

1875.

LEGISLATIVE ASSEMBLY,
NEW SOUTH WALES.

REPORT

OF THE

STORAGE OF GUNPOWDER BOARD,

APPOINTED 11TH MARCH, 1875,

TO ASCERTAIN AND REPORT AS TO THE BEST PLACE AND AS TO THE PROPER
MODE OF STORING GUNPOWDER, &c., &c.;
AND TO CONSIDER THE DESIRABILITY OF THE REMOVAL OF THE
GOAT ISLAND MAGAZINE;

TOGETHER WITH

RECOMMENDATIONS, MINUTES OF EVIDENCE,

AND

APPENDIX.

ORDERED BY THE LEGISLATIVE ASSEMBLY TO BE PRINTED,
16 *November*, 1875.

SYDNEY: THOMAS RICHARDS, GOVERNMENT PRINTER.

1875.

CHAIRMAN.
CAPTAIN G. K. MANN.

MEMBERS.

LIEUTENANT-COLONEL RICHARDSON.

E. O. MORIARTY, ESQUIRE.

CAPTAIN HIXSON.

JAMES BARNET, ESQUIRE.

1875.

LEGISLATIVE ASSEMBLY.
NEW SOUTH WALES.

STORAGE OF GUNPOWDER.
(CORRESPONDENCE.)

THE UNDER SECRETARY FOR FINANCE AND TRADE TO THE CHAIRMAN, STORAGE OF GUNPOWDER BOARD.

The Treasury, New South Wales,
Sydney, 5 May, 1875.

SIR,

With reference to the appointment by the Government of a Board to consider the desirability of the removal of the Goat Island Magazine, I am directed by the Colonial Treasurer to acquaint you, as Chairman, that the following gentlemen have been appointed to the Board, viz. :—

Lieutenant-Colonel Richardson,
Captain Hixson,
and
James Barnet, Esquire.

With E. O. Moriarty,
Esq.

I am directed at the same time to state that the Colonial Treasurer confirms the instructions addressed to you from the Department of the Colonial Secretary, and contained in Mr. Halloran's letter of 11th March last.

I am to add, that it is very desirable the inquiry should be entered upon at once, and prosecuted with the greatest dispatch consistent with the important nature of the investigation.

Copy herewith.

I have, &c.,
G. EAGAR.

[Enclosure.]

The Principal Under Secretary to The Chairman of the Board to report respecting the Gunpowder Magazine and Storing of Gunpowder.

Colonial Secretary's Office,
Sydney, 11 March, 1875.

SIR,

Referring to the enclosed account given in the *Herald* of the 5th instant of an interview which took place on the previous day between the Colonial Secretary and a Deputation appointed to wait upon him from the Sydney and certain of the Suburban Corporations and the Chamber of Commerce, to urge the removal of the Gunpowder Magazine to some safer place than Goat Island, I am directed by Mr. Robertson to request that you will have the goodness, in conjunction with the officers mentioned in the margin, who have been instructed to meet you at their earliest convenience, to ascertain and report as speedily as possible, as to the best place and as to the proper mode of storing Gunpowder.

A correspondence that has recently occurred, relative to Gunpowder being landed and left in an exposed situation at the Circular Quay without proper supervision, is enclosed for the information of yourself and the other members of the Board.

President of Marine
Board.
Engineer-in-Chief for
Harbours and River
Navigation.
To be returned.

Captain Mann,
&c., &c., &c.

I have, &c.,
HENRY HALLORAN.

THE PRINCIPAL UNDER SECRETARY TO THE UNDER SECRETARY FOR FINANCE AND TRADE.

Colonial Secretary's Office,
Sydney, 7 July, 1875.

SIR,

With reference to my letter of the 11th of March, respecting the appointment of the Gunpowder Storage Board, I am directed to request that the present state of the matter with which the Board was appointed to deal may be made known to me, for the information of the Colonial Secretary.

I have, &c.,
HENRY HALLORAN.

The Chairman of the Board, for the desired information.—G.E., B.C. 9/7/75.

THE

THE CHAIRMAN, STORAGE OF GUNPOWDER BOARD, to THE UNDER SECRETARY FOR FINANCE AND TRADE.

The Gunpowder Storage Board, &c.,
Office—Harbours and Rivers,
13 July, 1875.

SIR,

In reply to your B.C. communication of the 9th, forwarding the Honorable the Colonial Secretary's letter of the 7th instant, I do myself the honor to inform you that, on receipt of your instructions of the 5th May last, completing the nomination of the Members, the Board appointed to inquire and report relative to the storage of Gunpowder, &c., were thereupon enabled to proceed with the important duties entrusted to them.

As a preliminary step a careful and minute inspection was at once made of the Gunpowder Magazines.

These were found to be in good order and apparently carefully supervised; but further information will probably induce the Board to recommend some radical changes in their general arrangements.

The Board since their final organization in May have met twelve times, and have examined the witnesses enumerated in the margin. The evidence thus obtained, which is now in the hands of the printer, comprises much information, but additional evidence is necessary, particularly relative to the storage and transit of other explosives, such for instance as dynamite, gun-cotton, and the like.

The Board has also been engaged in the examination of various sites for Gunpowder Magazines.

No definite decision has yet been arrived at, but the information already obtained would seem to point to the advisability of discontinuing the Magazine at Goat Island.

