Completing the Heads Fortifications 1885-1895 / John Blackbourn Victorian Defence Engineer

Mr Keith Quinton

‘ …. the trials have been attended by officers representing the director of artillery, as the ordering of the carriages for the 9.2 in. and 10.4 in. guns depended on them. These carriages will now be proceeded with, and the general adoption of the "disappearing" principle for heavy guns for home defences may be expected before long. I may add that at the War Office the action of the Victorian Government and Tasmanian Government in the practical solution of the question is fully recognised and much valued.’

Report by Major-General Harding Steward. Elswick Works, Newcastle-on-Tyne, to Victorian Agent General, London. 19 May 1885

‘ …. in nearly every case the works have been planned or remodelled by officers of the Royal Engineers, specially sent out by the War Office, or by engineers of worldwide reputation, like Sir William Drummond Jervois.
The scheme of defence of Port Phillip, based on the recommendations of Sir William Jervois, has been consistently and ably carried out, and Melbourne, as soon as arrangements are completed for the outer minefield, will be one of the most perfectly protected ports of the empire.’

Major General A. B. Tulloch. Reply to Sir Andrew Clarke - The Age, 25 May 1892

The seven year gap between the above quotations covers a definitive transformation in the defence of Port Phillip Heads. At the time of the 1885 Harding Steward report and the ‘Russian War Scare’ the still incomplete Jervois-Scratchley plans for a combined battery fortification and controlled submarine minefield defence of the Great Sands channels was hurriedly extemporised. A year earlier, on July 18, 1884, Jervois, passing through Melbourne on transit to his appointment as Governor of New Zealand, met with Sir Henry Loch and the Officers Commanding Victorian Forces.[i] Incomplete War Office investigations into the effectiveness of breech loading guns for both naval and land fortification use, had triggered a suspension of Australian Colonial ordnance orders, *‘… until the results of artillery and armour testing at Shoeburyness could be fully evaluated.’* The Melbourne meeting agreed upon the necessity of constructing a fort on a shoal to support a submarine minefield in South Channel, while two alternative plans for a cupola containing twin 10” guns at the partly completed annulus fort were examined. A sketch of this proposal was sent to the War Office fortifications branch for development. It was also decided there were insufficient heavy guns available, with the meeting agreeing Jervois would cable Major-General E. Harding Steward R.E. in England to investigate the possible purchase of 6”, 9“, and 10”

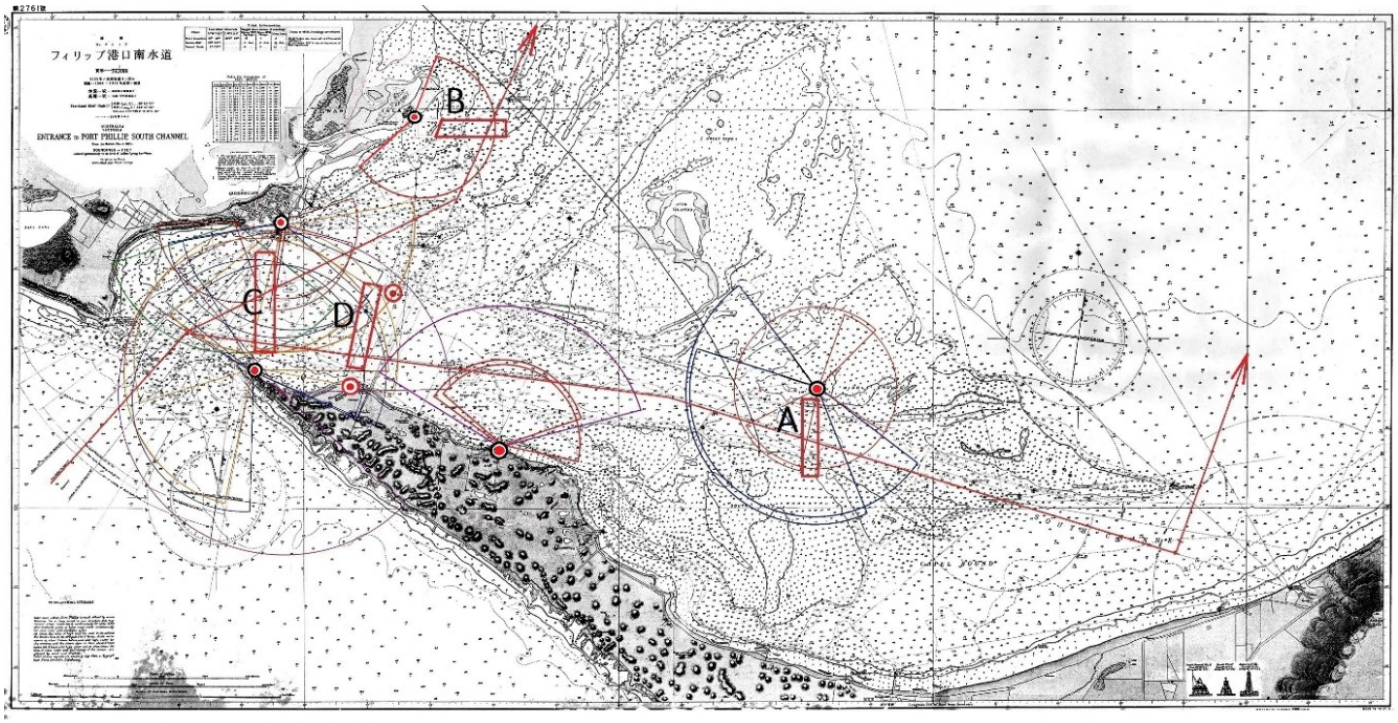
B.L. guns.[ii] This arrangement necessitated significant alterations to the barely completed gun batteries and re-examination of the electro-minefield locations.

Jervois and Scratchley independently returned to the U.K. in late 1883; where the Carnarvon Royal Commission (1879-1882) had led to formation of an Imperial Defence Committee tasked with establishing a British network of defended ports and coaling stations. The use of breech-loading ordnance in the development of multiple Imperial coaling stations by the W.O. Fortifications Department involved dispersal of large calibre gun emplacements, and extensive earthwork embankments to replace stone and armour-plate embrasures. As the Imperial government's refused to provide funding for experiments on hydro-pneumatic gun carriages the W.O. persuaded Tasmania and Victoria to provide an Armstrong 6-inch H.P. gun and an 8-inch H.P. gun for testing prior to shipment to the respective colonies, and the shift to breech loading guns ran parallel with the development of torpedo minefields.

At Port Phillip, three zones were considered to be essential to creating an adequate defence of the Great Sands Channels; South Channel, West Channel, and Queenscliff - Point Nepean. An observation station was constructed within Fort Queenscliff in 1885, and 1886 plans for the Engine house clearly indicate a 'torpedo' test room. While many historians recognize the significance of the South and West Channel locations, due to failed experiments within the deep water channel in 1885, there has been an erroneous acceptance this negated the significance of the Queenscliff - Point Nepean defence zone. In reality the problem encountered in mining the deep water channel could be resolved by moving 2.5 km to the east, and establishing the third torpedo mine zone between Pope's Eye Shoal and Observatory Point. The increase in the number of controlled torpedo mines located at Swan Island from 361 units (1892) to 447 (1896) clearly indicates an intent for a forward mine zone within range of the Fort Queenscliff and Fort Nepean batteries, although this was to remain a close secret.

' ….. The proposed line of heavy ground mines, fired by observation, in the deep water between Queenscliff and Nepean, has been given up as quite impracticable. As, however, an advanced minefield is required to keep vessels as long as possible under the fire of these forts, it is proposed, as soon as funds will admit, to arrange a minefield between Pope's Eye and Observatory Point. A test-room and some Q.F. guns at each of these places will be required to carry out this scheme.'[iii]

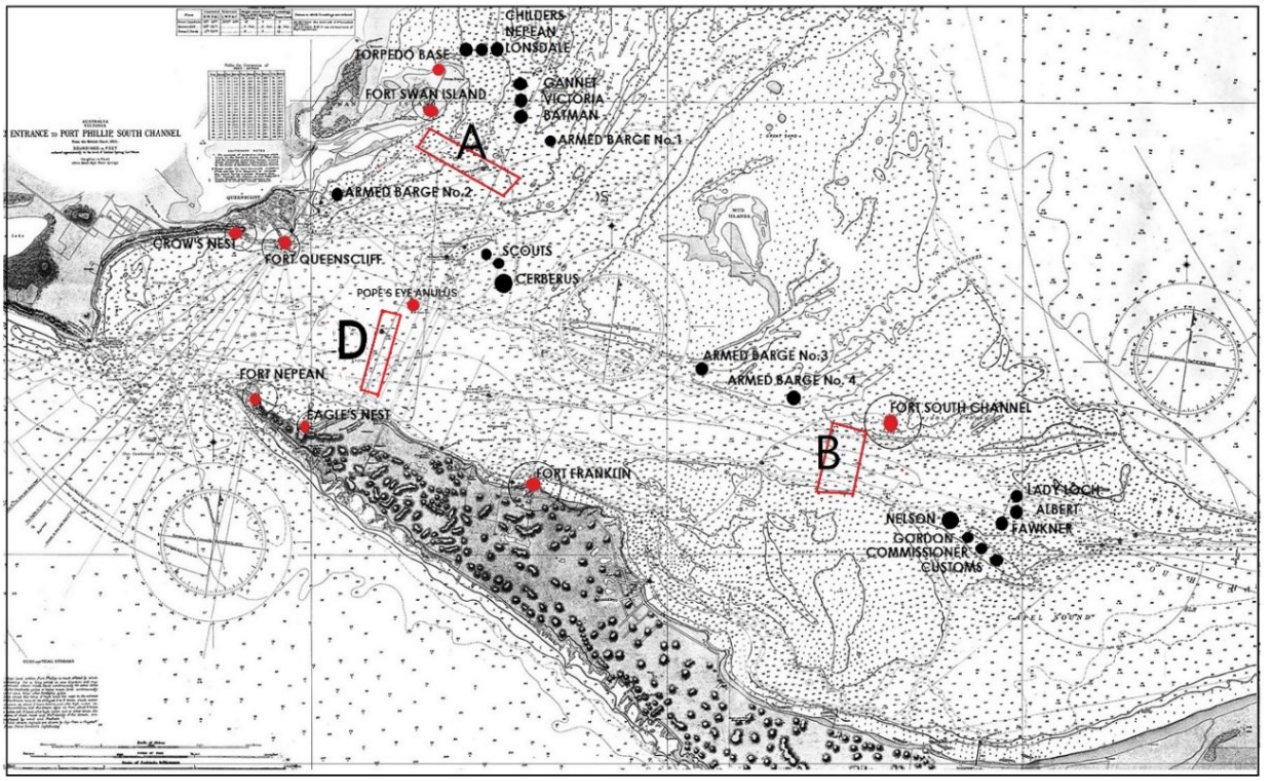
" …. The whole appliances were a profound secret, and the method of working them was known to only engineer officers. As regards the plans of the minefield, only two persons in the colony had ever seen them. This was highly necessary, as the whole use of mine defences would be lost were an enemy to obtain an accurate knowledge of where the mines were to be laid [iv]



