the Matara river to turn its water into the Giruwa pattu for the benefit of the paddy lands in the villages running down to Tangalla, as had been done at Urubokka by the Dutch in 1787. This great achievement of the Dutch turned some of the upper affluents of the Matara river into the Katuwenna valley, thus supplementing the stream which runs into the sea at Ranna, and irrigating *en route* several thousands of acres in the Giruwa pattu.

The Royal Commission, which reported on the Government of the Island in 1831, recognized the decadence of agriculture, but Colonel Colebrooke, who treated of the executive administration, reported adversely on the system of "*rajakariya*," which led to its abolition in 1832. General neglect of irrigation works followed, and in consequence the Urubokka and Kirama dams burst during the heavy flood of 1837, owing to the blocking up of the channels intended to carry the superfluous waters into the Giruwa pattu. A period of general neglect of irrigation work followed, until Sir Emerson Tennent in 1845 took up the subject earnestly. He obtained a Committee of Inquiry, which recommended the restoration of old tanks, and proposed to apply to this purpose some of the Road Ordinance labour which had just been created. This Lord Gray, then Secretary of State for the Colonies, refused to allow, but expressed the opinion that "grants in aid of irrigation should be restricted to works in which a considerable amount of native labour is engaged, or which can be shown to be likely to produce a fair return for the capital invested, by increasing the productive powers of the Island."

The depressed state of the Island's finances prevented advantage being taken of even this concession for some years, but fortunately there was improvement in this respect during the régime of Sir Henry Ward, and that energetic Governor soon determined that irrigation should be taken up as a part of his scheme for developing the resources of the Island by reproductive public works.

His Excellency accordingly proposed to include in the loan about to be issued for railway construction an additional sum of £50,000 to be devoted to irrigation works.

Although all exports were taxed for the loan, the idea of devoting a portion to irrigation was abandoned, probably as it was found that immediate requirements could be met from the surplus balances, and a beginning was made with the following works:—

- (1) The reconstruction of the Kirama and Urubokka dams in the Southern Province at an expenditure of about Rs. 170,465.
- (2) The construction of a dam in the Galle District for keeping the floods of the Gindura river out of an extensive range of lands in the village of Devitura to cost Rs. 66,000.
- (3) In the Eastern Province, Irrakamam and Amparai tanks and the construction of the Vammiyadi anicut and the foundations of another at Sengalpadai on the river below these tanks to facilitate distribution at a total cost of Rs. 89,040.

The total outlay arranged for during Sir Henry Ward's administration amounted to the very moderate sum of £47,765, including £6,600 voted for Devitura in November, 1860.

But the real author of the great scheme for the restoration of the old native system of communal labour in the repair and upkeep of irrigation works, and for securing the intimate co-operation so necessary for successful paddy cultivation, was Mr. John Bailey, at that time Assistant Agent of Uva.

He proposed legislation to provide for the reduction to writing of the old customs touching irrigation and cultivation in the form of rules, breaches of which could be dealt with summarily by a Village Council presided over by the Government Agent or Assistant Agent of the district and small fines inflicted.

Sir Henry Ward's Government readily accepted this view, and the result was the passing of the first Irrigation Ordinance, No. 9 of 1856, entitled "An Ordinance to facilitate the revival and enforcement of Ancient Customs regarding the Irrigation and Cultivation of Paddy Lands." With the departure of Sir Henry Ward the official interest in irrigation flagged. An examination of the Supply Bills between Sir Henry Ward's departure and the arrival of Sir Hercules Robinson discloses that only two small sums, aggregating £119. 3s. 3d., were voted for irrigation, and adverse inferences were drawn from the Batticaloa works not proving an immediate financial success, as is so often and unreasonably expected, but which time has shown were projected on a sound basis.

In 1866 irrigation came under the attention of Sir Hercules Robinson, and a strong Commission, presided over by the Queen's Advocate (Mr. Morgan), was appointed to inquire generally and report upon the subject. This body collected a very large amount of information as to the number and state of tanks and other works in the several districts, as well as to the condition of paddy cultivation throughout the Island. These inquiries confirmed the view that the abolition of "*rajakariya*" had much to do with the deplorable state of neglect and consequent deterioration into which all the irrigation works of the Island had fallen, and strongly recommended active steps, and that a generous expenditure of further funds should be devoted to the removal of this unfortunate condition of affairs; with this view the Commission made a large number of recommendations.

These recommendations being accepted by Council, immediate provision was made to the extent of £10,000 from surplus balances of revenue (Ordinance No. 2 of 1867), and Captain Woodward, Royal Engineer, was appointed Irrigation Assistant. In 1870 the vote was increased to £30,000 a year in view of the increase to the revenue, and, before leaving, Sir Hercules Robinson proposed fixing the expenditure for 1872 at £30,574, including £1,000 for upkeep. The expenditure during this Governor's administration was just under £100,000.

A new Irrigation Ordinance, No. 21 of 1867, was also passed, which, besides re-embodiment of the provisions of the older Ordinance of 1856 (already referred to) for the revival and enforcement of the ancient customs regarding the irrigation and cultivation of paddy lands, laid down the procedure to be observed for consulting the landowners likely to be benefited by any proposed work and as to the amount of Government aid which it was desirable to apply for, and bound them to repayment in ten annual instalments of any money advanced by Government.

It was soon found that Rs. 20 per acre would not cover the expenditure even when the areas benefited were extensive, and a large

acreage of Crown waste land was included in the specification as in Batticaloa. When there were no such extraneous sources of recoupment (as in Matara), the cost ran up to Rs. 60 an acre, while, owing to accidents and want of sufficient surveys in the earlier stages, estimates made to meet the views of Government, as far as possible, proved utterly inadequate, and the money had to be found to complete the work without giving Government a claim to any repayment beyond the original estimate.

Sir William Gregory, who had succeeded to the Government in 1872, found that, unless the terms of repayment were made less onerous, progress would be very slow, if not stopped altogether. He accordingly introduced into his new scheme an option to be exercised by the landowners of a payment of Re. 1 per acre in perpetuity to cover both cost and maintenance, instead of repayment in full in ten years. Those who had already accepted the older terms were permitted to exercise this option, and this was largely done in the Matara District where the excessive actual cost, as compared with the original rough estimates, had created much alarm and discontent.

But Sir William Gregory, who had heartily taken up the resurrection of the old District of Anuradhapura and created the North-Central Province, and placed it under the energetic and able administration of Mr. J. F. Dickson, soon discovered that even easier terms were necessary to reach the native cultivator in poor and remote districts. Accordingly, in an Address to Council (Governor's Speeches, page 341), he said: "We have advanced still further, and have offered most liberal terms in the North-Central Province. By aid of Village Councils, rules have been laid down by which the villagers are to repair and clear the bunds of their tanks, and the Government in return to furnish them *gratuitously* with a sluice and skilled labour for constructing it."

Under these liberal terms immense progress was made in the restoration of the village tanks throughout the North-Central Province. In 1885 Mr. Fisher reported that the headmen had between 1874 and 1885 done just under five million cubic yards of earthwork, worth, at the modest figure of 30 cents a yard, the sum of Rs. 1,301,500, while Government had expended Rs. 318,081 in sluicing 236 tanks, the area under which had also increased from 18,800 acres to 32,228, while the gross yield was believed to have been raised by about 250,000 bushels a year.