We find also that a prominent element of danger to the community generally, exists in the removal and transit of powder about the harbour, from the practice being on these occasions to entrust it to inexperienced hands, and moreover to convey it in ordinary boats with inadequate precautions, and without any indication of the dangerous nature of the freight; also in a marked degree from the occasional inefficiency of the packages of merchants' powder.

A question is here involved which probably may be considered by the Government of sufficient importance to call for some special legislation, and for regulations placing explosives during transit under the supervision of the Magazine Department.

In view of the foregoing, a telegram has been sent to England, at the instance of the Board, for the transmission to the Government, by the earliest opportunity, of the Evidence and Report of an analogous Committee that was sitting in January last, on the Transit and Storage of Gunpowder, and for other official documentary information bearing upon the subject.

That Committee may not yet have completed its labours, as it is stated that "every day fresh questions crop up"—each difficulty demanding further efforts to meet its peculiarities; but doubtless the information that has been collected by the action of the Imperial Government up to this time, following as it does on the Report and Evidence of the Select Committee of the House of Commons, in June, 1874, will be found to be of great value.

The Board is still engaged taking evidence necessary to make the inquiry both as searching and complete as possible.

I have, &c.,
GOTHER K. MANN,
Chairman.

THE CHAIRMAN, STORAGE OF GUNPOWDER BOARD, to THE UNDER SECRETARY FOR FINANCE AND TRADE.

The Storage of Gunpowder Board,
Office—Harbours and Rivers,
30 August, 1875.

SIR,

I do myself the honor to state that the Board is desirous of obtaining information relative to a portion of land situated between the Parramatta River and Hacking's Creek, being a portion of Blaxland's grant, or of land situated and bounding it on the east and south-east, and I have to request that the Surveyor General may be instructed to cause a survey to be made of the land in question showing the following particulars, viz. :—

Section showing the relative heights of the ground above high-water tides ;
Do. do. of do. low do. do.
and of the extreme flood levels.

I have, &c.,
GOTHER K. MANN,
Chairman.

The Under Secretary for Lands.—G.E., B.C., 2/9/75.

THE UNDER SECRETARY FOR FINANCE AND TRADE to THE CHAIRMAN, STORAGE OF GUNPOWDER BOARD.

The Treasury, New South Wales,
Sydney, 5 October, 1875.

SIR,

I have the honor to hand you herewith two packets containing papers respecting the storage and carriage of explosives, which have just been received from London from the Agent General, and I am to request you will be good enough to lay the same before the Board appointed to report upon the subject.

I have, &c.,
G. EAGAR.

THE

THE CHAIRMAN, STORAGE OF GUNPOWDER BOARD, to THE UNDER SECRETARY FOR FINANCE AND TRADE.

The Storage of Gunpowder Board,
Office—Harbours and Rivers,
5 October, 1875.

SIR,

I do myself the honor to forward herewith a Report of the Board appointed under the instructions of your letter, dated 5th May, 1875, relative to the removal of the Goat Island Magazine and storage of gunpowder, &c.

I have, &c.,
GOTHER K. MANN,
Chairman.

[For Report, see Appendix A.]

MINUTE OF THE COLONIAL SECRETARY.

Inform the Board that I have already given instructions for the immediate carrying out of their 13th recommendation. Call their attention to my fear of injury arising during the great delay that must occur should the powder remain where it is until the buildings they recommend to be constructed are completed; and ask them if they can suggest a temporary means of providing for the removal (immediate) of the powder, say by placing it in hulks or otherwise—JOHN R.

THE CHAIRMAN, STORAGE OF GUNPOWDER BOARD, to THE UNDER SECRETARY FOR FINANCE AND TRADE.

The Storage of Gunpowder Board,
Office—Harbours and Rivers,
Sydney, 7 October, 1875.

SIR,

I do myself the honor to forward a plan of the Parramatta River, showing the position of the site proposed by letter of the 30th August last, and more particularly referred to at clause 2 of the recommendations accompanying the Board's Report of the 5th instant for a Gunpowder Magazine.

I have, &c.,
GOTHER K. MANN,
Chairman.

[For Plan, see Appendix.]

TREASURY MINUTE.

The Treasury, New South Wales,
Sydney, 8 October, 1875.

Subject—Gunpowder storage.

THE Gunpowder Storage Board make in their report, dated the 5th October instant, a number of recommendations many of which can I fear only be carried out after legislation, and some of which ought not to be dealt with without consultation with my colleagues. The 13th recommendation seems to require such prompt action that it is in this minute authorized. The Ordnance Storekeeper to be instructed to carry out the work without delay.

JOHN ROBERTSON.

With reference to the above, I should like to have it ascertained whether the Government have power to remove the gunpowder forthwith without legislation, as, in that case, the Cabinet may think it desirable to procure hulks for the purpose.

JOHN ROBERTSON.

THE UNDER SECRETARY FOR FINANCE AND TRADE to THE CHAIRMAN, STORAGE OF GUNPOWDER BOARD.

The Treasury, New South Wales,
Sydney, 8 October, 1875.

SIR,

I do myself the honor to acknowledge the receipt of your letter of the 5th instant, covering the Report of the "Storage of Gunpowder Board."

I have submitted this document to the Minister acting for the Colonial Treasurer, and I am directed to inform you that Mr. Robertson has already given instructions for the immediate carrying into effect of your 13th recommendation.

I am further to call your attention to the possible injury that may arise from the retention of the gunpowder at Goat Island during the time necessary to admit of the construction of the proposed new Magazine; and I am to ask if the Board can suggest any immediate temporary means for providing for removal and storage of the gunpowder—say by placing it in hulks or otherwise.