A. South Channel minefield
B. West Channel minefield
C. Queenscliff - Point Nepean minefield
D. Pope's Eye - Observatory Point minefield

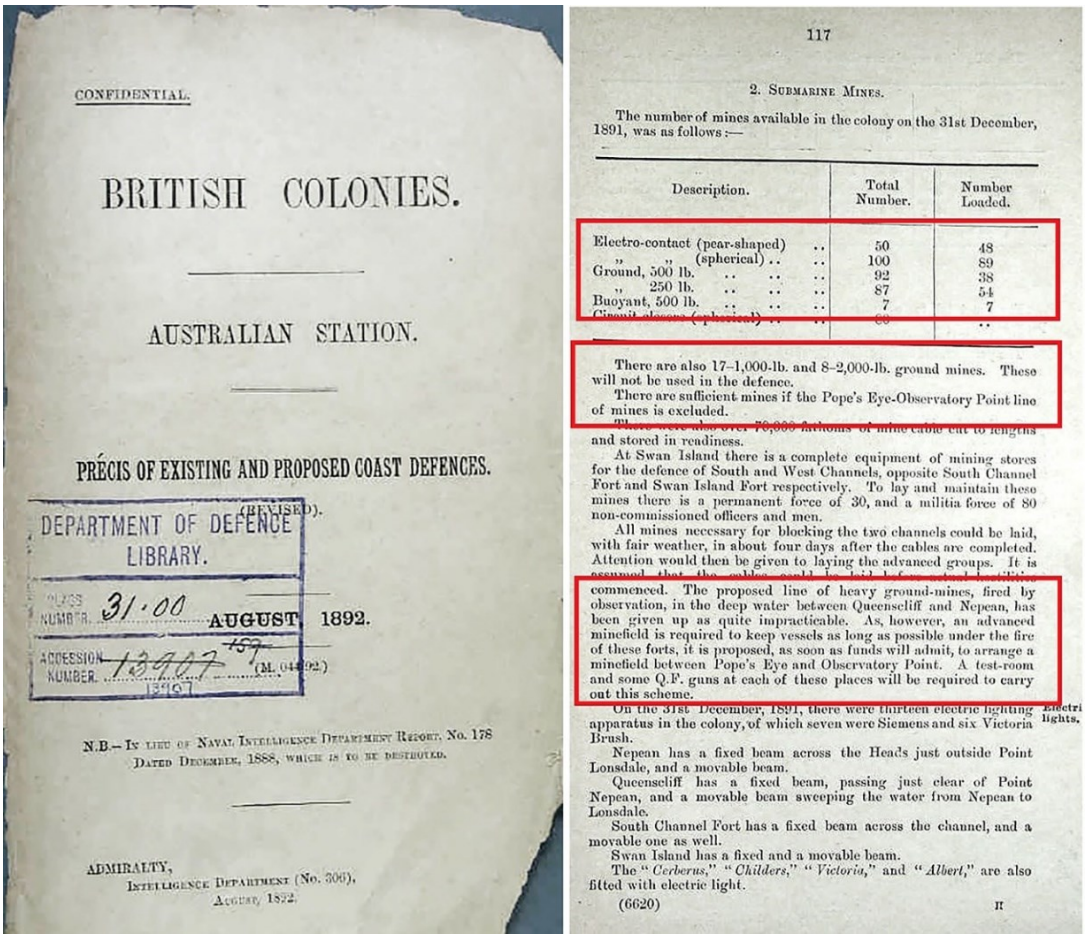
Circa 1894 DISTRIBUTION OF VICTORIAN ORDNANCE
PORT PHILLIP HEADS

Above: Battery And Minefield Plan Drawing - The Author



Circa 1894 DISTRIBUTION VICTORIAN NAVAL SQUADRON
PORT PHILLIP HEADS

Above: Distribution Victorian Naval Squadron – The Author



CONFIDENTIAL.

BRITISH COLONIES.

AUSTRALIAN STATION.

PRÉCIS OF EXISTING AND PROPOSED COAST DEFENCES.

(REVISED).

N.B.—In lieu of Naval Intelligence Department Report, No. 178 Dated December, 1888, which is to be destroyed.

ADMIRALTY,
Intelligence Department (No. 306),
August, 1892.

117

2. Submarine Mines.

The number of mines available in the colony on the 31st December, 1891, was as follows :—

Description.	Total Number.	Number Loaded.
Electro-contact (pear-shaped) ..	50	48
,, ,, (spherical)	100	89
Ground, 500 lb.	92	38
,, 250 lb.	87	54
Buoyant, 500 lb.	7	7
Circuit closers (spherical)	60	..

There are also 17–1,000-lb. and 8–2,000-lb. ground mines. These will not be used in the defence.

There are sufficient mines if the Pope's Eye-Observatory Point line of mines is excluded.

There were also over 70,000 fathoms of mine cable cut to lengths and stored in readiness.

At Swan Island there is a complete equipment of mining stores for the defence of South and West Channels, opposite South Channel Fort and Swan Island Fort respectively. To lay and maintain these mines there is a permanent force of 30, and a militia force of 80 non-commissioned officers and men.

All mines necessary for blocking the two channels could be laid, with fair weather, in about four days after the cables are completed. Attention would then be given to laying the advanced groups. It is assumed that the cables could be laid before actual hostilities commenced. The proposed line of heavy ground-mines, fired by observation, in the deep water between Queenscliff and Nepean, has been given up as quite impracticable. As, however, an advanced minefield is required to keep vessels as long as possible under the fire of these forts, it is proposed, as soon as funds will admit, to arrange a minefield between Pope's Eye and Observatory Point. A test-room and some Q.F. guns at each of these places will be required to carry out this scheme.

Electric lights.

On the 31st December, 1891, there were thirteen electric lighting apparatus in the colony, of which seven were Siemens and six Victoria Brush.

Nepean has a fixed beam across the Heads just outside Point Lonsdale, and a movable beam.

Queenscliff has a fixed beam, passing just clear of Point Nepean, and a movable beam sweeping the water from Nepean to Lonsdale.

South Channel Fort has a fixed beam across the channel, and a movable one as well.

Swan Island has a fixed and a movable beam.

The "*Cerberus*," "*Childers*," "*Victoria*," and "*Albert*," are also fitted with electric light.

(6620) H

Above N.A.A. - Reference: Item No. 4007930

In 1892 Victoria's military commandant, Major-General Tulloch, angrily responded to a letter sent by Sir Andrew Clarke; acting Australasian Agent-General, London; to the Victorian Government stating there had been a prolonged absence of consistent policy and stable defence planning, stemming from over-reliance upon 'expert knowledge' from 'visiting' military and naval officers. As Inspector General of Fortifications (1883-1886), Clarke had played a key role in promulgating the network of Imperial Coaling Stations protected by integrated defences. The expansion of harbour fortifications across the 'breadth of Empire' had continued apace under Major-General Lothian Nicholson (1886-1891).

By 1884 three British manufacturers had successfully applied the Hydro-Pneumatic carriage principal to B.L. guns of 6-inch, 8-inch, 9.2-inch, and 10-inch calibres. They were Moncrieff's Easton and Anderson Company, (E. & A.) Armstrong's Elswick Ordnance company (E.O.C.) and the Woolwich Royal Carriage Department (R.C.D.). Each had put forward designs that were competitively tested before the Director of Artillery was willing to accept them for service use. Tests for the 10-inch B.L. took place at Landguard (E & A mounting) and at Shoeburyness (E.O.C. and R.C.D.). The 9.2-inch B.L. guns were tested at Grain. From 1885 to 1895, as production gradually met demand, guns of these calibres were disbursed to selected fortifications within the UK and Britain's developing network of protected overseas coaling stations.

Following withdrawal of Imperial troops in August 1870, the Royal Navy had retained responsibility for defence at sea, while individual self-governing colonies developed fortifications and militia forces 'officered' by Imperial appointments on 5-year rotation. By 1883 revised fortification concepts linked with emergent submarine mining defences fostered a demand for Royal Engineer Officers conversant with all of the new ordnance developments that could not be satisfied, and each colonial Public Works Department (PWD) sought individuals capable of draughting defence

engineering. In Victoria, John Blackbourn, C.E. was appointed Victorian assistant to Colonel Peter Scratchley in 1882, tasked with producing plans for completion of the Heads batteries. At the instigation of Scratchley; who had been Deputy Inspector General of Works, then Inspector General of Works, at Woolwich Arsenal (1864-1876); the Elswick Ordnance Company (EOC) would become principal provider of new ordnance to Port Phillip. By 1885, most sites were near completion and hydro-pneumatic carriages were on order for the colony's 80-pdr M.L. guns. Swan Island mine depot contained in excess of 400 electro-fired mines, with a nearby harbour for three Thornycroft torpedo boats with Whitehead torpedoes. This had been achieved through Blackbourn, Jervois, Scratchley, and five Imperial Officers seconded to command the various forces. Victoria's defence advisor, Major-General Edward Harding Steward R.E. (1885-1891), was also acknowledge by Defence Minister Sir James Lorimer after the 1887 Colonial Conference, London:

"I am certain we are working on the right lines, that everything is well designed, and that our armaments are of the most modern description. In fact they are in advance of anything I have seen in England, thanks to the counsel and assistance of General Harding Stewart, military advisor for the colonies." [v]

Blackbourn had been employed as an assistant engineer by engineers Kelk & Laird during 1865-1866, on the huge Millwall Dockland development located at the Isle of Dogs on the Thames River, and was resident engineer for the Limehouse Dock extension connecting Regent's Canal to the Thames River (1866-1869). Both projects involved, hydraulic machinery, coffer dams, extensive excavation and construction of substantial dock walls interlaying brick bands and mass concrete.