The average cost per sluice had been Rs. 1,347, but fortunately this heavy rate was shortly after (in 1888) very considerably reduced by the introduction of an arrangement of cement pipes designed by Mr. Murray, Provincial Engineer, which reduced the cost to Rs. 35 per sluice. It was claimed that by its introduction a sum of Rs. 930,000 was saved to Government on the sluicing done during 1889-90, while it admitted of the sluicing of some 750 tanks at a very moderate cost.

At the expiration of Sir William Gregory's administration there were three classes of irrigation works under construction, which may be classified as follows:—

- (a) Those the original cost of which was to be repaid in ten yearly instalments without interest.
- (b) Those liable to a rate of Re. 1 per acre per annum in perpetuity to cover interest on the outlay and cost of maintenance and repair.

- (c) Those tanks for which Government supplied a sluice and any other required masonry free on condition of the villagers doing all the earthwork required and maintaining the bunds under supervision, also provided free by Government.

During this administration the expenditure on irrigation was Rs. 1,187,000, exclusive of upkeep, which had risen to Rs. 33,100 in 1878 from Rs. 10,000 in 1872.

Sir James Longden, on assuming the Government, found it pledged to the completion of a very heavy programme of irrigation works, including an expenditure of Rs. 206,222 for sluicing village tanks in the North-Central Province, where under Mr. Dickson's energetic rule the cultivators had done a very large amount of earthwork on the terms sanctioned by Sir William Gregory. The great fall in the revenue of the Colony, which marked this period, led to a restriction of the expenditure on irrigation, and in 1881 the amount available was only Rs. 120,000, inclusive of Rs. 40,000 required for maintenance and Rs. 50,000 devoted to sluicing village tanks. In 1882 the expenditure on work was only Rs. 45,656. But with a slight improvement in the revenue of the Colony Rs. 100,000 was provided in 1883. The total expenditure during this Governor's administration was Rs. 1,171,400, exclusive of upkeep, but though desirous of undertaking the restoration of Kalawewa, Sir J. Longden did not feel justified in committing the Colony to the large outlay required.

In Sir Arthur Gordon (1884-90) the Colony obtained the services as Governor of a most enthusiastic believer in the benefit of irrigation and determined to find funds for carrying out his views. The plans for the restoration of Kalawewa in the North-Central Province had been completed and were ready for execution, and only the want of funds stopped the way. In 1884 His Excellency mooted the propriety of an irrigation loan, but restricted his action in this respect to borrowing money from the Savings Bank to make a beginning on the great work, which eventually cost Rs. 405,095. Later (1889) the *Yoda-ela*, leading from the tank to the tanks *en route*, was undertaken at a cost of Rs. 304,484, while the restoration of Tisawewa, Bassawakulam, and Nuwarawewa which followed brought the total expenditure up to Rs. 900,000. On the other hand, the cultivation rose from 564 acres of old land imperfectly tilled to 8,581, while it is estimated that there is still some 23,000 acres of waste land (Crown property) to be sold and brought under cultivation. The sale of the land realized Rs. 77,457 to December 31, 1899, and water-rate had brought in Rs. 18,045.

The total expenditure during Sir Arthur Gordon's administration amounted to Rs. 2,855,481, besides Rs. 307,966 for upkeep, which had increased from Rs. 33,752 to Rs. 57,444 in seven years.

In 1884 the contribution from the general revenue to the irrigation vote was fixed at Rs. 200,000 a year, and in 1887 an Ordinance was passed creating a Central Irrigation Board, with the Governor as President.

Sir Arthur Havelock, at the first meeting of the Central Irrigation Board at which he presided (July 2, 1890), expressed his determination to press on with the work of irrigation, but he found himself obliged to adopt great discrimination and care in sanctioning projects.

The abolition of the paddy tax also added strength to the arguments of those opposed to a liberal expenditure on irrigation, but this was met by substituting one-tenth of the import duty on rice for one-fourth of the paddy tax set aside by law as the irrigation contribution. Finally, in consequence of a further debate in Council, the Governor gave an assurance that no work estimated to cost more than Rs. 300,000 should be undertaken without reference to that body.

From 1890 expenditure on irrigation was very materially reduced, and fell from Rs. 455,393 in 1891 to Rs. 202,546 in 1895, inclusive of the special votes of Council, which were curtailed from Rs. 214,000 to Rs. 90,178 in 1894, and then ceased.

The total expenditure on irrigation from the inception of Sir Hercules Robinson's scheme in 1867 under each administration was as follows :—

	Rs.
Sir Hercules Robinson	789,646
Sir William Gregory	1,521,420
Sir James Longden	1,181,408
Sir Arthur Gordon	2,855,481
Sir Arthur Havelock	1,703,486

(“ *The Ceylon Manual, 1911.* ”)

Return of some of the most important Irrigation Works executed and in progress during, 1860-96.

	Initial Expenditure by Government on Restoration or Construction. Rs.
1861 .. Diviture Dam and sluice	66,000
1867 .. Kalmadu anicut	18,510
1868 .. Denagama and Uyanwewa	121,699
Rukam tank	158,943
1869 .. Kantalai tank	14,105
1870 .. Nil	—
1871 .. Nil	—
1872 .. Keknadure tank and channel, 1869-72	68,152
Pulukanavai tank	56,343
Kadukkamunai tank and channel	33,680
Divulane tank	43,924
Sengalpadai anicut	36,190
Aladiodai anicut	14,968
Sakamam tank and channel	105,733
1873 .. Chadayantalawa tank	55,926
Ambarai tank	32,217
Bassawakkulam works	69,591
1874 .. Nil	—
1875 .. Repairs to Maha Madawachchiya	26,930
Hali-ela scheme, 1872-75	64,035
Kirama works, 1858-75	94,603
1876 .. Horaborawewa	11,405
1877 .. Nil	—
1878 .. Alawatugoda anicut, 1874-78	19,330
Ellavella tank, 1874-78	101,842
1879 .. Tissawewa restoration	28,572
Galgomuwa tank	15,505
Dandeniya store tank and channel, 1877-79	45,278
1880 .. Pattampuddi anicut	47,346
Kaliodai anicut	38,817
Badulla-oya anicut and channel	11,853
1881 .. Nil	—
1882 .. Nil	—
1883 .. Upper aqueduct	14,436
1884 .. Nil	—