I have, &c.,
G. BAGAR.

THE UNDER SECRETARY FOR FINANCE AND TRADE, to THE ORDNANCE STOREKEEPER.

The Treasury, New South Wales,
Sydney, 8 October, 1875.

SIR,

I have the honor, by direction of the Minister acting for the Colonial Treasurer, to call your attention to the recommendation of the Board as to the storage of gunpowder, of which a copy is given on the other side; and I am desired by Mr. Robertson to request that the action necessary to the carrying of the Board's suggestions contained therein into effect may be taken at once.

I have, &c.,
G. EAGAR.

Recommendation referred to.

"13. That the whole of the underwood at Goat Island be cleared away, and that the general surface of the island be kept clear from undergrowth. That no buildings be erected in the vicinity of the Magazine, and that the small building *in particular* to the eastward of it be at once removed."

THE ORDNANCE STOREKEEPER AND BARRACK MASTER to THE UNDER SECRETARY FOR FINANCE AND TRADE.

Ordnance Office,
Sydney, 11 October, 1875.

SIR,

I have the honor to acknowledge Treasury letter, No. P6, 2,074, conveying certain recommendations of the Board as to the storage of gunpowder to be carried out on Goat Island.

I beg to inform you that I have invited the Colonial Architect to proceed with the immediate removal of the building (at some inconvenience) to eastward of the Magazine, and have requested that no buildings be erected on Goat Island in the vicinity of the Magazine.

I have found it necessary in executing the clearance of the underwood, which is extensive at Goat Island, to employ three additional men at 6s. per day, which, with an extra allowance to departmental labourers, will occasion an outlay of about £50.

Instructions have been issued that the general surface at both the islands must be kept clear of all undergrowth at all times.

Trusting the action taken in this matter will meet with approval,—

I have, &c.,
J. THOS. BLANCHARD,
Ordnance Storekeeper and Barrack Master.

P.S.—The whole of this work will occupy at the least a fortnight to complete.

THE CHAIRMAN, STORAGE OF GUNPOWDER BOARD, to THE UNDER SECRETARY FOR FINANCE AND TRADE.

The Storage of Gunpowder Board,
Office—Harbours and Rivers,
Sydney, 13 October, 1875.

SIR,

I do myself the honor to inform you that the Board having had under their consideration your letter of the 8th instant, suggesting an "immediate temporary means for providing for removal and storage of the gunpowder, say by placing it in hulks or otherwise," until the proposed new Magazine is completed, are of opinion that their Report of the 5th instant offers the most certain and readiest means of removing, as far as practicable, any cause of danger that may exist at the Goat Island Magazine. They therefore recommend its immediate adoption, as far as at present practicable, in preference to the transfer of the powder on board a hulk,—a step that would necessarily be attended with some delay, considerable inconvenience to the trade, and much danger.

Should the Government however be desirous of placing the merchants' powder now stored at Goat Island in a hulk at a distance from the city, the Board consider that a properly fitted-up vessel might probably be procured and moored at a site in the vicinity of the locality recommended for the new Magazine, at a cost of from £2,000 to £3,000.

This arrangement would necessitate some special provision for transit and the erection of temporary buildings for quarters for the men in charge, as no fires or cooking could be permitted on board.

With a view of removing the additional impediment to trade, it was suggested at the Board that a quantity of merchants' gunpowder might still be retained at Goat Island, sufficient to meet the current demand. Had this powder been the property of one individual or firm, and also of one description, this suggestion would possibly have been feasible as a temporary measure, but the Board are of opinion that the danger from the frequent removal of small packages of gunpowder to and from the Magazine, for the supply of the trade and replenishing the stock at the Goat Island Magazine, would more than counterbalance any advantage arising out of this latter proposal.

The statement set forth in the 12th paragraph of the Report is fully borne out by all the documentary evidence in the possession of the Board.

I have, &c.,
GOTHER K. MANN,
Chairman.

THE CHAIRMAN, STORAGE OF GUNPOWDER BOARD, to THE UNDER SECRETARY, FOR FINANCE AND TRADE.
 The Storage of Gunpowder Board,
 Office—Harbours and Rivers,
 Sydney, 28 October, 1875.

SIR,

In returning herewith enclosures, as per schedule, forwarded with your letter of the 5th instant, I have the honor to inform you that the Board find that the evidence and recommendations therein set forth are, as far as applicable, confirmatory of the correctness of their Report of the 5th instant.

2. These Reports, commencing with Colonel Boxer's inquiry relative to the explosion at Erith, in May, 1865, and terminating with the "First Report of the Committee on the Storage and Transit of Gunpowder and Guncotton," dated 20th March, 1875, embracing a period of about ten years, are for the most part a review of the imperfections of the Imperial Law relating to gunpowder and other explosives, which law however does not appear to have been as yet revised by recent enactment.

3. As a matter of further detail, the Board would supplement their Report of the 5th instant, by drawing attention to such paragraphs in the information now received as appear applicable to this Colony.

4. "22. The general regulations agreed to by the Clearing-house, in which all the Railways of England and Scotland join, are as follows:—

Storage and Transit of Gunpowder and Guncotton, Committee's Report, 2nd March, 1875, p. VI.

"1. Gunpowder may only be packed for transmission by railway in one of the undermentioned modes:—

"1st. Kegs or barrels, in quarter, half, or whole barrel sizes, thickness according to size of barrel and quality of wood used; minimum, half an inch.