Crossing the Atlantic to the U.S.A. in 1871, Blackbourn gained employed as resident engineer for the Cairo-St. Louis Railway Company, Illinois, where he encountered extensive earthwork gun battery fortifications constructed on the Cairo levee banks at the junction of the Mississippi and Ohio Rivers by Union military engineers during the Civil War. In May 1872 Blackbourn departed St. Louis utilizing the transcontinental rail link to San Francisco, California, where he was employed by the Corps of U.S. Engineers at Fort Point under the direction of Commanding Officer, Colonel Charles Seaforth Stewart. Mostly involved in pile restoration at Fort Point pier, he also oversaw construction of a portion of the Eastern Heights Gun Battery where the work provided unsupervised access to fortification plans in the Engineers hut on Fort Point jetty. His dismissal of an Irish foreman and civil war veteran led to newspaper attacks on his refusal to take up U.S. citizenship. Blackbourn decided to take passage on a mail steamer to Australia and following his departure there were accusations in the U.S. Congress that he was a British spy. Obliged by Congress to present an official response, Colonel Seaforth Stewart reported this was unlikely, as Blackbourn had promised not to copy any plans and had always maintained he was the son of an English Gentleman!

John Blackbourn C.E. 1842 - 1911

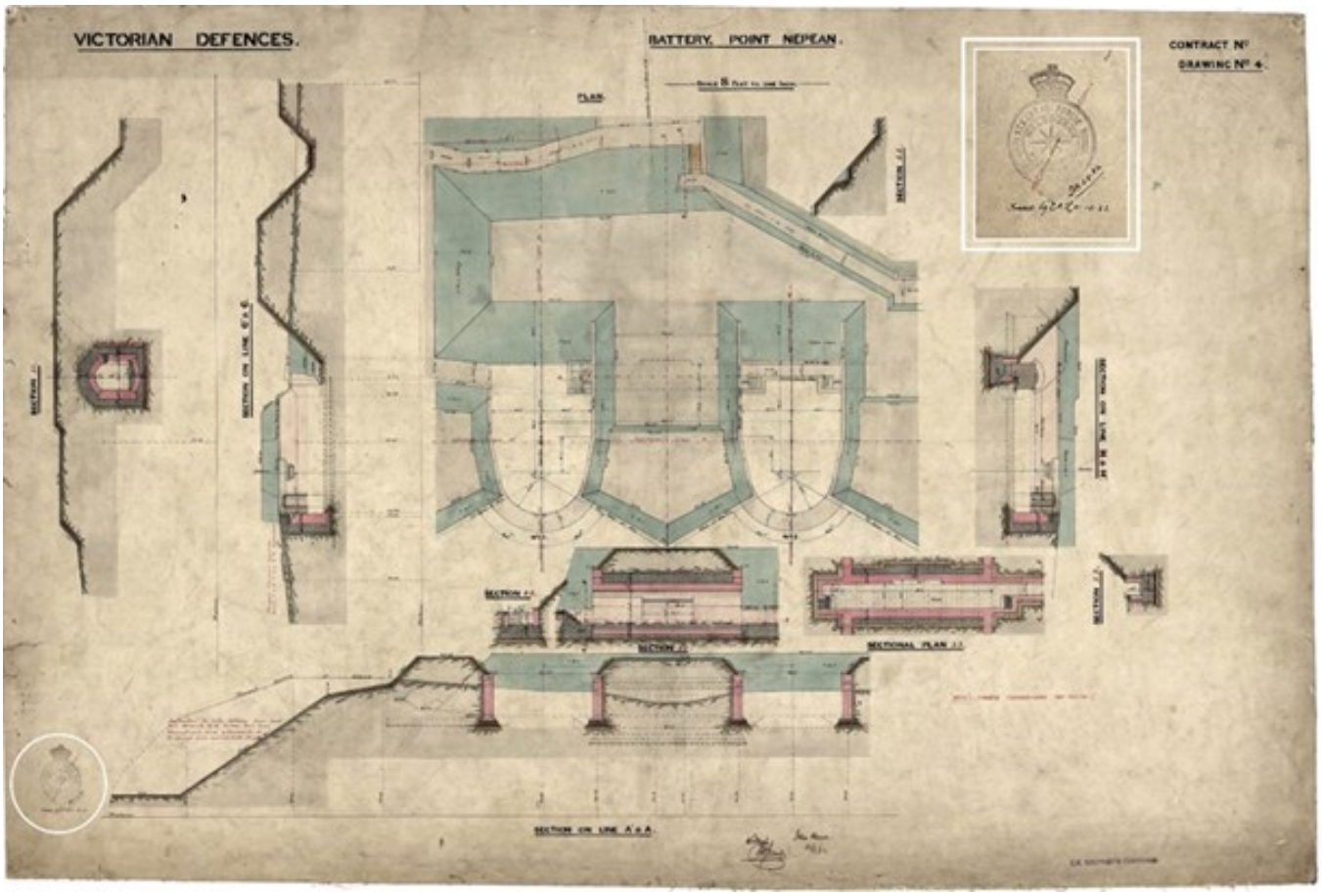
1859 - 1864	Apprentice Engineer - W.M. Ordish & Le Feuvre
1865 - 1866	Assistant Site-Engineer, Millwall Docks - London
1866 -1869	Resident Engineer - Limehouse Dock Extension - London
1869 - 1870	Visited Melbourne, Australia
1871 - 1872	Resident Engineer Cairo - St. Louis Railway, Illinois, U.S.A.
1872 - 1873	Defence Engineer - Fort Point, San Francisco, California, U.S.A.
1874 - 1875	PWD Road & Bridges Engineer, Melbourne, Victoria
1875 - 1878	Resident Engineer Port Wakefield - Wallaroo Railway, S.A.
1879 -	Roads Engineer Waipawa, New Zealand
1880 - 1881	Private Practice, Melbourne
1882 -1884	Assistant Defence Engineer to Colonel Scratchley
1885 - 1889	PWD Victorian Assistant Defence Engineer
1890 - 1901	PWD Victorian Defence Engineer
1901 - 1906	Federal Inspector of Works, Victoria

Above: Employment Timeline – The Life & Times of John Blackbourn R.E. by Keith Quinton

Following his arrival in Melbourne Blackbourn was employed as a P.W.D. Roads & Bridges engineer, producing plans for an iron bridge across the Yarra River at Johnston Street, Collingwood. This was followed by two years as resident engineer constructing a railroad line in South Australia, from Port Wakefield to Wallaroo. Why Blackbourn was selected as ‘Defence Surveyor' and assistant to Colonel Scratchley in April 1882 remains ambiguous.

The first traceable plans bearing Blackbourn’s trademark initial ‘JB’ are a set of three contract drawings from the Point Nepean defences - dated: 1st August 1882; laying out the permanent concrete, brick, and earthwork battery of six M.L. 80-pdr’s, replacing the four gun temporary sandbag battery that had been hastily constructed in 1878 on the limestone crest at Point Nepean headland.

Blackbourn was officially designated ‘Assistant Defence Engineer’ in 1885, and ‘Victorian Defence Engineer’ in 1890. For 18 years his P.W.D. department of three had produced the multiplicity of plans required by the Victoria Government for defence building contract purposes. At Australian Federation in 1901, he was appointed as the Commonwealth P.W.D. Inspector for Victoria.



Above: One of six Blackbourn plans of the 1882 Point Nepean battery. N.A.A. Item no.

Endnotes

[i] Sir William Jervois, Governor of N.Z.; Captain Thomas R.N., Naval Commandant; Colonel Disney R.A., Military Commandant; Lt. Colonel Walker R.A., Adjutant General; Major Ellery, Commanding Submarine Miner, the Inspector General of Public Works, W. Steele, and Major Cautley R.E. (Cautley had been reassigned by the W.O. from his posting to Tasmania to accompany Jervois and establish harbour fortifications and submarine mine defences in N.Z.)

[ii] Ibid: (Harding Steward had replaced Sir Peter Scratchley as the U.K. Colonial Defence Advisor in 1883)

[iii] 1892 British Colonies. Australia Station – Victoria, 'Precis of existing and proposed coast defence.'
NAA Series A1194 Control 31.00/13907 Item: 4007930
1896 British Colonies. Australia Station – Victoria, 'Precis of existing and proposed coast defence.'
NAA Series A1194 Control 31.00/13908: Item 4007931

[iv] ibid

[v] ." Age (Melbourne) 16 February 1900. Major Parnell to Major General Downes - Queenscliff; 'Inspection by the Commandant'

References:

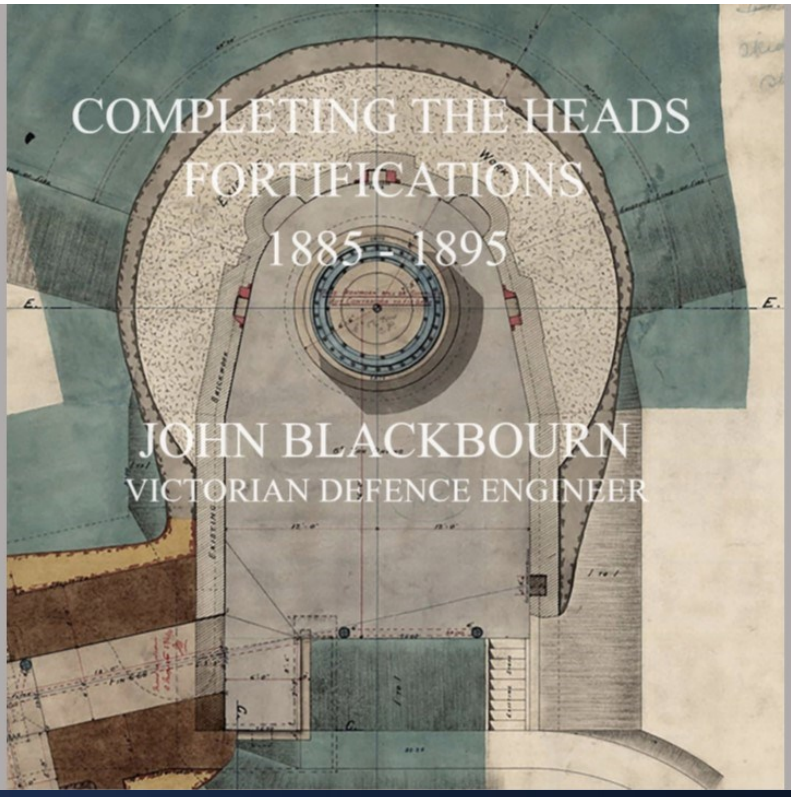
Gun Instruction Manuals – The Great War Forum
https://www.greatwarforum.org/topic/156281-instruction-manuals-for-various-armstrong-guns/

Imperial Defence 1868-1887 Donald M. Schurman, Edited by J. Beeler: Frank Cass Publishers. 2000

Sighting on HP Carriages – 8-inch manual
https://recordsearch.naa.gov.au/SearchNRetrieve/Gallery151/dist/JGalleryViewer.aspx?B=4039828&S=1&N=38&R=0#/SearchNRetrieve/NAAMedia/ShowImage.aspx?B=4039828&T=P&S=7

Report on the Defences - British Coaling Stations Abroad, and of Colonial & Indian Defended Ports – Colonel Robert Hamilton Vetch R.E. Deputy Inspector General of Fortifications. War Office, London. 1894.