			Initial Expenditure by Government on Restoration or Construction. Rs.
1885	..	Andankulam tank	32,953
		Kudawewa	14,532
		Reservoir, Barrack Plains, Nuwara Eliya, 1877-85 ..	33,917
1886	..	Pettera anicut and channels, 1875-86	66,747
		Rambe Vihara channel	13,452
		Manalpuddi-aar anicut	16,300
		Amban-ganga	39,995
1887	..	Rotawewa tank	27,550
		Elahera	55,430
		Kalubalaluwewa restoration	401,655
1888	..	Buttala anicut and channel	17,501
		Taldena-ela anicut and channel	21,873
1889	..	Viragoda tank	37,669
		Yoda-ela restoration	295,750
		Magam pattu irrigation works, 1873-89 ..	210,595
		First anicut across Ketigan-aar and north and south channels, Panamure	10,280
1890	..	Ereula	16,275
		Nuwarawewa works	65,307
		East and west Gal-oya anicut	32,414
		Dambagalla tank	12,849
		Allai and Peruveli tanks, 1869-90	58,085
		Kospotu-oya anicut, 1872-90	12,417
		Tinipitiyawewa, 1876-90	12,970
		Nikatuela	14,660
1891	..	Waggalmodara and Timbirimodara flood outlet, 1889-91 ..	24,051
		Dedduwa irrigation works, 1888-91	33,702
		Hambegamuwa tank	31,887
		Sudupanawala anicut	14,120
		Deduru-oya scheme, 1873-91 (Chilaw District) ..	24,595
		Anicut across Kitulbokka-ganga	12,665
		Channel to Ketigan-aar	19,335
		Second anicut across Ketigan-aar at Ambagahawela, channel to Hinguruaruwewa, &c.	30,390
1892	..	Madukkanda tank, 1891-92	14,990
		Tumpankeni tank	20,521
		Kumbukkan-oya anicut and Yodi-ela, also known as Okkampitiya Yodi-ela	188,345
		Anicut across the Walawe-ganga at Uggalkaltota ..	35,271
		Magallewewa works, 1873-92	65,050
		Urubokka dam and stream, 1858-92	407,302
1893	..	Bodi-ela	75,184
		Mediyawe tank, 1879-93	28,772
1894	..	Wenoruwewa works, 1872-94	40,508
		Maha Uswewa works, 1877-94	61,392
		Village tank sluices, North Western Province, 1884-94..	51,734
1895		Anicut across Deduru-oya, Restoration of Battalgoda tank and cutting channel, 1890-95 (Kurunegala District)..	526,660
		Bowetenna	15,101
1896	..	Giant's tank restoration, 1881-96	117,082
		Kanukkany tank restoration, 1891-96	27,222
		Periyakulam restoration, 1891-96	22,640
		Vavuniyavilankulam restoration, 1880-96	11,207
		Iratperiyakulam restoration and channel, 1886-96 ..	25,556
		Mamadu, 1886-96	16,396
		Mandukkodai restoration, 1886-96	19,807
		Kanagarayankulam restoration, 1888-96	27,714
		Maha Rambaikulam restoration, 1888-96	16,712
		Venkalacheddikulam restoration, 1888-96	17,570
		Periya Olukkulam restoration, 1893-96	18,586
		Uduwe channel, 1879-96	39,976
		Pullumalai tank	10,560
		Sluicing village tanks, North-Central Province ..	424,294
		Nawadun korale irrigation works, 1889-96	22,050
		Gangaboda pattu irrigation works, 1877-96	10,280

(Report of the Central Irrigation Board, 1896.)

CHAPTER X.

MAJOR SKINNER'S MEMORANDUM ON THE ROADS IN CEYLON,
1848, AND THE DEPARTMENTS OF COMMISSIONER OF
ROADS AND CIVIL ENGINEER, 1856.

MAJOR SKINNER'S memorandum regarding the roads in Ceylon, their present condition, and treatment recommended (1848):—

Colombo to Kandy, 72 Miles.—The first 35 miles (from the bridge-of-boats to the 35th) is in a very precarious condition, the thin crust of 4 inches of metal with which it has been repaired is worn through and it is in vain we attempt to keep it patched up by means of depôts, the continued filling in of the holes has rendered its whole surface so lumpy and uneven that the very inequalities of its surface adds to its wear and tear. Restriction of means for the upkeep and repair of this main line has been carried to an injurious extent; the system must be changed, or the road cannot be preserved in a state to bear the traffic it is subject to.

From the 35th mile to Kandy the road will be at the end of this year, with the exception of 3 miles between the 46th and 49th, in a comparatively efficient state; the Passes are fortunately in good order.

The following is a statement of the miles which have been repaired in each year from 1841 to the end of 1847:—

	Miles.	Yards.
1841 .. 25 and 26, 30 to 33, 62 to 67	.. 9	0
1842 .. 11 to 13, 21 to 25, 36 to 41, 13 to 17	.. 15	0
1843 .. 17 to 21, 33 to 36, 42 to 45, 32 and 33, 41 and 42 ..	.. 11 $\frac{3}{4}$	0
1844 .. 26 to 32, 46 to 49, 53 to 61..	.. 11	2·890
1845 .. 49 to 50 ..	.. 2	0
1846 .. 51 to 53, 36 to 43, 35 and 36	.. 10	0
1847 .. Completed the mile between 35 and 36.		

Commenced the miles 27 to 29, 43 to 46, 62 to 68. Thus it will appear that many of the miles have had no general repair for five or six years.

To bring the road to a safe and creditable condition, I consider that an expenditure for four years (including the current year) of not less than £15,000 per annum is necessary.

The whole distance under charge of this Department is 68 miles, every mile of which should undergo repair once in four years. The first repair must be an expensive one, and will cost, say, £600 a mile, all charges included, thus:

	£ per Annum.
68×600	
<hr/>	
4 = £10,200	10,200
For five flying parties in charge with transport, &c.	2,500
For keeping up supply of metal in Depôts ..	2,300
	<hr/>
Total ..	15,000
	<hr/>

At the end of four years I think the expenditure may be considerably reduced; but until the road has had the advantage of one thorough repair with 6 inches of metal it cannot be pronounced safe.

In 1841 before the road was metalled it took carts from thirty to forty days for one trip to Kandy and back before the cattle were in a condition to start for a second trip, the effect therefore of permitting the Kandy road to get into a state of disrepair is to diminish the means of transport, which already is unequal to the demands of the country.

Ambeputta through Kurnegalle to Kandy, 48 Miles.—This road has never been completed, most of its bridges are temporary; it is insufficiently drained, and many portions of it have never been metalled or gravelled. It is only a bridle road, nor can it in the present state of the Colony be much improved; to properly bridge, drain, and metal this line would not cost less than £30,000. It is, however, in its present state a very useful road in dry weather, and every effort should be made to prevent its deteriorating.

Colombo to Galle, 72 Miles.—This is nothing more than a gravelled road throughout. Its improvement from a sandy track to its present condition has been of very slow progress. It cannot be too soon covered with a coat of metal. The traffic on it is very limited, but being the high road from Colombo to all parts of the world, it cannot be neglected. It ought not to have less than £2,000 a year for its upkeep, though I am sorry to say it was limited to £1,500 last year and only £1,000 this year. With so small an outlay it cannot possibly be kept in repair, it must retrograde.

Galle to Matara, 28 Miles.—This road is so shaded with coconut trees that it will always cost money to keep in good repair. The traffic on it, however, is so limited that £500 a year is as much as it can claim with reference to the demands of other roads.

Matara to Hambantota, 51 Miles.—Many years ago the road from Matara to Tangalla (23 miles) was a tolerably fair carriage road, but for the past ten or twelve years it has been barely passable for vehicles, thence to Hambantota it is little better than a track, and so large a sum would be required to improve it that I think it inexpedient to fritter away small amounts on it.

Colombo to Negombo, 23 Miles.—This road runs parallel with the sea coast and a navigable canal, the traffic on it ought not therefore to be heavy, nor is it, a few hundreds a year ought to keep it free of holes and ruts.

Negombo to Puttalam, 61 Miles.—This road in like manner is or ought to be relieved from all heavy traffic by the means of communication afforded by inland navigation and the sea, but unfortunately the canal is often impassable for boats, and the road is too sandy to be available for heavy cart traffic. The bridges, however, have been constructed of very durable materials, and they should be kept up; the expense will not be heavy, say £10 a mile from Negombo to Puttalam, 61 miles of which are in charge of the Department.