"2nd. Canisters made of tin, copper, zinc, or other approved metal; and cardboard boxes, sufficiently strong and well made to prevent leakage, enclosed in wooden cases. Thickness of cases half an inch, ends one inch.

"3rd. Metallic cylinders of an approved pattern, similar in construction to, and equally secure as those used by Government for the conveyance of small quantities of powder by rail.

"2. Gunpowder in kegs, barrels, wooden cases, or canisters, must not be loaded with other explosives or goods, and must only be carried in gunpowder vans, and except by special arrangement, in the same van throughout, and on certain fixed days to be named as described by the respective Companies.

"3. Gunpowder, in metallic cylinders, as described above, may be conveyed either in gunpowder vans or in ordinary goods vans, but must not be loaded with other dangerous articles such as acids, lucifer matches, fuses, petroleum, or cartridges.

"4. Each package must be labelled 'gunpowder,' with letters of not less than 1 inch in depth, and no package must contain more than 100 lbs.

"23. Each Railway Company has special rules in addition to the above, which enter more or less into detail. Those of the Great Eastern Railway are more strict and comprehensive than any others within the knowledge of the Committee. The following deserve particular notice:—

"Two inspectors are appointed whose duty it is to receive all powder delivered for transmission. They are supplied with a special suit of clothing, consisting of canvas trowsers, smock-frock, cap, and leather slippers. Before entering a van they are required to divest themselves of their ordinary jacket, waistcoat and cap, and put on the canvas dress. They are also strictly enjoined never to stand or walk inside the van without the slippers, and never to allow the sole of the slipper to come in contact with anything but the floor of the van. They are also strictly charged never, when with the gunpowder vans, to carry lucifer matches or steel articles of any kind in their pockets.

"The vans are always to be kept locked, waggons containing oil or other goods of an inflammable nature must not be put on the train near vans containing powder.

"In loading or unloading a powder van, when not done direct between the van and the road vehicle, sheets must, as far as practicable, be placed on the platform or ground over which the packages are carried. Not more than three vans containing powder must form a part of any one train, and when more than one van is forwarded, the vans are to be separated from each other and from the engine by as great a length as practicable. Nothing whatever is to be put in the gunpowder van with gunpowder.

"Special circumstances are provided for by more detailed instructions.

"24. The 'safety cylinder,' referred to as 'used by the Government for the conveyance of small quantities of powder' is known as 'case iron for conveyance of ammunition by rail.' It is made in two sizes, to hold respectively half and quarter powder or ammunition barrels. It is constructed of iron, one end is permanently closed, the other has a removable iron lid secured by four iron screw bolts; a spanner accompanies the case.

"When loose powder is to be conveyed, it is packed in bags of flannel, which are then placed in a barrel; this is enclosed in a stout canvas bag, before it is packed in the cylinder. A canvas bag is likewise used as a cover for the ammunition barrel before it is placed in the cylinder."

5. In the same report it is recommended that hired and un-decked vessels should not be used for the conveyance of gunpowder and explosives; that the barges for this service should be "closed-decked, fitted with sinking-valves," and supplied with "a small fire-engine, capable of being worked by one man."

Committee's Report, 2nd March, 1875, paragraphs 33 to 36.

6. Much contained in Major Majendi's "Reports on the necessity for the amendment of the law relating to Gunpowder and other explosives," presented to both Houses of Parliament by command of Her Majesty in 1874, is inapplicable to this Colony, but the Board consider that the following suggestions which are in conformity with Major Majendi's recommendations, are deserving of consideration in the event of the Government determining on a revision of the existing law:—

(a) To recognize and bring specially within the operation of the law all those explosives the existence of which is an established fact.

(b) To give power to the Government to apply the law from time to time to any new explosive P. 16.

(c) To prohibit the use of unsafe tools or the misuse of gunpowder magazines, by the storage within them of improper articles or other explosives.

(d.)

- (d.) To secure that only competent persons shall act as managers of magazines.
- (e.) To oblige persons employed in magazines to use and wear suitable clothing.
- (f.) To regulate the manufacture and "breaking up" of ammunition and fireworks.
- (g.) To regulate the nature of barrels, cases, or packages which may be used for the storage and transport of gunpowder and other explosives.
- (h.) To prohibit the preparation of blasting cartridges, mining fuzes, and used for blasting in dwelling-houses or unsuitable places.
- (i.) To regulate the provision for the security of magazines in connection with mines, quarries, and collieries.
- (j.) To regulate the storage of powder used in the construction of railways, docks, and other public works.
- (k.) To regulate the loading of gunpowder and other explosives in vessels, trains, and other conveyances, or the unloading of the same.
- (l.) To authorize the inspection of all private magazines and stores of gunpowder and other explosives, and to give power to the inspector to enforce the immediate removal of all unsafe tools or improper material that he may find stored therein.

The Board further recommend that in all cases where water is procurable, a fire-engine or hydrant, engine hose, ladders, and firehooks, &c., be supplied to store gunpowder magazines.

That gauze-wire be fitted to all magazine and laboratory windows and apertures for ventilation.

I have, &c.,

GOTHER K. MANN,
Chairman.

SCHEDULE of Reports and Proceedings as forwarded from the Agent General.