The Life & Times of John Blackbourn C.E. 1842-1911 - Victoria's Defence Engineer. Author. Keith Quinton Published. Blurb Books 2020 ISBN 978-1-64713-271-2



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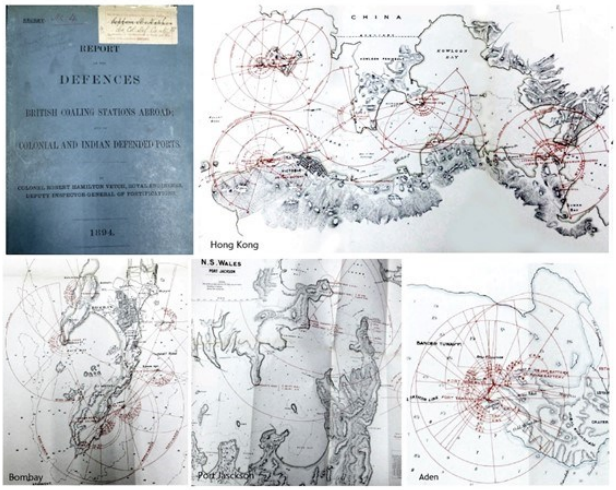
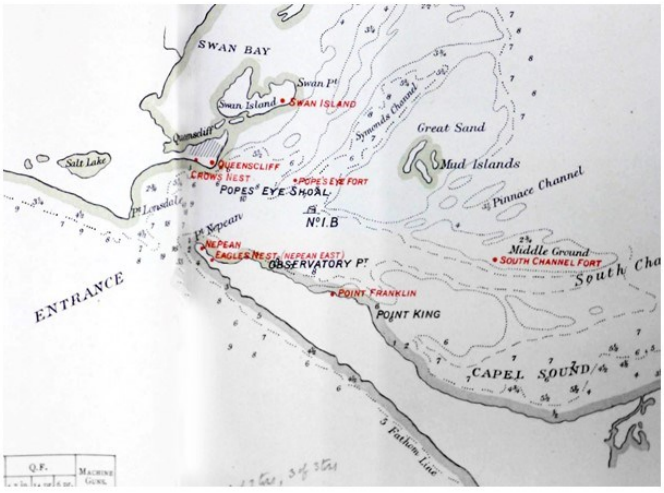
Major General A. B. Tulloch. Reply to Sir Andrew Clarke - The Age. 25 May 1892

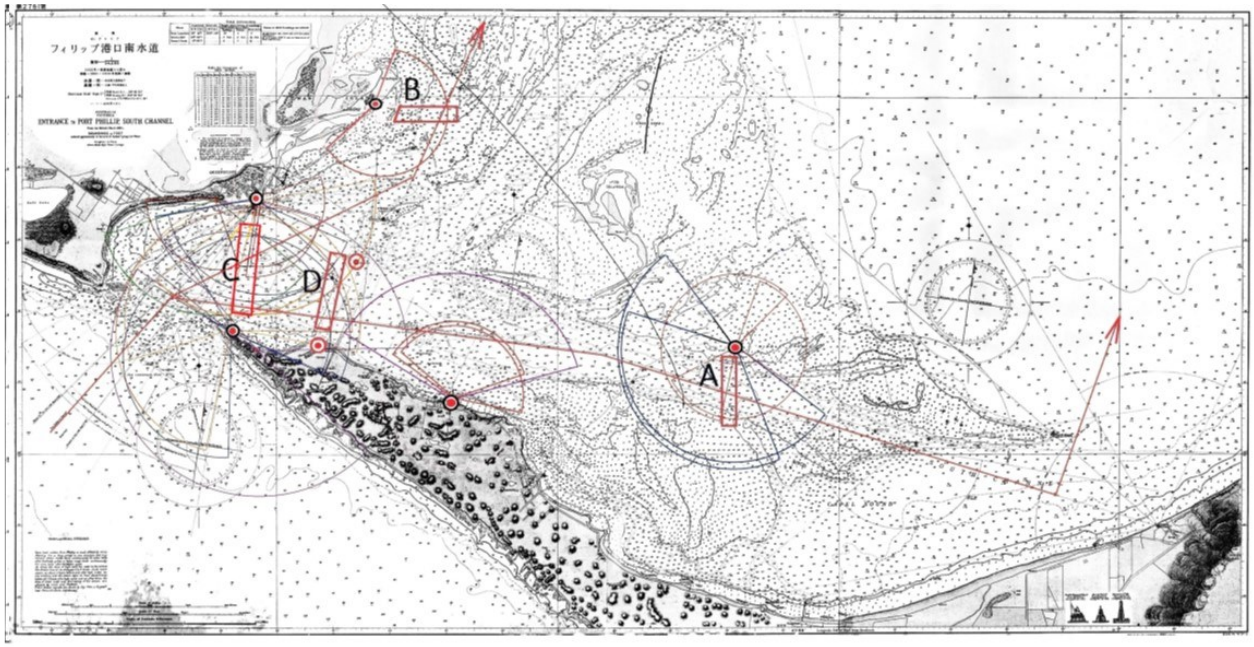
VETCH: REPORT ON THE DEFENCES - IMPERIAL COALING STATIONS ABROAD & COLONIAL AND INDIAN DEFENDED PORTS - 1894

Imperial Coaling Stations



Port Phillip





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D. Pope's Eye - Observatory Point minefield

Circa 1894 DISTRIBUTION OF VICTORIAN ORDNANCE PORT PHILLIP HEADS

Torpedo Mines

Port Phillip Heads

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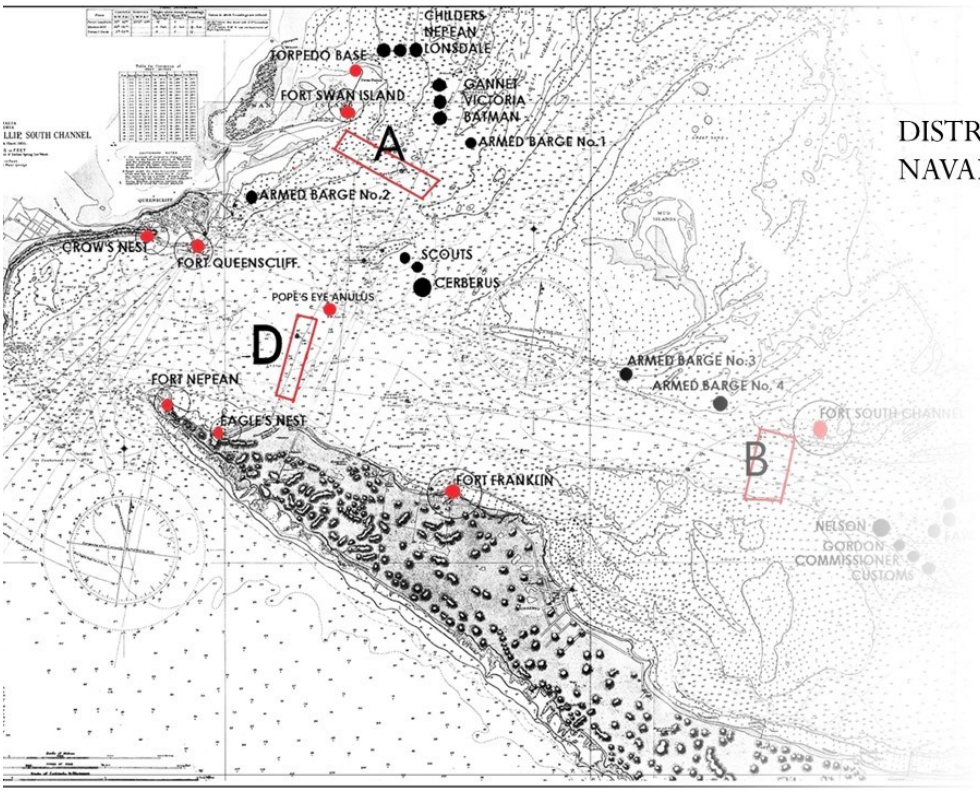
As regards the plans of the minefield, only two persons in the colony had ever seen them.

This was highly necessary, as the whole use of mine defences would be lost were an enemy to obtain an accurate knowledge of where the mines were to be laid."

Major Parnell to Major General Downes

Queenscliff Inspection by the Commandant

Age (Melbourne) 16 February 1900



DISTRIBUTION OF VICTORIAN NAVAL SQUADRON

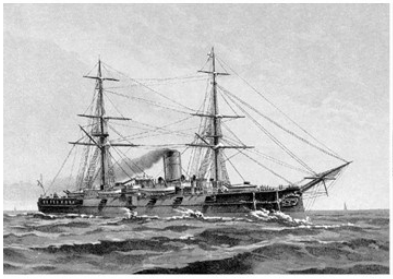
- *Planning for an integrated Port Phillip Heads and 'Great Sands' defence included the Victorian Naval Squadron -*
- *Three Torpedo boats armed with Whitehead torpedoes*
- *The monitor HMVS Cerberus and two Rendel gunboats – (Victoria & Albert)*
- *A cluster of armed Harbour Trust vessels mounting spar torpedoes*
- *4 armed barges fitted with (temporary) 6-inch BL guns*

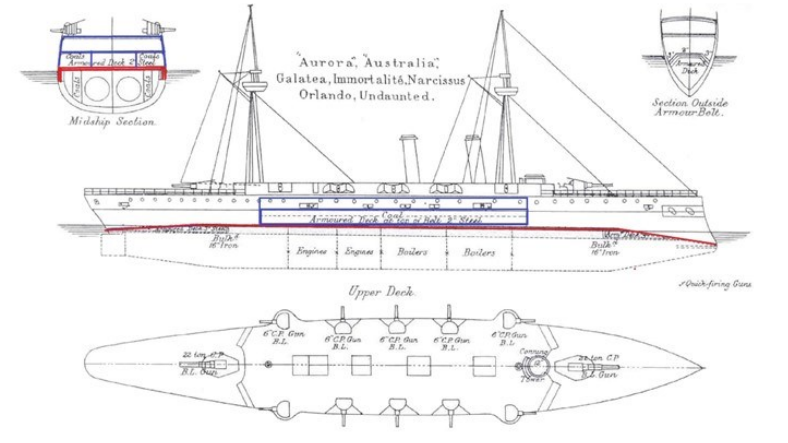
Russian Corvettes, Frigates, & Protected Cruisers