Kandy to Trincomalie, 114 Miles.—The only portion of this which we can pretend to keep up with our present means is that distance from Kandy to Matale, 18 miles, the remaining 96 will require some £15,000 to bridge, drain, and cover; with a small sum, however, say £1,000 a year, it should be gone over to clear away fallen timber and brushwood and to put the resthouses in repair.

As regards the portion just named, much is required yet to be done. It has many temporary bridges, is insufficiently drained, and requires metalling and gravelling, there being an absence of good stone on some, and a great scarcity of it on several miles of the road; 2 or 3,000 pounds a year could be well spent on this line for a year or two to come, but as we are not likely to get that, we must secure for the line *all* we can get. Very extensive coffee districts are dependent on this road, and the Government is sensible of the necessity of doing something for it.

Puttalam to Kurnegalle, 53 Miles.—The importance of this road is very great, but its condition most *miserably* bad. Until a few years ago its bridges had been allowed to fall to a state of decay, the traffic on it having in consequence ceased, the whole road was like a beautiful racecourse, but no sooner were the bridges restored than wheel traffic poured upon it. The fine sward with which alone the road was covered was unequal to the weight of carts heavily laden with salt and salt

fish worked by buffaloes, the consequence is it now in most parts resembled a brick field more than anything else. I have represented to Government the desirableness of repairing this line, and it wants funds rather than inclination to render it what it ought to be—a good serviceable road.

Negombo to Veyangoda, 19 Miles.—This is an important little road, as giving the Negombo trade the means of access to the Kandy road at the 24th mile from Colombo in 19 miles, instead of going round by the bridge-of-boats, thereby saving 21 miles.

It has never been properly put out of hand, but improved from time to time with the small means we could obtain for it. Many hills have to be cut down, and low ground to be raised and drained, the causeways across paddy fields run at right angles to the drainage of extensive valleys, and these in nearly all cases require greater waterway than they yet have; 5 or 600 pounds a year judiciously expended on this road for a few years would improve it amazingly.

Negombo towards Kurnegalle.—This road has only been carried out to the furthest sugar estate, that of Mr. George Fraser. It is very useful to the town of Negombo, but as it pays no tolls, I am no advocate for spending more money on it than will save it from falling into disrepair. It is not a highly finished road; the contrary, and the last 2 or 3 miles are in an unfinished state. £200 a year is as much as we ought to ask for it. I am of opinion that when the labour order passes, this road should be carried across the Maha-oya to Kurnegalle, it will open up a *very rich* green country, and will give a stimulus to the Negombo trade, as well as to the agricultural interests in the Western Division of the Seven Korles.

Kurnegalle to Dambool, 33 Miles.—This runs through rather a populous country, and is so far useful and is important as the great direct Military line connecting Colombo and Trincomalee, but it has never been finished, and would cost a large sum to complete, bridge, drain, and cover it; in the meantime it should be kept open at as moderate a cost as may be.

Dambool to Jaffna, 150 Miles.—From Dambool to the edge of the Jaffna lake at Pass Beschuter the distance is 118 miles. The character of the road is merely this: the jungle on an average about 24 or 30 feet has been rooted and surface levelled about 12 or 15 feet, and may have cost about £35 a mile.

Kandy through Gonedama to Badulla, 54 Miles.—If the defect in this line of going over the Gonedama Hill, instead of descending by the valley of the river from near the Maha-oya could be rectified, this line would be a very desirable one to render practicable for wheel traffic. It is already so from Kandy to Maha-oya, and it would not take much to make it so from the Ooma-oya to Badulla, but the interval between the Maha-oya and Ooma-oya would cost a good deal of money, and I have always been deterred from doing anything to it from my reluctance to perpetuate the defect in the trace I have above referred to.

The line is the most unsalubrious I have ever known in the country and it is a curious fact that not a bazaar man or settler of any kind (save the ferry men at rivers) has established himself on the road to my knowledge since it was first opened. It is the only direct line of communication between Kandy, Bintenna, Batticaloa, and the eastern coast, and ought not therefore to be abandoned. All we have done to the line of late years has been to keep down overgrowth of vegetation, and clear it of jungle, &c., and on this principle I conceive it should still be treated till funds may be available to make a decided impression on it.

Kandy through Gampola and Nuwara Eliya to Badulla, 85 Miles.—This road is so well known to the Government and the officers at present in the Department that it seems needless saying much about it; that portion of it from Peradeniya to Gampola is, I regret to say, in no

condition for the very heavy traffic it is subject to. Were stone available along it, I should desire to have it widened and properly metalled at once, but there being a scarcity of that material, we must be content with gravel, of which there is an abundance of a very good quality, but when gravel is used as a covering, it is most essential that the foundation of a road should be perfectly drained, which is not the case with the portion of road I am now writing of. It needs at least double the amount of side and cross drainage it has; it should wherever practicable be widened to 22 feet at least, and at intervals, where it can be done without great cost, I would extend its width to 26, 28, or 30 feet to provide for the stoppage of carts along it.

From Gampola to Ramboda the road is in fair order, but the Attebage and a few other minor bridges with timber platforms need vigilant attention, or the breaking down of some of them may impede the communication, perhaps, at a critical season. The lower 6 or 7 miles of the Ramboda Pass is tolerably fair, but the upper portion of it is execrable, and will need larger funds to put it in repair than the Colony can now afford.

From Nuwara Eliya to Badulla can only be kept up as a bridle road at present, and receive funds sufficient to clear away landslips, repair bridges, &c.

From Peradeniya to Nuwara Eliya may be kept up for £2,000 per annum, and from Nuwara Eliya to Badulla for £500 per annum.

Badulla to Hambantota, 71 Miles.—I think it of the greatest importance that the whole distance from Hambantota to the foot of the Pass of Ella should be made perfectly practicable for carts, the distance would be at least 52 miles.

To the present zig-zag Pass I will never do more than keep it practicable for tavalam and horses, but whenever funds may be available I would boldly face the proper line of trace, which should never, in my opinion, have been sacrificed to temporary expediency for the present defective trace.

It was not the result of a defect either of judgment or zeal in Major Rogers (he traced the proper line), but to the miserable system of opening roads with units where hundreds were needed is the present line to be attributed.

To keep this line up and secure it the slightest progress towards improvement £1,000 a year will be needed.

When the time arrives for its being completed, every Division and Subdivision of Pioneers in the country should be marched down to it with the Head of the Department, it is too remote to get justice done it by frittering away small sums of money.

Badulla to Batticaloa, 71 Miles.—This is nothing more at present, I regret to say, than a very bad trace, but the use which has been and is made of it in its present condition shows how great an advantage it would prove to the country if opened for wheels, but before anything more is done to it the trace might be correctly completed by an intelligent officer.

From Badulla to Ratnapura, 88 Miles.—By the direction of Government nothing has been done to this line for some years. The Happoottalle Pass has become overgrown with brushwood and jungle, and is at this moment, I believe, unpassable for horses. I do not think any expenditure should be allowed on it, beyond, perhaps, preserving the trace until the other lines in Ouvah are in a more advanced state.

From Colombo through Avisawella and Ambegomowa to Kandy, 88 Miles.—From Colombo to Avisawella, 30 miles, is common to this line and the Ratnapoora one; it has never been put into the state it deserves; but I recommend that as fast as it can be done permanent drains should be built and the road should be gravelled. There are still some slopes to be softened off and embankments to be raised.

The 11 miles from Avisawella to Pallelegama has never been opened to anything beyond a bridle path, and has had no permanent drains or bridges built on it. I doubt the propriety of adhering to this portion of the trace, encountering as it does a summit level of 500 feet immediately on the left bank of Calana, the descent to which is a gradient of no less than 1 in 200.