1. "Gunpowder"—"Copies of the Reports of Lieutenant-Colonel Boxer, R.A., and of Correspondence relating to the explosion of gunpowder at Erith, and the condition of Magazines and Manufactories of Gunpowder. House of Commons, 4 May, 1865."
2. "Gunpowder." "Copy of further Correspondence relating to the Cartmel and Cotton Gunpowder Works. 13 June, 1865."
3. "Gunpowder, &c., Explosions." Return of Explosions during 1868, 1869, and 1870, in Powder Mills and Magazines, and in Manufactories and Depositories of other compositions of an explosive nature. 4 April, 1871.
4. Report on the Explosion of Guncotton at Stowmarket, 11th August, 1871, dated 9th September, 1871.
5. "Report from the Select Committee on Explosive Substances." 26 June, 1874.
6. Index to the same. 26 June, 1874.
7. "Report and Proceedings at the Special Committee on Guncotton, &c." 1871 to 1874.
8. Reports on the necessity for the amendment of the Law relating to Gunpowder and other explosives, by Major Vivian Dering Majendie, R.A., 1874.
9. Committee on the Transport and Storage of Gunpowder and Guncotton. Report on the Transport of Gunpowder, 20 March, 1875.

THE UNDER SECRETARY FOR FINANCE AND TRADE TO THE CHAIRMAN, STORAGE OF GUNPOWDER BOARD.

The Treasury, New South Wales,
Sydney, 13 November, 1875.

SIR,

Referring to my letter of the 5th ultimo, forwarding certain papers relative to explosive substances, I have now the honor to hand you herewith the following further publications on the same subject, which have just been received from London, from the Agent General, and I am to request you will be good enough to lay them before your Board, viz. :—

1. Complete set of the forms in use in relation to the grant of licenses for nitro-glycerine preparations—(but I am to observe that these forms will be discontinued on the coming into operation of the new Explosion Act, 38 V. c. 17, on the 1st January, 1876).
2. Copy of an Order in Council, classifying explosives, made under the new Act.
3. Three pamphlets by Major Majendie, R.A.
4. Explosives Act, 1875 (38 Vic. c. 17).
5. Annual Report of H.M. Inspector of Gunpowder Works (Major Majendie).
6. Journal of the Society of Arts, No. 1,175, dated 28th May, 1875 (contains a good paper on Modern Blasting Agents.)

I have, &c.,

G. EAGAR.

APPENDIX

A

REPORT

OF the Board appointed to ascertain and report as to the best place, and as to the proper mode of Storing Gunpowder, &c., &c.; "and to consider the desirability of the removal of the Goat Island Magazine."

THE Board in their investigation as to the dangerous proximity to the city of the Goat Island Magazine, and the collateral questions emanating from that inquiry, and those to which their attention was directed by the enclosures to the Colonial Secretary's letter of 11th March, and your letter of the 5th May, have examined the witnesses named in the margin, the existing enactments, and all procurable official and other documentary information bearing upon the question. They have also minutely inspected the magazines at Goat Island and Spectacle Island, and visited various localities likely to afford suitable sites for the storage of gunpowder.

Commodore
Goodenough, R.N.
Mr. J. T. Blanchard.
Mr. Thomas Rogers.
Mr. W. M. Jackson.
Mr. H. Williams.
Mr. W. Wolfen.
Mr. William Bayliss.
Mr. W. M. Alderson.
Mr. John Alger.
Mr. J. Lang.
Mr. D. Vernon.
Mr. J. T. Blanchard.
Major C. Roberts.

2. Although the information thus obtained is not so full and conclusive in many particulars as could be desired, it is nevertheless considered by the Board sufficient to justify them in recommending, for the safety of the public, some material changes in the existing Law of the Colony, bearing on the management of magazines, and the transit of gunpowder and other explosives.

3. The Imperial Government has been for some considerable time past prosecuting an analogous inquiry to that entrusted to this Board, and the reply, which may be shortly expected to the telegram recommended to be forwarded by their letter of the 9th June, 1875, will doubtless contain valuable information not now obtainable in the Colony.

4. The enactments now in force in New South Wales, relative to the question under investigation are in many particulars insufficient, and in some disregarded; such defects were not, however, peculiar to this Colony; the evidence taken before the Select Committee of the House of Commons in June, 1874, discloses a somewhat similar inadequency in the Imperial Law.

5. In the Colonial Act, 5 Vic., No. 11, by clause 2 it is enacted that all boats for the conveyance of gunpowder "shall be properly housed over, &c."; it is considered that the intention of this provision of the Act has hitherto not been fulfilled, the usual practice being merely to spread a sail or tarpaulin over the hatchway of an ordinary vessel or ballast boat, as described by Mr. Bayliss in his evidence, and it is, or has been, customary to convey gunpowder and other explosives in a waterman's boat without covering.

6. Gunpowder and other explosives for transmission to the interior by the Southern and Western Railway are now delivered at the head of Darling Harbour, no doubt with a view of avoiding transit through the City. This practice is in direct contravention to the provisions of the 19th Vic. No. 6, which enacts that gunpowder shall be landed at Dawes' Point only. By reason of the large and rapidly increasing traffic in Darling Harbour the present arrangement is no longer safe.

7. The guard or watch at each magazine as at present constituted is manifestly insufficient, this is shown by Mr. Blanchard's evidence to consist of the ordinary magazine labourers, acting on their own responsibility. A watchman told off for duty for the night may have been fully employed during the day; it is therefore unreasonable to suppose that he could under such circumstances be vigilant, and in the event of his being required to act, he has no definite legal authority to guide him.