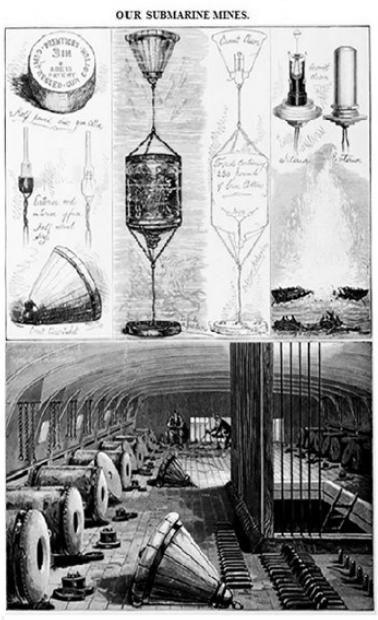
Top:
IRS Admiral Nakhimov c.1888
7781 tons
254 mm (10-inch) Armoured belt
8 - 203 mm (8 inch) BL guns

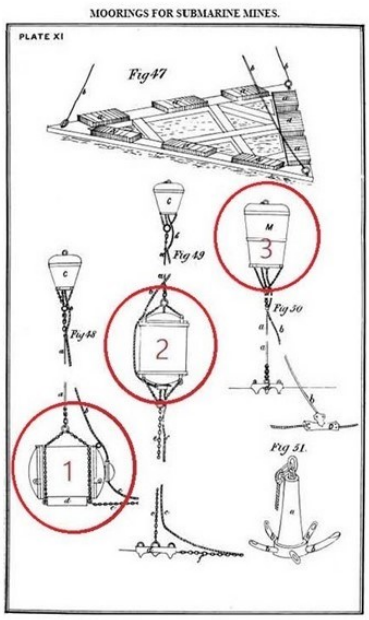
IRS Admiral Kornilov c.1888
5861 tons
50 mm (2-inch) Deck armour
14 -152 mm (6-inch) BL guns

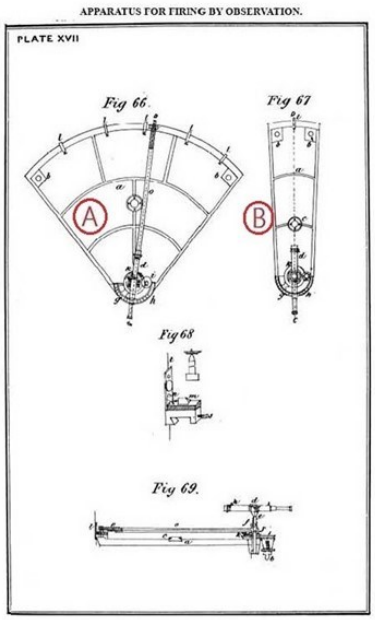
Opposite:
Orlando class RN Cruisers c.1886
5600 tons
10-inch Armoured belt
2 - 9.2-inch BL guns
12 - 6-inch BL guns

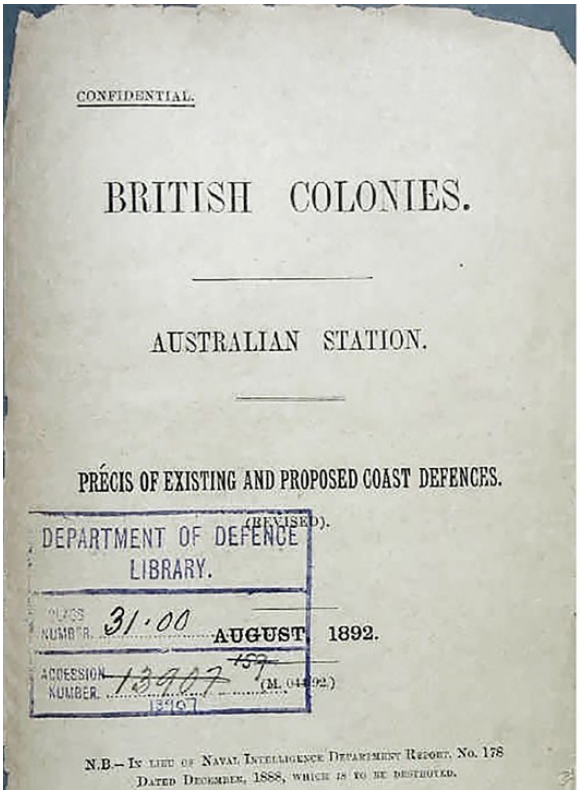












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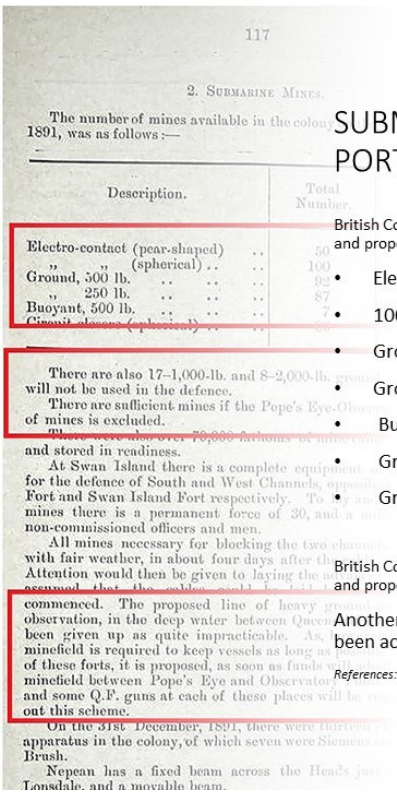

117

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SUBMARINE MINES PORT PHILLIP - 1892

British Colonies, Australian Station - Precis of existing and proposed Coast Defences, August 1892

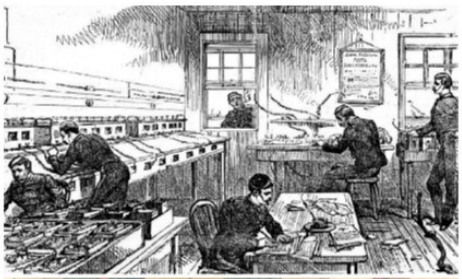
- Electro-contact (pear shaped) 50
- 100 Electro-contact (spherical) 100
- Ground 500-lb 92
- Ground 250-lb 87
- Buoyant 500-lb 7
- Ground 1,000-lb 17
- Ground 2,000-lb 8

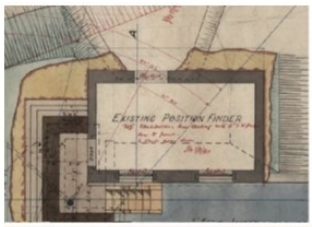
British Colonies, Australian Station - Precis of existing and proposed Coast Defences, August 1896

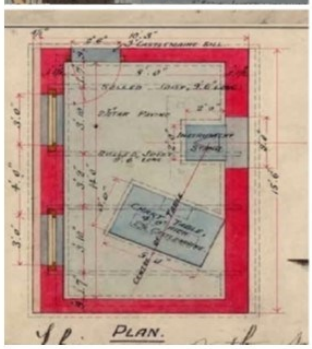
Another 86 of the 500-lb ground mines had been acquired by 1896

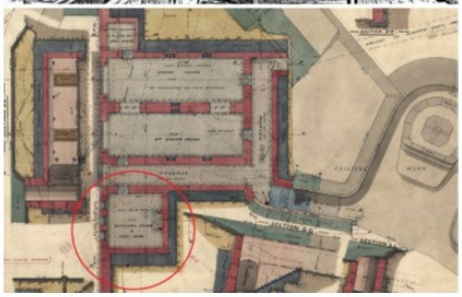
References: *NAA: A1194, 31.00/13907 Item ID 4007930*

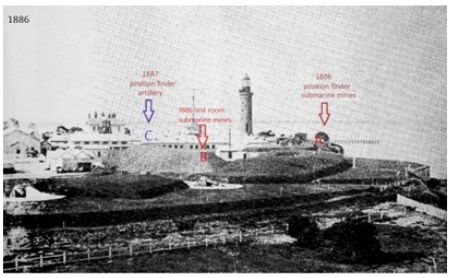
NAA: A1194, 31.00/13908 Item ID 4007931

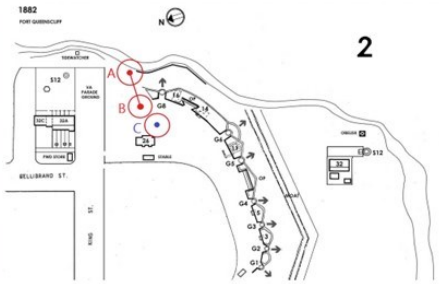








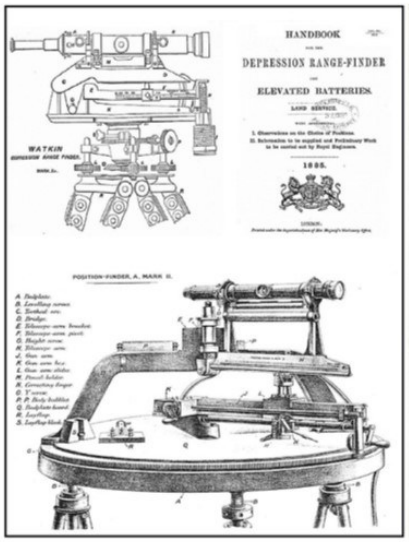




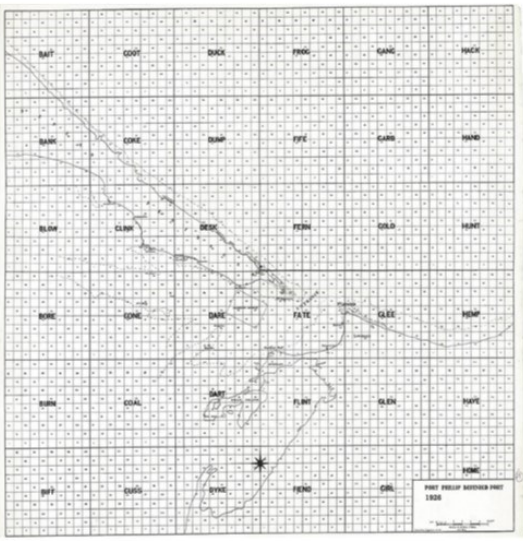
Fort Queenscliff 1886 – 1887 (Asset 34) Submarine Mine Position Finder & Test Room