I have great hope that the high ground over which the present line runs may be flanked to the northern by carrying the line from the site of Algodde to Yatteantotte instead of to Pallelegama at no great sacrifice of distance. There are good reasons for making Yatteartotte the point of junction if it can be done without any great income. I have not yet had time to reconnoitre the ground, and would only ask that no more money should be laid out on the direct line between Avisawella and Pallelegama until the expedience or inexpediency of the alteration I have suggested be proved.

As regards the line from Yatteantotte to Ambegamowa and thence to Gampola, clear instructions have been laid down for our guidance by the Legislative Council. We have nothing to do but to follow them out as well as we can consistently with the reduction of £2,800 which has been directed to be made from the vote of this year.

The removal of the four divisions of Pioneers from the line has induced me to authorize hired labour to be added to the first subdivision to admit of their getting as much as possible of those portions of the road which we are ordered to macadamize finished before the wet season renders it impassable and unfit to work on, but this hired labour is to be reduced, and the distribution of the first subdivision to be so regulated that the limit to which our expenditure is restricted shall not alternately be exceeded.

Avisawella to Ratnapoora, 30 Miles.—This is the only line by which Ratnapoora can be approached. It is a good trace, and ought to be easily completed to an useful condition, but at present it is next thing to impassable from the decayed state of the bridges and drains. I cannot too strongly urge that it be permanently bridged and drained as fast as our means will admit of, but may use nothing but masonry, no timber will stand in so moist and hot a climâte.

From Ballapany to Ruanwella and Yatteantotte, 22 Miles.—I greatly regret leaving the 17 miles between Ruanwella and Ballapany in the unfinished state it is in. I have tried but in vain from year to year to obtain funds for its improvement, but its importance has never been sufficiently recognized. Should the Labour Ordinance come into effect, I hope we shall be more fortunate.

Avisawella to Ruanwella, 9 Miles.—An old impracticable piece of road with which nothing can be done at any cost we should be justified.

Caltura to Agglewatte, 17 Miles.—You need not concern yourself about this while there are so many more important lines craving notice and your means.

Peradeniya through Deltotte.—We should be very cautious how we incur any great expenses on account of the public on this line, and under no circumstances should Government go beyond the Deltotte Saddle with it. I cannot but admit that I committed great error in judgment in recommending Government to identify itself so much with it as it has done. I was misled by information, which I had no time to test by personal inspection, but involves a long visiting, which I cannot now enter into. If parties interested in this line are willing to contribute towards the construction of permanent bridges, and widening the road for traffic between Peradeniya and Deltotte, I think Government should be recommended to give an equivalent sum, but beyond that I would not have you recommend anything being spent.

Mannar to Tallemannar, 18 Miles.—This is nothing more than a deep sandy track with no materials in the island of Mannar with which to improve it. All we have attempted (or rather Mr. Dyke has) is to open wells at intervals and encourage the growth of vegetation along the side of the line.

Cross roads in Ouvah, 60 Miles.—There are only bridle roads through an open country, and may be kept in an efficient state at a very small outlay of money or labour.

From Ratnapoora to Rakwana in Atacolon Corle, 28 Miles.—Opened at the joint and equal expense of the Messrs. Shand and the Government. In the present state of the planting interests there is no great need for the Government going to any further expense with this road.

From Negombo through Giriulla to Kurnegalle, 47 Miles.—This has been noticed.

Pantura through Bolgoda to Horenne.—This road leads to some important sugar estates near the Maha Wakoya. So long as they last, the road should be kept up at as small a cost as possible.

From Galle to Baddegama and to Hickgodde, 18 Miles.—This line may be kept in sufficient repair at a small outlay—the traffic cannot be great—the Gindurah river running past Baddegama to Galle.

Made Roads in Jaffna.—The upkeep of these roads if regularly and systematically attended to may be carried on at no great annual cost, but if they are once permitted to get out of repair in lumps and holes, the wear and tear (from the nature of the material) will increase in a fearful ratio. I strongly urge you to keep these roads in repair, now you have them so, and satisfied on your visit to Jaffna that they are suffering materially by the reduction in the amount voted for their repairs, I beg of you to represent it to Government with the view to being allowed to expend the whole sum voted.

Cross Roads in Jaffna.—You cannot understand the question of these roads until you know the country; depending upon Mr. Dyke's advice, I would have you go on steadily reclaiming, defining, and laying down on surveys every cross and parish road in the peninsula. Should Mr. Dyke be removed from Jaffna, the chance of our ever being able to carry out the system at all would be very much reduced, if not altogether lost, when to establish these lines of road would be attended with all manner of difficulties and expenses.

From Mannar to the Great Central Line, 45 Miles.—This trace is intended as the high road from Ceylon to India. It is to supersede the present road from Anurajepura and Aripo, which is a barren waste, almost destitute of population and resources, and with great scarcity of water.

The line from the great Central road at Madawatchie to Mannar passes through a country studded with villages, and capable of much improvement to the migrating cooly. It will prove an immense comfort, while there are other reasons for its adoption, with which we have nothing to do. I trust that Government will on no account withhold from us the £750 or half of the estimate, which has been withdrawn until wanted, for it is most unsatisfactory having one of these roads in an half-opened state, as the Putlam road unfortunately was left, and remains now of little or no use to any one. I shall be sadly disappointed and grieved if you do not carry this through this year. Money is what you want; Mr. Quintom will not fail you. As regards the trace, I have left it to Mr. Dyke to decide the villages which he desires to make points of direction. Mr. Quinton will do the rest.

**Memorandum regarding the Road from the Central Province to
Batticaloa and on the subject of the Communication
Generally on the Eastern Coast.**

The original object of the trace to Batticaloa was to connect it with Badulla and the Ovuah District, with the view of opening a channel for the introduction of labour and supplies from the former to the latter district, and it has, even in its imperfect and unfinished state, facilitated the introduction of the latter, but the population of the Batticaloa District does not appear greater than is needed for its own demands.

For the want of other qualified officers for the duty, the opening of the trace was entrusted to a gentleman who had been in the sea service, but who knew little more of such matters than the use of a compass, the country being flat, a hill in land at the boundary of the district, which is visible from Batticaloa, was given him as a point of direction, and he appears to have steered literally a direct course from point to point. The trace is consequently defective in its details, crossing small streams half a dozen times, whereby a deviation of a few yards one crossing would have sufficed, and going directly over small abrupt features, which should have been flanked. These defects are, however, so completely those of detail that an officer of any experience and judgment will have little difficulty in remedying them, but these corrections must be made as soon as possible, in order that when the Labour Ordinance comes into operation, there may be work whereon to employ the means which it will place at our disposal in that portion of the district. The expenditure on this road which I have been adverting to has purposely been restricted to what would render it merely passable for cattle and horses, and I have refrained from pushing it forward to the notice of Government, feeling that we had more roads of greater importance on hand than our funds and means of effective superintendence could do justice to, there is in consequence at this moment an unexpended balance of (I think) nearly £600 on a Special Supply Ordinance estimate, but which with many others of a similar kind it was agreed should be cancelled, as there is no surplus revenue to meet them, and the new form of accounts rendering it necessary that we should begin them with new estimates only.