8. It is considered that localities selected by the Government as sites for powder magazines and for the storage of other explosives, after being duly proclaimed, should be protected by special enactment, and that trespassers within their boundaries should be liable to fine or imprisonment.

9. Under the existing law of the Colony any person may constitute himself a dealer in gunpowder and explosives, subject to the restrictions of the 10th clause of 7 Wm. IV. Magazines may also be established without restriction in the country districts for the storage of any quantity of these materials. The Board consider that the public safety is endangered by this system, and that no person should be permitted to store or deal in gunpowder or other explosives without obtaining, in the first instance an ordinary license, and in the second a special license, for a magazine to store larger quantities.

10. It is not considered advisable to recommend any modification of the law prohibiting the conveyance of gunpowder by steam vessels. Placing due weight on Mr. Williams' evidence that "these stringent regulations induce people to break the law, and that they act unfairly to those who are inclined to keep it." The Board are notwithstanding of opinion that the transit of gunpowder and other explosives by ordinary steam vessels would be attended with too much risk to the public to justify its being authorized.

11. The transit of gunpowder and other explosives, both by land and water, as at present conducted in the Colony, is a source of considerable danger to the public.

12. Gunpowder when once stored in a magazine and guarded under proper and stringent regulations is comparatively safe, but the operation of handling and removing it is attended with danger. Accidental explosions generally occur during transit, as instanced by the origin of the explosion at Erith, and more recently of that on the Regent's Canal. Hence the evident necessity of employing experienced and disciplined labor, and boats and vehicles of approved construction.

13. These essential precautions have hitherto not been sufficiently observed, the transit of Government and merchants' gunpowder, ammunition, and explosives being entrusted to lightermen and watermen in boats of ordinary construction with inadequate protection. The same absence of proper care characterizes the transit of these materials on shore.

14. The Board are of opinion that to ensure all possible safety to the public the carriage of explosives in the harbour, through the city, and for delivery at the railway, should be under the direct control of the Government.

15. The attention of the Board was directed at an early period of their inquiry to the frequent inefficiency of the packages of mercantile powder.

16. The late Commodore Goodenough, in his evidence before the Board, lays considerable stress on this: He estimates that "95 per cent. or even more" of the danger attending the storage in magazines is due to the presence of merchants' powder. It is observed that the Government has had occasion to issue a special magazine regulation relative thereto. Mr. Bayliss in his evidence details as an example an instance of inefficiency. Mr. Curtis before the Select Committee of the House of Commons (26th June, 1874) states: "I think if packages were made as perfect as they might be many accidents from gunpowder would be prevented." A similar opinion is expressed in other parts of the evidence, and it may be noted here that the serious and fatal explosion that occurred in this Colony, about two miles from the Weatherboard Inn, on the 16th November, 1865, originated in the "defective state of the casks."

17. The efficiency of package for general use is therefore unquestionably of great importance, but it is inferred that so long as the demand for gunpowder is supplied by importation the customary trade package cannot well be regulated by local enactment, and that legislation in this direction must emanate from Imperial authority. Apparently from the following extract, attention has recently been directed to this subject:—"Major Majendie, R.A., the Government Inspector of Explosives, is busily engaged in the laboratory department of the Royal Arsenal at Woolwich, testing the strength of powder-barrels ordinarily employed for the storage and transit of this material, with a view of designing a pattern which shall be rigidly adhered to by all manufacturers of such articles."

18. Improvement in the package of merchants' powder may therefore be expected, but it is considered that the necessities of the trade will not permit of this ever becoming so perfect as that used for Government service. It is essential therefore, with a view of insuring the utmost possible safety, that merchants' gunpowder should be stored in distinct and separate magazines especially constructed for its reception, and at a safe distance from Imperial and Colonial Government powder.

19. It has not been possible to obtain any information that would define the limits of the area of danger surrounding a gunpowder magazine. Majors Majendie and Ford, of the Royal Artillery, before the Select Committee of the House of Commons, "can give the Committee the limit of the effect of some of the more considerable explosions that have taken place, but they are so exceedingly capricious that we cannot decide any positive rule for them." Mr. Curtis before the same Committee states:—"With reference to the area of danger, I do not think that I could give definite information, because so much depends on many circumstances in connection with the explosion. My own feeling is that an explosion may often happen with fifty barrels of gunpowder, and produce quite as serious an effect as if there were 100 barrels. It depends on the buildings, the state of the wind, and various other circumstances." The late Commodore Goodenough and other witnesses gave evidence before the Board to the same effect.

20. Ordinary precaution requires this question to be considered under its most unfavourable aspect, and from this view it is apparent that the danger area, and effect of an explosion of 500 tons of gunpowder, a quantity that has been stored at one time in the Goat Island Magazine, would include and be disastrous in the extreme to a very considerable portion of the city and its suburbs. Goat Island should not therefore be retained as the site for the principal gunpowder magazine of the Colony, but it is considered, that for some time to come, it might be made available for storing with safety the smaller quantity of ammunition and gunpowder required for Her Majesty's ships on this station.

21. A distinct arrangement for the storage of merchants' gunpowder and explosives thus becomes necessary, and the Board have visited various localities that appear to them likely to possess the conditions essential for this magazine; that is to say, combining the greatest security to the public, with the least possible impediment to trade. After careful inspection it is considered that a site on the right bank of the Parramatta River offers the best prospects of attaining these desiderata, from its comparative isolation, capabilities of easy and safe access by land with the Railway at Haslem's Creek, and facilities for transit by water with the harbour and city.