item 1845474 1/2/1886 item 30477375 12/11/1885

Telescopic Sights c.1887



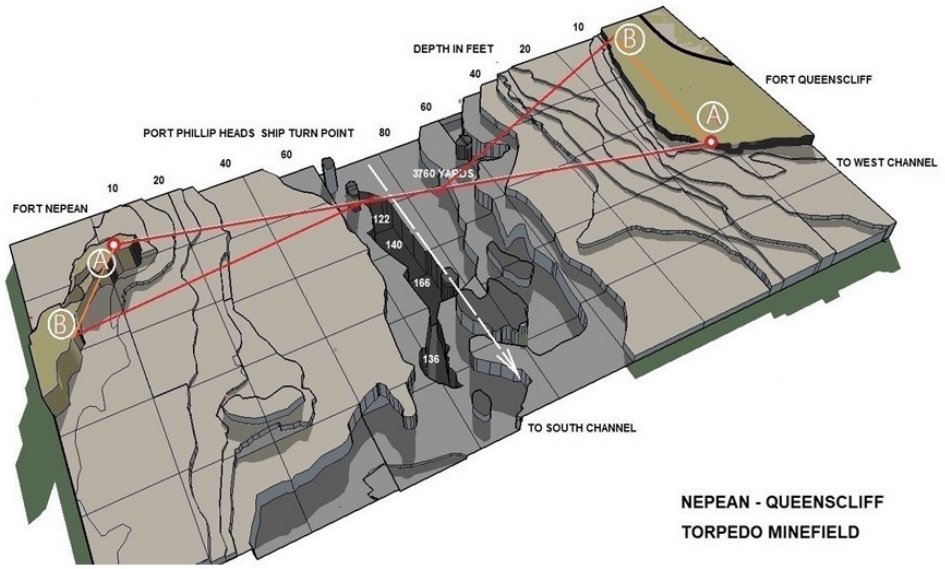
Watkin Position Finder



Port Phillip Heads Grid Plot Chart

Scott's Gunnery Sight

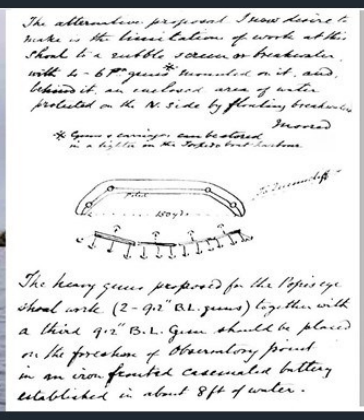
Point Nepean - Queenscliff Torpedo Minefield

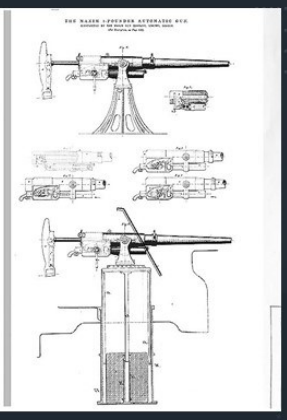


POPE'S EYE MINEFIELD

- *'……The proposed line of heavy ground mines, fired by observation, in the deep water between Queenscliff and Nepean, has been given up as quite impracticable. As, however, an advanced minefield is required to keep vessels as long as possible under the fire of these forts, it is proposed, as soon as funds will admit, to arrange a minefield between Pope's Eye and Observatory Point. A test-room and some Q.F. guns at each of these places will be required to carry out this scheme.…..'*

- *1892 British Colonies. 'Australia Station' – Victoria 'Precis of existing and proposed coast defence.'*





POPE'S EYE FORT

Above: (L to R)

Portland Breakwater Sea Fort

Harding Steward's 1889 note on Pope's Eye alterations

6-pr Q.F. gun - C.P. and hydraulic mountings

- Jervois and Scratchley initially proposed mounting multiple M.L. guns in a sea fort of the type built to defend the Solent and Britain's South Coast naval ports.
- The introduction of BL ordnance saw a proposal in 1885 to modify the ordnance - two 9.2-inch BL guns & two 6-inch B.L. guns, with a third 9.2 B.L. to be placed at Observatory Point in an iron fronted casemate battery. (Rhodes)
- Harding Steward suggests Pope's Eye should be reduced to four 6-pdr Q.F. guns, supported by four 'ammunition' barges in the rear torpedo boat harbour.
- Inclusion of a Brennan torpedo station and Zalinski dynamite gun were also considered.

Port Phillip
1884 - 1892
Armstrong B.L. Guns & H.P. Carriages

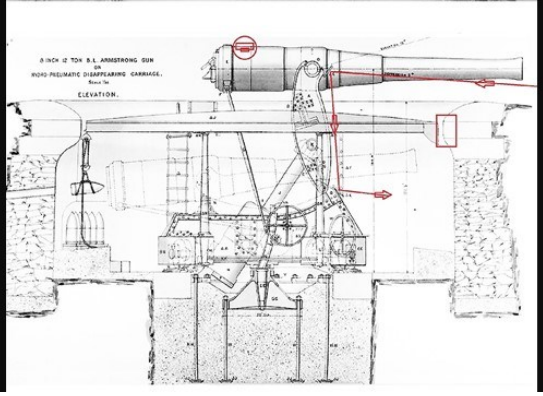
Top:

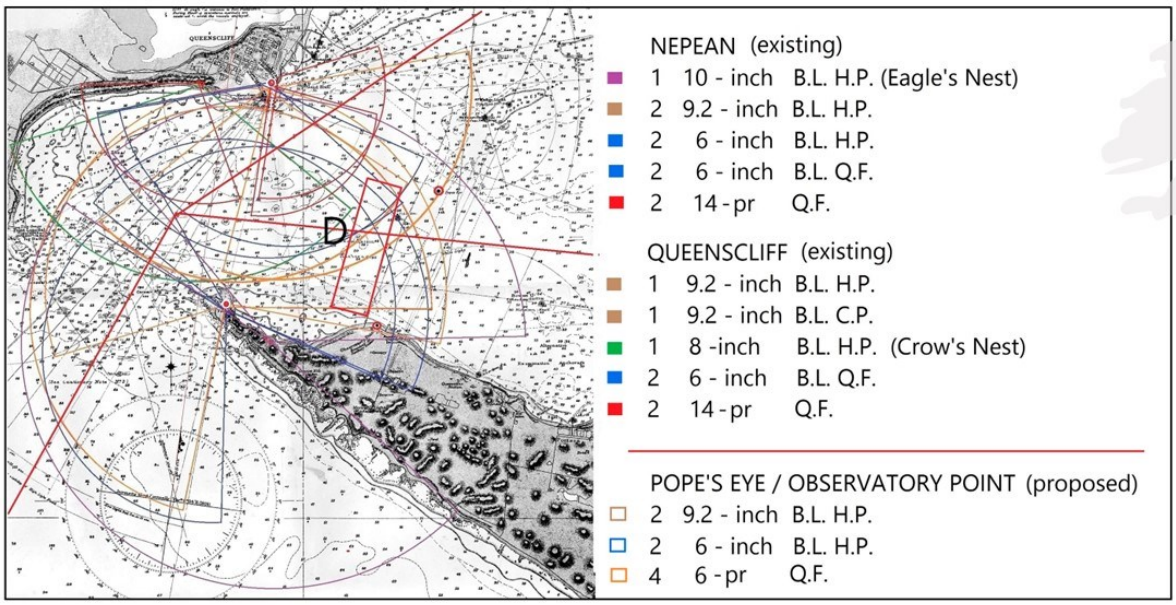
9-inch 300-pr RML - Tangent sights

Lower:

8-inch Armstrong BL on HP Carriage

- Mirror Sight
- Scott's Telescopic Sight
- Depression range finder
- Range clock
- Compass bearing indicator ring

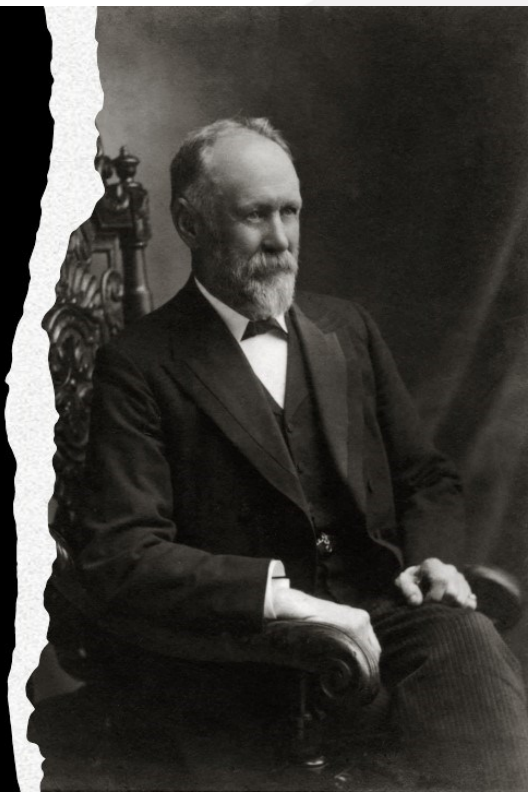




ORDNANCE - PORT PHILLIP HEADS FORWARD DEFENCE ZONE 1894

John Blackbourn C.E. 1842 - 1911

1859 - 1864	Apprentice Engineer	W.M. Ordish & Le Feuvre - London
1865 - 1866	Assistant site Engineer	Millwall Docks - London
1866 - 1869	Resident Engineer	Limehouse Dock Extension - London
1869 - 1870		Visited Melbourne - Australia
1871 - 1872	Resident Engineer	Cairo – St, Louis Railway - Illinois, U.S.A.
1872 - 1873	Resident Engineer	Fort Point, San Francisco - California, U.S.A.
1874 - 1875	PWD Engineer (Roads)	Melbourne - Victoria
1875 - 1878	Resident Engineer	Port Wakefield - Wallaroo Railway S.A.
1879	Roads Engineer	Waipawa - New Zealand
1880 - 1881	Private practice	St. Kilda - Victoria
1882 - 1884	Defence Surveyor	Assistant To Col. Scratchley - Melbourne
1885 - 1889	Defence Engineer	P.W.D. Assistant Engineer – Victoria
1890 - 1901	Defence Engineer	P.W.D. Victorian Defence Engineer
1901 - 1905	Federal Works Inspector	Commonwealth of Australia (Victoria)