The district of Batticaloa (and, indeed, the whole of the eastern districts of the Island) is destitute of roads; it is traversed by indistinct foot tracks (on which a stranger would be as much at a loss without a guide as on the prairies of America). These paths pass either through or round the margin of tanks, swampy marshes, and tidal flats, crossing so many rivers and wide deep inlets of the sea, as to be impracticable to an unaided traveller during any but the driest seasons of the year. Nor is it possible in our present ignorance of the face of the country south of Trincomalie to suggest a remedy for these defects.

It is quite apparent that any attempt to form a good road by the present line without an *enormous* expenditure would be as futile as injudicious, while the various fine inlets of the sea appear to be so nearly connected with each other and the great Batticaloa lake as to render it probable that at no very great outlay of local labour a continuous line of inland navigation might be secured for at least 100 miles from north to south, while the various creeks and rivers might be found to carry it for considerable distances inland, but this must continue to be mere speculation until Government possesses itself of surveys, by which *alone* it can be determined with any degree of confidence how the labour of the district can best be applied to the improvement of its communications. I am of opinion that along the coast it should be directed entirely to connecting the inland navigation, and that the roads should be carried inland through the more populous portions of Tamankaduwa.

The Labour Ordinance may be expected so soon to come into operation when my Department will be responsible for the proper application of the labour it will place at our disposal that I cannot too strongly urge upon the consideration of Government the necessity for my being provided with the means of executing those surveys by which alone I can be enabled to act either with confidence or advantage. The arrangement I would propose to make would be to engage under Mr. Hall (my Assistant in this Province) native Tamil surveyors (of whom I understand there are several the Government is desirous of providing employment for), and by this inexpensive machinery working up the topographical information, which they can supply accurately enough for our purpose. I would establish Mr. Hall's headquarters at Batticaloa, giving him the Badulla trace to connect to the limits of the district of the Maduru-oya, near the Paddacumbera, and at the same time the general superintendence and laying down on connected sheets the work of the native surveyors.

As regards the expenses of this arrangement, a slight addition only (say 5 shillings a day) to Mr. Hall's present salary would be necessary, while to the native surveyors a salary of 4 shillings a day each would suffice, thus for six months :—

	£.	s.	d.
Extra allowance of 5s. a day to Superintending Officer for 180 days	45	0	0
4 Native Surveyors at 4s. for 180 days	144	0	0
Chainman and labourers	100	0	0
Purchase of five small boats.	11	0	0
Total	300	0	0

As a further recommendation to this project, I would beg leave respectively to suggest that it would afford to Government the opportunity of redeeming a promise which I have been led to understand was made to the four native surveyors or apprentices who were placed under Mr. Byrne to employ them when they were reported to be duly qualified.

Trincomalee, February 26, 1848.

T. SKINNER,
Commissioner of Roads.

EXPENDITURE ON THE KANDY ROAD, AND AMOUNT OF TOLLS RECEIVED.

To the master mind of Sir Edward Barnes we are indebted for the speedy construction of this road, which was begun in 1820 and finished in 1821. Of course, the road was not permanently completed within that time, that is to say, not gravelled or metalled, yet it was opened for traffic. It was traced by and under the directions of General Fraser, late Deputy Quartermaster-General, and by Captain Dawson, then Commanding Royal Engineers. A certain number of subalterns, among whom was Major Skinner, were selected by Sir Edward Barnes, and though they had not the aid of anything like skilled labour, yet they got through their work without more trouble than is experienced at the present time. The fact was, in the words of Major Skinner, that in those days it was considered a high distinction to be selected for any duty by such a man as Sir Edward Barnes, and the officers thus employed took pretty good care not to disappoint him; men never doubted their ability to do what he ordered them to undertake.

The present annual traffic up and down the Kandy road amounts to 70,000 tons, for the transport of which, together with passengers, £150,000 is now paid. The up traffic consists of rice, poonac, cloth, and other merchandise, Commissariat stores, cocoanuts, arrack, and salt. The down traffic is made up of coffee and a small quantity of plumbago. The upkeep of the road of 72 miles cost £18,183 in 1858, and the tolls collected on it were £31,054. In 1859 the expenditure was £23,074, and the receipts from tolls £30,141, as will be more clearly seen from the following table :—

Expenditure incurred for the upkeep of the Kandy road, and Amount of Tolls received from 1847 to 1859, inclusive.

		Expenditure.	Tolls.
		£	£
1847	..	12,380	19,218
1848	..	16,407	20,603
1849	..	15,321	16,736
1850	..	9,631	17,060
1851	..	11,485	16,190
1852	..	7,273	15,742
1853	..	8,089	15,830
1854	..	10,067	17,681
1855	..	12,946	19,052
1856	..	15,313	21,707
1857	..	19,544	28,588
1858	..	18,183	31,054
1859	..	23,074	30,141
	Total ..	179,713	269,602

Cart hire to Kandy is £1. 18s., and, during the coffee season, from Kandy £2. The contract load for a cart is generally 15 cwt. Carts drawn with large Coast bullocks take a load of 1 ton up and bring down 100 bushels of coffee = 30½ cwt. It is estimated that cart owners get sixpence per ton per mile for the journey to and from Kandy (A. M. Ferguson).

Major Skinner's Memorandum on the condition of the Department of Commissioner of Roads and Civil Engineer, 1856.

1. On my return from England I found that the numerous resignations and changes of officers which have taken place in this Department during my absence have reduced its efficiency much below its ordinary very humble pretensions, and have brought it to a condition which precludes the possibility of the increasing works of the Colony being carried on otherwise than at a most serious disadvantage. While the experience of the fifteen years during which the Department of roads has had its existence proves beyond question that the principle upon which it has been hitherto officered has been eminently unsuccessful, and that that principle can no longer be persevered in with the slightest hope of improvement.

2. I have long in vain attempted to combat the opinion too generally entertained in this Colony that "any one will do for a road officer," a principle which, I regret to say, has given to my Department too much of the character of a "refuge for the destitute." As pertinent to the subject under consideration, I shall preface the remarks I have to make with the opinion of one of the ablest, if not the ablest General Road Surveyor in England, Mr. McAdam, whom I have had the privilege of consulting on many professional questions, and whose opinion on the point I am about to quote is supported by an extract from a report of a Select Committee of the House of Commons.

Extract from a series of questions to and replies from Mr. McAdam :—

Question by Major Skinner : Perhaps in England Mr. McAdam may not have experienced the annoyance and other consequences of a constant succession of road officers in the capacity of the sub-surveyor, each new hand being utterly ignorant of his duties, but Mr. McAdam may be able to imagine the evils of such a system. Will he kindly state his idea of the necessity for experience and knowledge of road making and repairing in an officer entrusted with an extensive district, and large expenditure and the probable consequence of employing men on road works who are destitute alike of knowledge and experience in that Department ?

Mr. McAdam's Reply : " I cannot conceive anything more injurious to the interests of the public or more unjust to a Surveyor-General than the reiterated appointment of under surveyors to the same district of roads, even were the persons appointed of undoubted fitness, how much more so, when they are untaught and inexperienced.

" In confirmation of this opinion, I quote from the report of the Select Committee of the House of Commons appointed to take into consideration the state of the turnpike roads and highways in England in 1819."

There is no point upon which a more decided coincidence of opinion exists amongst all those who profess what may now be called the science of road making than that the first effectual step towards general improvement must be the employment of persons of superior ability and experience as Superintending Surveyors.

3. A longer experience of such matters than most men can bring to bear upon the subject enables me to testify in the most unqualified manner to the truth of the foregoing, which applies with infinitely greater force to the circumstances of a country like Ceylon than it does to England.