22. The Board consider that Spectacle Island may, with some re-arrangement and additional buildings, be safely continued as a site for a magazine for the storage of Colonial Government powder and ammunition, but they are of opinion that its present capacity should not be increased.

23. The Board has also had under discussion the expediency of establishing magazines in the country districts, with a view to the distribution of the stock of gunpowder held by the merchants, and thus obviating the necessity for the storage of the bulk of that material in the vicinity of Sydney, and also as a means tending to reduce the necessity that now exists for its frequent transit by rail and otherwise; but on further investigation this arrangement was found to be impracticable, inasmuch as, that the consumption in any one particular locality is not a fixed or increasing, but a fluctuating, quantity. They are of opinion, however, that the object they had in view might be attained by a legalized system of "licensed powder magazines."

24. Although gunpowder magazines are more numerous in England, and in most instances closer to habitations and public thoroughfares than in this Colony, it does not appear to be necessary to store in any one of them so large a quantity as that recorded for Goat Island.

25. This may be explained by the facilities consumers there have of obtaining direct from the gunpowder manufactories a regular and periodical supply commensurate with their average current expenditure.

26. The expediency of manufacturing gunpowder in the Colony thus becomes a prominent question, considering that an increasing demand for that material must be anticipated, the probable difficulty of obtaining a sufficient and immediate supply in the event of war; and lastly, the additional safety to the public consequent on the reduction in the quantity that would be stored in the magazines. Under these circumstances the Board are of opinion that the question of establishing a gunpowder manufactory ought at no distant date to be entertained, as a considerable time must elapse before the requisite ingredients could be provided and the machinery put in operation.

27. The comparative safety of ordinary gunpowder and the various nitro and chlorate explosives now in use—such, for instance, as gun-cotton, dynamite, lithofracteur, &c., in the former, and Horsley's blasting-powder, Brain's blasting-powder, &c., in the latter class—does not appear to have been as yet satisfactorily determined, notwithstanding the many assertions to the contrary. Some railway companies in England will not convey chemical explosives. Mr. Kay, Chairman of the London and Western Railway Company, enumerates six companies who refuse to carry "dynamite," and the fatal explosion of gun-cotton at the Royal Arsenal, Woolwich, so recently as the 24th May last, when under manipulation in accordance with the most carefully prepared rules, is evidence of its instability and dangerous character.

28. Public security consequently demands that all chemical explosives should be dealt with as particularly dangerous, and the Board are of opinion that special provision should be made for storing them, and that in no instance should they be in proximity with ordinary gunpowder, neither should they be conveyed in any boat or vehicle at the same time with that material.

29. The Board therefore submit the following Recommendations:—

RECOMMENDATIONS.

1. That the whole of the merchants' gunpowder and other explosives now stored at the Goat Island Magazine be removed from that establishment, and that it be retained only for the limited quantity of gunpowder and ammunition required to be stored for the use of Her Majesty's ships on this station.

2. That a separate and distinct magazine for merchants' gunpowder, capable of storing about 300 tons, be established on the right bank of the Parramatta River, at the site indicated by the tracing forwarded by letter from the Board on the 30th August last.

3. That a suitable hulk be provided and moored at a safe distance from the proposed magazine for the storage of all explosives other than gunpowder.

4. That efficiently constructed powder barges, and a steam-launch for towing the same, be provided by the Government for the removal of gunpowder and other explosives.

5. That the magazine at Fort Denison be used as an expense magazine in the event of vessels not being ready to receive the powder brought down by the barges for exportation.

6. That for the conveyance of gunpowder and other explosives by land to and from the magazine and in the immediate vicinity of the city efficiently constructed vans only be used.

7. That the transit of gunpowder and all other explosives be under the immediate control of the Government, and that the service be conducted by experienced labor only, in conformity with Government regulations.

8. That all boats, barges, and vehicles carrying gunpowder or other explosives be obliged to exhibit a conspicuous danger signal.

9. That a guard at each of the established magazines be provided, and that to ensure efficiency three gunners and one non-commissioned officer of the Permanent Artillery Force be detailed periodically for this duty.

10. That fixed and definite boundaries be determined and proclaimed around all magazines.

11. That the law of the Colony respecting the storage and transit of gunpowder and other explosives be revised, and that authority be given to the Government to fix and define the localities for the delivery of gunpowder. That trespassing within the proclaimed boundary of a magazine be made illegal. That dealers retaining the authorized quantity of 2 cwt. on their premises be required to take out an ordinary license, and that proprietors of country and local magazines, capable of storing larger quantities of gunpowder or other explosives, be required to take out special licenses, and that all licensed stores and magazines be liable to Government inspection.

12. That all explosives be duly labelled and declared, and no explosives (except small quantities for sportsmen) be carried in public vehicles.

13. That the whole of the underwood at Goat Island be cleared away, and that the general surface of the Island be kept clear from undergrowth. That no buildings be erected in the vicinity of the magazine, and that the small building *in particular* to the eastward of it, be at once removed.

14.

14. That the following alterations be made at Spectacle Island Magazine, viz. :—The buildings now occupied as quarters in the vicinity of that magazine to be converted into storage for ammunition, shifting, and making-up rooms, &c. The shells and ammunition, now stored at the northern end, and close to the Powder-magazine, to be removed and stored in the vacated building.

15. That quarters be constructed on the vacant space, to the north-west of Spectacle Island, and that the magazine be not increased beyond a capacity of storage for 150 tons of gunpowder.