SNARGATE STREET - DOVER

The Pent

Admiralty Pier

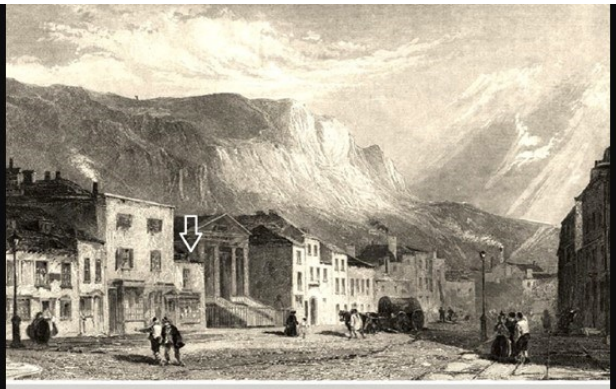
Dover Castle

Western Heights Barracks

Dover Railway Terminal

Royal Mail Steamers

John Blackbourn – Chemist & Druggist



MILLWALL DOCK & LIMEHOUSE DOCK EXTENSION

Top left:

Armstrong Hydraulic Dock Gates, Millwall
('The Engineer' 1867)

Top right:

Limehouse Dock Extension

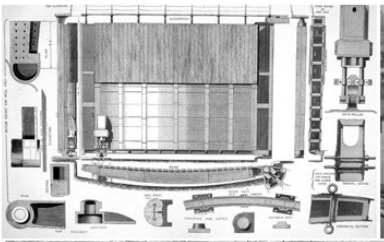
Centre:

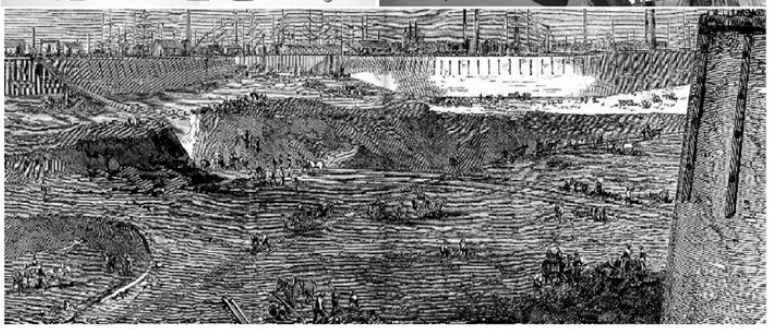
Millwall dock excavation

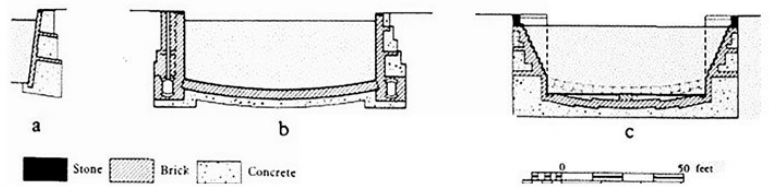
Lower:

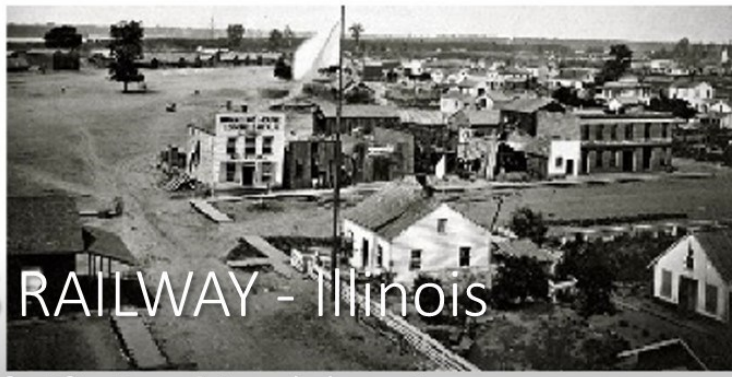
Sections: Millwall Dock dry docks

Stone, brick, mass concrete









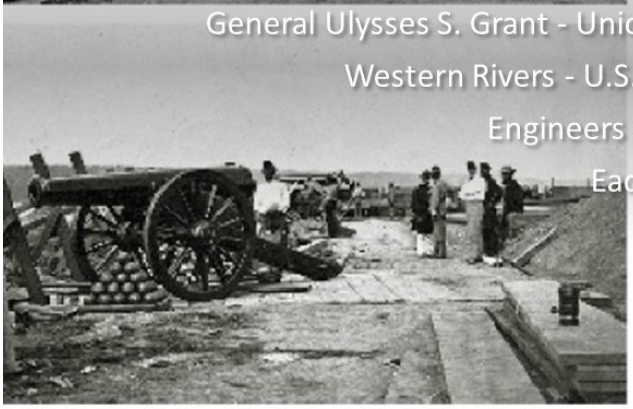
CAIRO - ST. LOUIS RAILWAY - Illinois

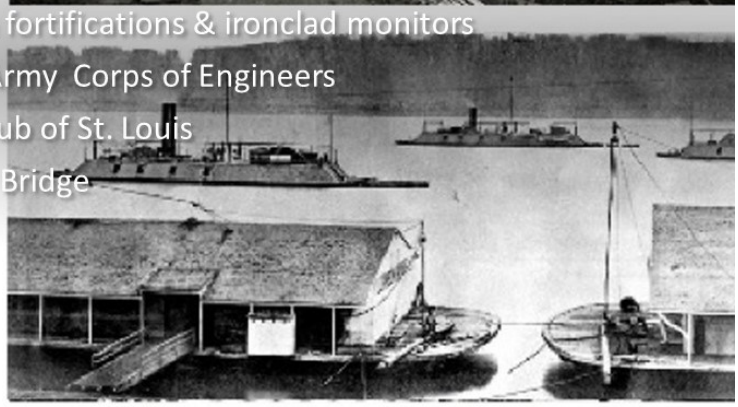
General Ulysses S. Grant - Union fortifications & ironclad monitors

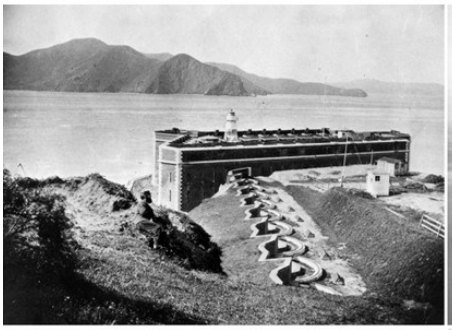
Western Rivers - U.S. Army Corps of Engineers

Engineers Club of St. Louis

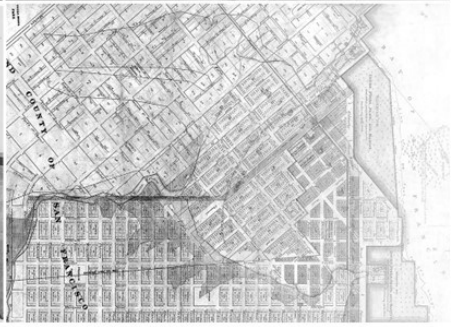
Eads Bridge







MISSION BAY CANAL & FORT POINT BATTERY - SAN FRANCISCO



Top left:

Battery West - Fort Point, Golden Gate

Top right:

Engineer's Workshop & Torpedo Pier

Lower right:

Battery East - Fort Point

Lower left:

Plan for the development of a ship canal and land reclamation at Mission Bay, San Francisco c.1868

Third System Forts - Alcatraz Island & Fort Point c.1853

Colonel Charles Seaforth Stewart

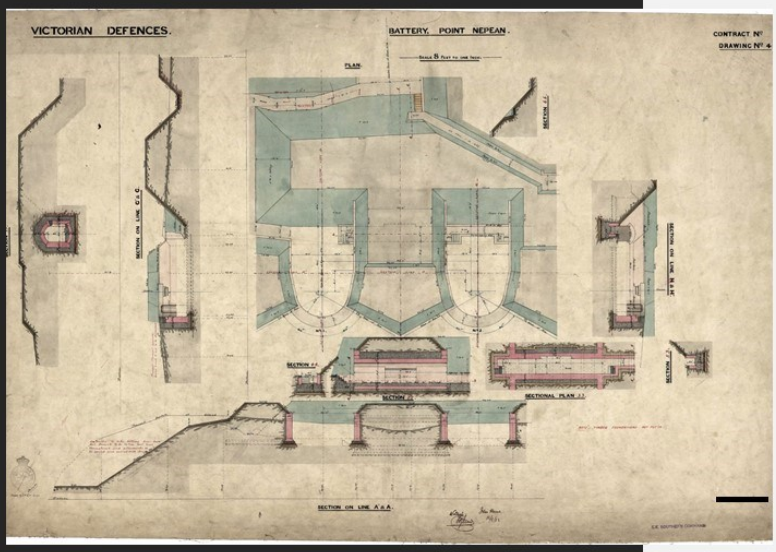
Civil Engineering 1874 -1882

Johnston Street Bridge, Victoria

PWD Victoria - Roads & Bridges Department (1874 - 1875)

Port Wakefield - Wallaroo, South Australia

South Australia Commission for Railways (1875 - 1878)