4. At home, with a temperate climate, a general surveyor of roads has charge of a county or a portion of a county, not only has he well qualified sub-surveyors under him, but he works with a class of intelligent labourers, who thoroughly understand their business. When he has occasion to change one of his sub-surveyors, he has a large field of experienced men from which to select, and if he needs to break this new assistant into a system and to teach him the details of local peculiarities, he is within reach to impart this instruction, and moreover, has the time to devote to so necessary a duty.

5. In Ceylon the charge of the Commissioner of Roads and Civil Engineer is not merely equivalent to an English county or a portion of a county, but embraces the whole Island nearly equal in its area to Ireland. He has not only charge of roads, but of buildings, and of every description of work required in the Colony. Nothing short of the power of ubiquity could enable this officer to afford the instruction which the class of gentlemen who are placed in his Department require, even with regard to the names and uses of the ordinary tools which it is their first business to take charge of on assuming the duties of their station.

6. These gentlemen, however, are not only expected to be inspired road makers, they must be builders, must have or acquire the art of framing correct estimates for every description of work, and must become perfect accountants in a system which, for volume and complication, it is to be hoped, stands unrivalled.

7. But it may be argued, as I have heard it said, " if you have officers of inferior professional attainments, your works are more simple and less perfect here than elsewhere."

8. I beg to state that in the matter of roads, an English nobleman cannot be more fastidious with reference to his park drive, than is the Ceylon public with reference to the main roads of the Colony, and this is the necessity for if they are not perfect in their construction, they are unfit to resist the influence of the great extremes to which the peculiarity of tropical climate subjects them.

9. In regard to the execution of works of any description, whether of roads, buildings, canals, &c., so responsible is the head of this Department held, not only that they shall be completed in a workmanlike manner by his unprofessional assistants, but that they should be so completed according to the views of any experienced young gentleman who may be ordered to report on them, that an unfavourable report on any work prevent its cost being passed in Audit. A long and wearisome correspondence ensues, which, if it is not satisfactory to the Auditor-General, ends in the amount being finally surcharged against the personal salary of the Commissioner of Roads and Civil Engineer, and it is stopped therefrom accordingly by the Treasurer. It is quite immaterial that the head of this Department may never have had the opportunity of seeing the work. This is no mere theory; it has to my inconvenience and to my extreme annoyance been acted on.

10. Under these circumstances, can it be doubted that if frequent changes of sub-surveyors of roads in England are undesirable, such changes amongst the officers of Public Works in Ceylon and the employment in that Department of untaught inexperienced men must be fatal to the interests of the Colony. As little will I allow myself to suppose that there can be a second opinion as to the force with which the quotations in paragraph 2 apply to the circumstances of this Island.

11. It is now for consideration whether the changes of officers on which I have been dwelling are in reality so frequent as to be prejudicial to the public interests, and to demand the remedial interposition of the Government. Appendix A* exhibits a nominal list of officers who have died in or have left the Department since its formation in 1841 to the present time. Collectively they amount to no less than 99, including the Civil Engineer's Branch of the Department for ten years before it was incorporated with that of the roads, doubtless they would together much exceed 100. The average length of period of service of these officers has been two years one month and sixteen days.

12. Under favourable circumstances, it takes about two years' acquaintance with his work to render an unprofessional gentleman really efficient and valuable to this Department, but in many cases a much longer apprenticeship is needed. For years past I have been in the habit for stating that I consider a young man before he is fairly broken into his work costs the public from 3 to 400 pounds.* This opinion has been shared by old officers of the Department, whose position has afforded them the means of judging, and now I advisedly record it as the result of my very unenviable experience. Then, if in these particulars, I am not overstating my case, and I desire most guardedly to avoid doing so. The result of Appendix A is that the average of 99 officers have died in or have left the Department just at that period of their service when they are becoming really useful to it, at what pecuniary loss to the Colony, I am unable accurately to state, but I think I am within bounds when the round numbers I estimate it at from 20 to 25,000 pounds in the fifteen years.

13. Appendix B* (shows the present effect of these changes, viz., that of 20 officers in charge of Provinces, districts, and of divisions of Pioneers—

7 have been in their present appointment under 1 year
 7 have been in their present appointment under 2 years
 1 has been in his present appointment under 4 years
 2 have been in their present appointment under 10 years
 3 have been in their present appointment over 10 years

—
 20
 —

* Unfortunately lost.

The average length of service of these 20 officers is a fraction over $3\frac{1}{2}$ years, but the average of the first fourteen above referred to amounts to only eleven months and four days.

14. It may be thought that the frequent changes of officers from one Province or district to another is of little moment, but long experience has taught me to regard it very differently. Provinces and sometimes even districts in this Island differ so materially from each other in climate, soil, and resources that I believe my Assistant, who has been $14\frac{1}{2}$ years in the Northern Province, would be very little more at home on translation to the Southern Province than he would have been if landed at Galle fresh from Europe. If in England, where work is very much performed by the job, where contractors (in the legitimate sense of the term) are ready to compete for the execution of all works, and where the markets overflow with every description of materials the service can need, changes of Superintending Officers in the same district are thought prejudicial to the public interests, how much more so ought they to be considered in a country where the direct converse of those conditions prevail, and in which the success of our operations mainly depend on the ability and local experience of the individual acting as Superintending Officer.

15. I can adduce or need no stronger illustration of the value of this local experience and thorough knowledge of men and things than the case of Mr. Byrne, my Assistant in the Northern Province. Can it be contended, I would ask, that any three men wanting in these qualifications would be capable of carrying on his duties with the system, regularity, and success which characterize his operations, and he at present unaided by a single European officer. I have no hesitation in expressing my opinion that they could not.

16. The labour and responsibility attached to the head of this Department would be of no ordinary character even were he supported by an able and experienced staff. I have no power to describe what it has been for the past fifteen years with such a constant succession of assistants, most of whom before their appointment to the Department never thought of the work and occupation on which they were embarking, and whose knowledge of accounts in most cases extended little beyond those of their personal expenditure. The evil consequence of this unacquaintance with accounts being augmented by the elaborate details of our system. This untoward combination has imposed upon the Accountant Branch of my office, in addition to its legitimate duties, the continued labour of instruction.

17. But most serious considerations are involved in the state of affairs I am describing than any of a mere personal character. Not unnecessarily to extend the retrospect of our annual expenditure, I may state that that of last year was £80,450. 10s. $0\frac{1}{2}d.$, and that I hold sanctioned estimates for the current year to the amount of £94,942. 2s. $3\frac{1}{2}d.$ Road Ordinance funds inclusive in both cases. For the superintendence of this expenditure the Department commands the staff mentioned in paragraph 13. Of the 20 officers, however, there referred to, it needs to be explained that *four* only are professional Assistants.

- 1 in charge of the works in the town of Colombo.
- 1 at Jaffna.
- 1 at Kandy.
- 1 accidentally and temporarily at Trincomalie.

For the Southern Province there is none, for the North-Western Province there is none, nor has the Department at its disposal for any special work, report, or survey, or to provide for any casualty a single officer. The last we had having, after a service of six years, resigned

within the last few days on precisely the same grounds on which numerous other valuable officers have left the Department. See Appendix C.*

18. I annex this document (Appendix C*) because it is a key to the defective system I have alluded to, as having existed during the last fifteen years, and which will be perpetuated for the next fifteen years, unless the circumstances of the officers, as well of Fixed and of the Unfixed Establishment, are very considerably improved.