VICTORIAN DEFENCES
BATTERY – POINT NEPEAN
1882

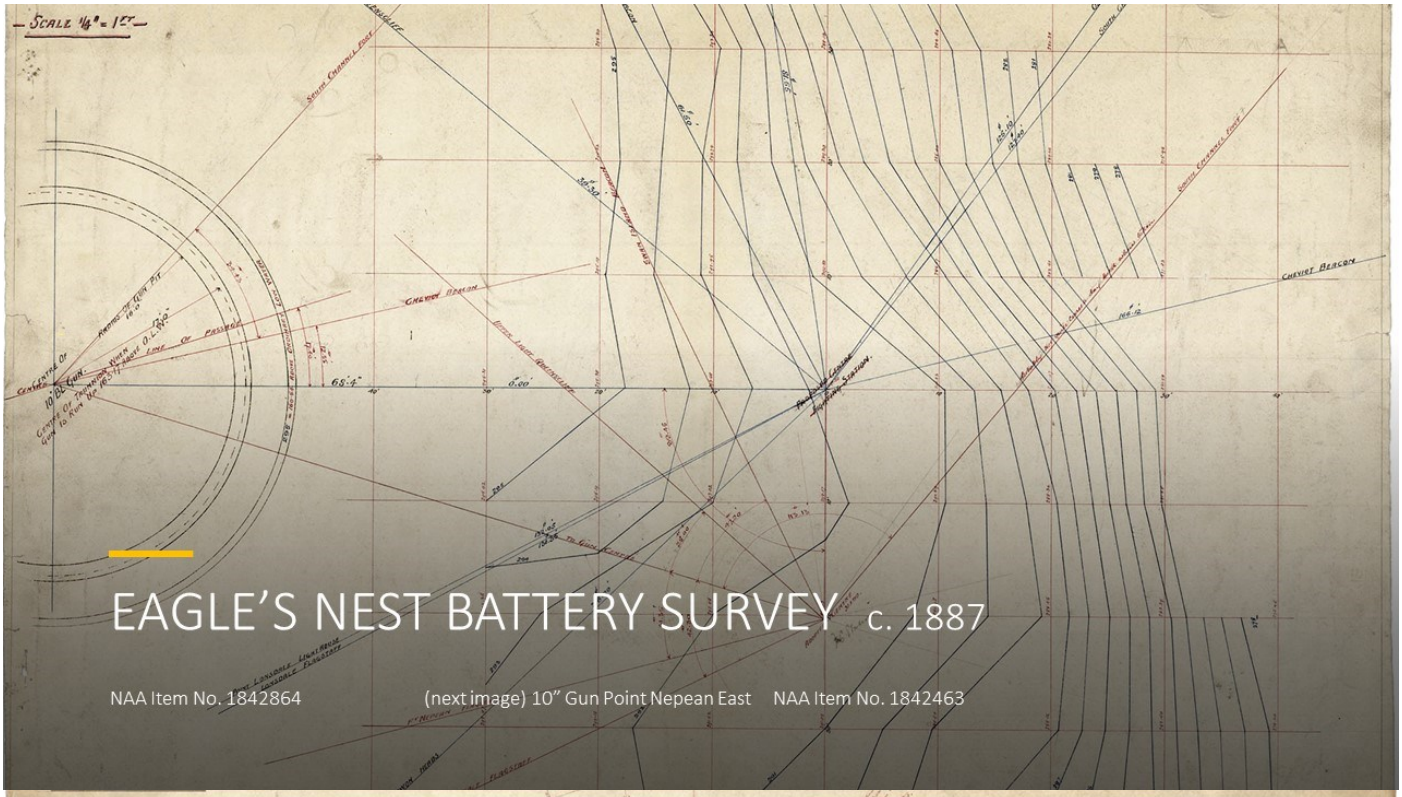
Drawing No.4

NAA Item 1843182

Below:

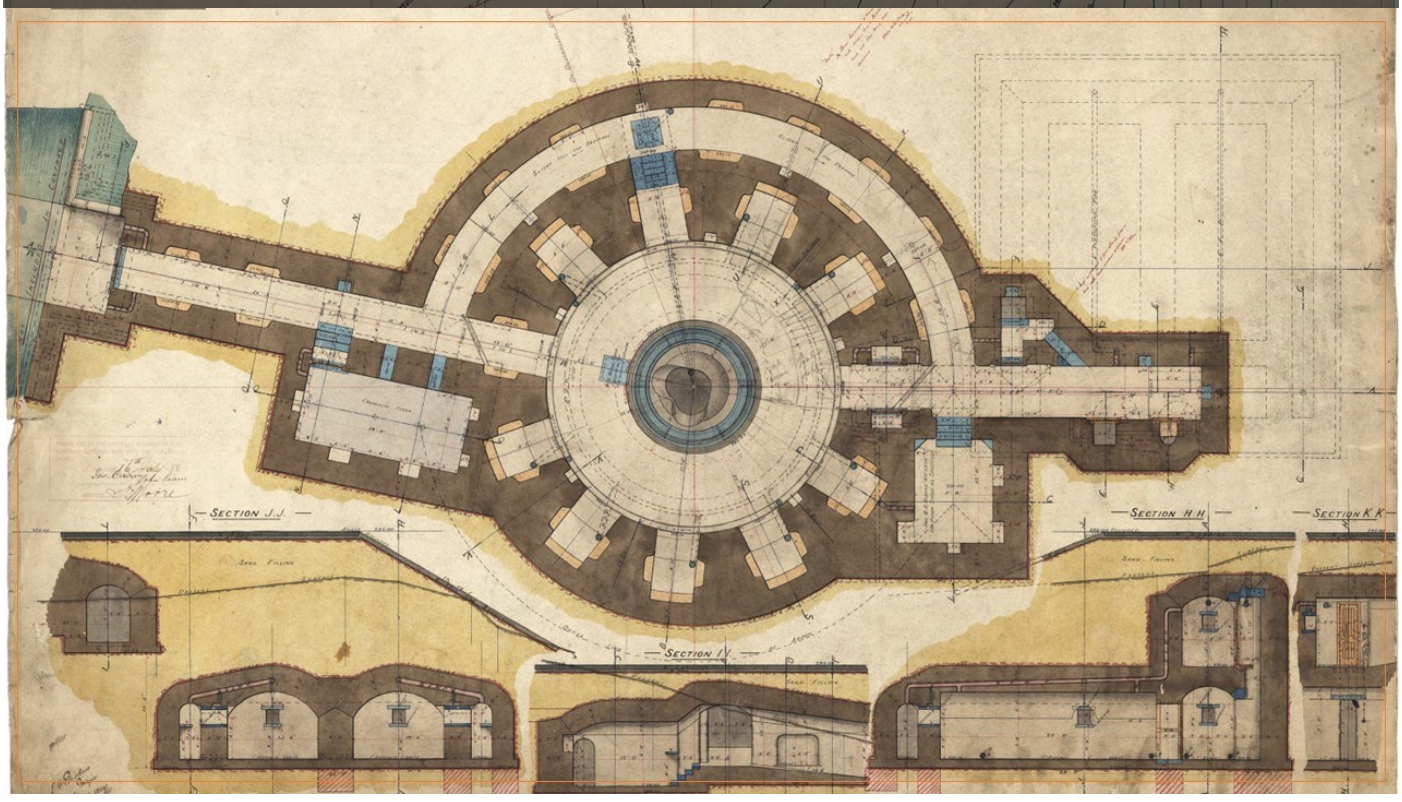
Contract Drawing Signature

Blackbourn 'JB' - initialed 1882 drawing



EAGLE'S NEST BATTERY SURVEY c. 1887

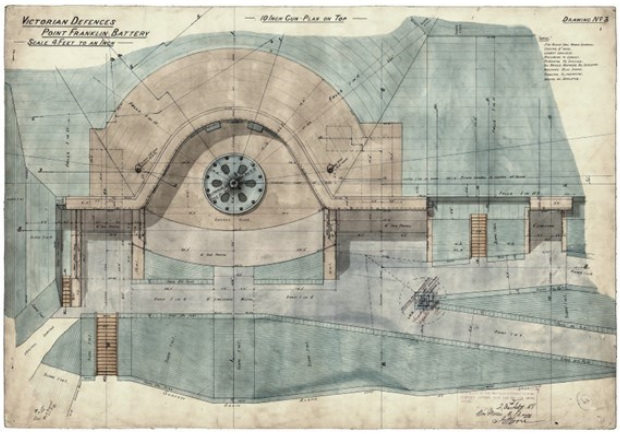
NAA Item No. 1842864 (next image) 10" Gun Point Nepean East NAA Item No. 1842463



Point Franklin Battery

10" gun plan Drawing No.3 c.1888

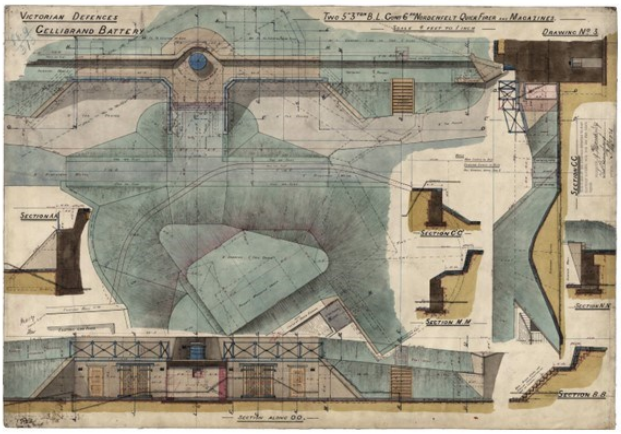
NAA Item No. 468871

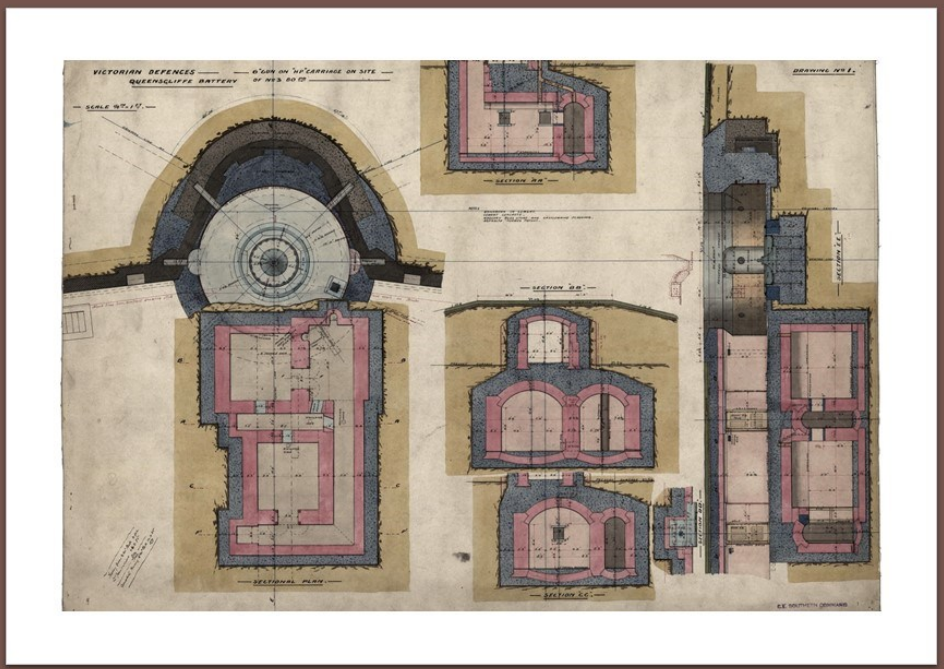


Gellibrand Battery

Two 5" BL guns – 6-pr Nordenfelt Q.F. & Magazine Drawing No.3 c.1889

NAA Item No. 3346219





Queenscliffe Battery

6" Gun on site of No.3
80-pr Drawing No.1

c. 1885

NAA Item No. 1842463

*Point Nepean is the only fortification at Port Phillip that fully utilized the dispersal of 6-inch and 9.2-inch B.L. ordnance into separate emplacements **

(Envisaged by the War Office Fortifications Branch under Major General Lothian Nicholson's command. 1886-1891)*

NAA Item No. 1842862

FORT NEPEAN - 1893

Staff Victorian PWD *C. 1896* *John Blackbourn (circle)*

State Library of Victoria Photo Collection