19. The uninviting conditions on which the officers of the Unfixed Establishment are employed, viz., simply those of the day labourer whom they superintend, their pay ceasing directly they from incapacity fail to perform their work, without prospect of retirement in old age, and with the certainty of destitution. As the consequence of loss of health in the service of Government are patent in the Colony, but it is thought that the officers of the Fixed Establishment are placed above all grounds of reasonable complaints. To prove that such is not the fact, I take advantage of an individual case. Appendix D* which has recently been submitted for the consideration of Government as a type of the discouragements of which officers of this Department complain.

20. Advantages of position and salary are relative, is it to be supposed that the officer referred to in Appendix D, a gentlemen held in high esteem both socially and officially, who was thought not unworthy to be entrusted with the expenditure of nearly one-fifth the amount of the revenue of the Colony, can be well satisfied in having been made to descend in one step from that class and branch of the Civil Service in which he was, while acting for me, associated with the highest officers of the Government to the fifth or *lowest class* of the Junior Branch (see Appendix E*), a class in which, besides the Assistants to the Surveyor-General's and my own Department? There seem to be but two appointments in the whole Civil Service of the Colony low enough to find a place, and that after fourteen years of exposed arduous service, with a responsible charge, he finds himself doomed to a salary which any young writer in the service would be disappointed if he did not obtain under three if not in two years' standing.

21. Added to the foregoing, my officers have before them the comparison of their respective positions with those of officers brought up in, but who have within recent date left the Department for, India:—

Lieutenant Anderson, late 4th Division of Pioneers, said to be in receipt of £1,000 a year on the Bengal Railway.

Mr. Bews, late 1st Division of Pioneers, said to be in receipt of £600 a year.

Mr. J. Cummins, late 2nd Division of Pioneers, said to be in receipt of £600 a year, of which he writes he is enabled to lay by a fair portion.

These salaries being exclusive of house rent and travelling charges of every description.

Mr. Craig, late in charge of Saffragam District, and Mr. Scott, late in charge of Ouvah District, have also, it is stated, succeeded to well-paid appointments on Indian Railways. With such advantages open to young men, who can claim from me a certificate that they have served in my Department for upwards of three, five, or ten years (as the case may be), and that they have proved themselves to be good, practical, zealous, energetic, trustworthy gentlemen, is it to be supposed that this Colony will, under existing circumstances, retain the services of many enterprising men worth keeping, unless they are induced by local associations to remain. It has been made known to me that some of the best of the few remaining experienced unfixed officers of my

* Lost.

Department are remaining in it conditionally only, I shall have no hope of retaining them unless their circumstances are improved.

22. That the Pioneer Divisions form no bad training school may be inferred from the success of the three young men who left in one year ; but placing in this school too quick a succession of pupils is extremely prejudicial to the discipline and efficiency of the Divisions. Pioneers at once perceive when their officer has everything to learn, and they take very good care to make the public pay for his education (paragraph 12). As this memo. has more special reference to the officers of the Department than to the no less important question of labour, I refrain from at present entering more fully on the policy of increasing—improving and encouraging that splendid body of workmen—the Pioneer Force, but as I have long had to contend against the prejudice entertained towards it as a *Fixed Establishment*, so I now earnestly commend it as being more than ever indispensably necessary to their furtherance of any extension of our means of communication as they are to the preservation to the existing roads.

23. I abstain from any expression of opinion as to the course which should be adopted with reference to the improvement of the efficiency of the officers of my Department. Understanding that measures of the precise nature of which I am ignorant have already been taken by Government in that direction, my aim is to make it known to His Excellency the Governor, as I should desire it to be known to the Council, that the Department of Public Works as at present constituted is not efficient for the work expected of it. That it has never been as efficient as for the interests of the Colony—it ought to have been, and that it cannot fail to become still more inefficient, if the circumstances under which it at present exists are permitted to continue. After upwards of thirty-seven years' hard service in the Colony I no longer am physically capable of that activity, with which, in time past, I have striven by personal exertion to overcome the evils of a system of which I have constantly complained, but which it has been hoped that time and experience would of themselves be sufficient to remedy. Things have, however, gone on from bad to worse, until I find it impossible longer to withhold this statement. If with these facts before them the Government and the public are content that their Department of Public Works shall go on as at present constituted, I pledge myself to do, as I have long done work on under difficulties, to the best of my ability, but it would be far more gratifying to me if, during the short remaining time I can serve the Colony with any advantage, it were permitted me to place my Department in that state of efficiency in the which I could hand it over with feeling of pride rather than one of shame to a more worthy successor.

24. Under any circumstances I trust that by the next mail application may be made to the Secretary of State for three professional Assistants, who are *immediately* and *urgently* required to fill the vacancies caused by Mr. Francis' death and the resignations of Messrs. Scott and Royston, the latter gentleman's appointment has heretofore been an unfixed one of £273 per annum. I believe it is hopeless our expecting to find a qualified successor in the Colony. I, therefore, think a professionally educated Engineer should be sent from England for it, and that henceforth it should be placed on the Fixed Establishment. The fact of Mr. Quintom and Mr. Hall having been placed on the Fixed Establishment in no degree diminishes the necessity for two professional Assistants to replace Mr. Francis and Mr. Scott, neither of the two first-named gentlemen are Engineers, and it would be no less an injustice to them than to the service to place them in a position wherein scientific attainments are needed. The services of these gentlemen well merited the reward of their being placed on the Fixed Establishment—a measure of justice which I hope may be extended to other deserving men of my Department.

MEMO.

The style of Assistants required for the Civil Engineer and Commissioner of Roads in Ceylon are men of general practical professional experience of good constitutions and temperate habits. We have found that the first-named qualification is of little avail, unless accompanied with the two latter; indeed, without these life would not be worth three years' purchase in this country with the work to be performed. When at home I was so much impressed with the perfection of system with which the Holyhead works are being conducted that I would submit it could not fail to be a good school from which to obtain an officer, but my great anxiety is to prevent, if possible, young men being sent out to me whose experience has been confined to an office and the drawing board rather than to the execution of work, and this anxiety is not lessened by my knowledge that theoretical engineers abound much more than practical men in England just now.

Colombo, August 14, 1856.

T. SKINNER.

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Muthiah Pillai Wellopilly Mudaliyar.	Herbert Edward Horace Hayes.
James Foster Coulson.	Edward Venning.
Ralph Tatham.	Thomas Smith.
James Augustus Caley.	Patrick Cummins.
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William George Hall.	Fenton Cummins.
Charles Prime.	Provincial Engineer's Residence, Badulla.
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Sir Robert Chalmers, G.C.B.
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Edward James Henry Christie.
Harry Thompson Simpson Ward.
Fredrick William Johnson.
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Administration Block, General Hospital, Colombo.
Harry Bathurst Christie.
Before the advent of the Motor Car.
Elie House Reservoir.
Victoria Memorial Eye Hospital.
Leonard Creasy, I.S.O.
H. Parker.
New Peradeniya Bridge.
Matara Bridge.
Anuradhapura Hotel.
New Public Works Office, Colombo.
Do.
Lawford Maclean Acland.
Hugh Arthur Grote Grant.
Colonel Edward Campbell Davies, V.D., I.S.O.
New Royal College, Colombo.
The Hon. Lieut.-Colonel Thomas Howard Chapman, V.D., O.B.E.
Record Floods at Batticaloa.
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