16. That in no instance should gunpowder and chemical explosives be conveyed in the same van, boat, or barge.

17. That in no instance is gunpowder, or other explosives, to be delivered from the magazine, or received by the railway for transit, until arrangements for its immediate removal on arrival at its destination are completed and provided by the consignee.

18. That regulations for the storage and transit of gunpowder and other explosives be in force in any city, town, or locality of the Colony on proclamation to that effect being made by the Governor.

19. That the regulations for gunpowder magazines in charge of the Control Department, including rules for the reception, conveyance, storage, classification, and examination of gunpowder, ammunition, and other explosives, as contained in an Imperial work designated "Treatise on Ammunition," dated 1874, and issued under the authority of the Secretary of State for War, be in force so far as applicable to the somewhat necessarily altered conditions of the Colonial service.

GOTHER K. MANN,
Chairman.

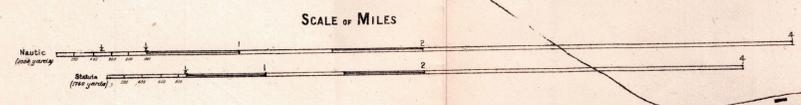
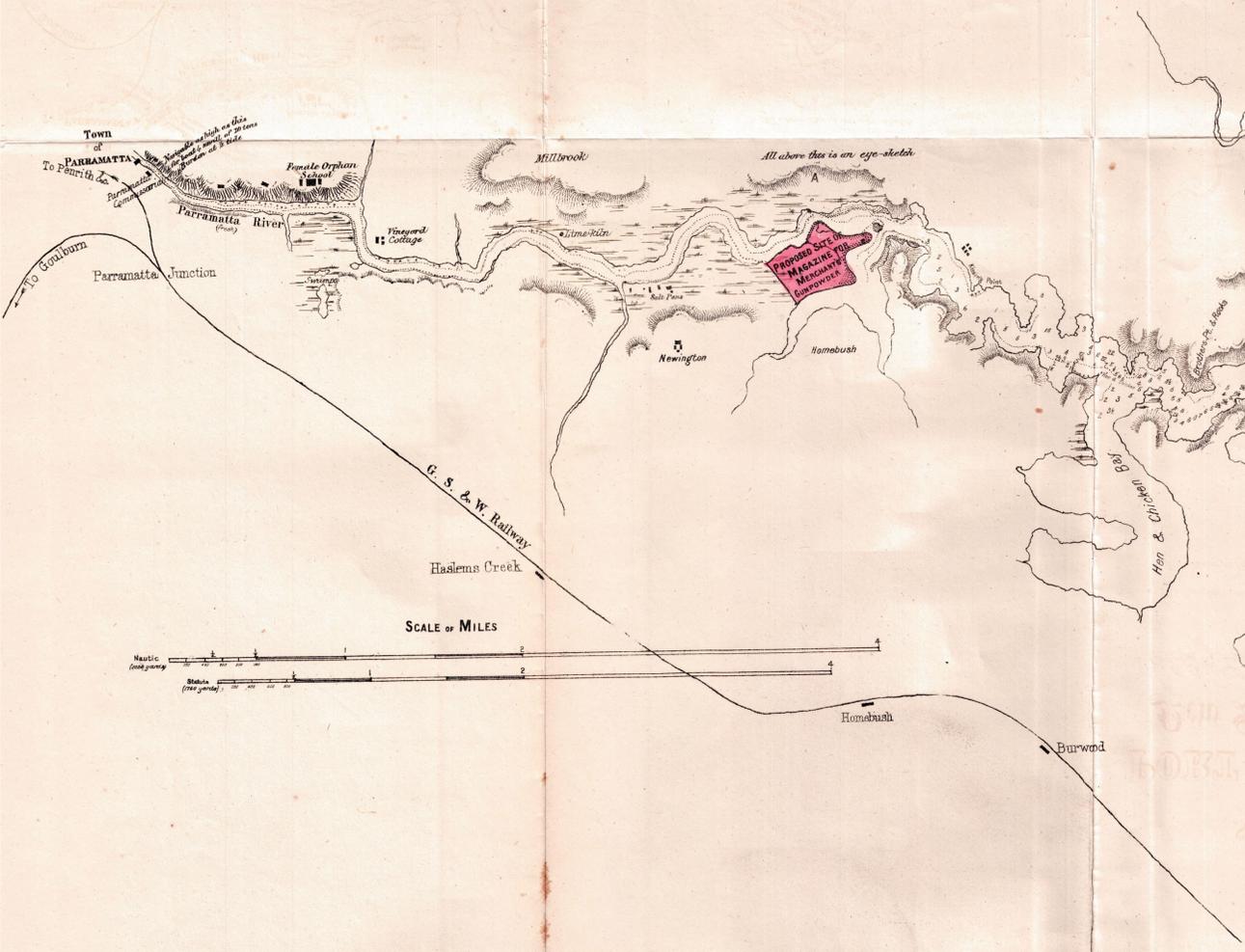
5th October, 1875.

LIST OF WITNESSES.

	PAGE.
Alderson, Mr. W. M.	21
Alger, Mr. John	23
Bayliss, Mr. William	17
Blanchard, Mr. J. T.	3, 29
Goodenough, Commodore, R.N.	1
Jackson, Mr. W. M.	7
Lang, Mr. J.	27
Roberts, Major C.	32
Rogers, Mr. Thomas	5
Vernon, Mr. D.	27
Williams, Mr. H.	10
Wolfen, Mr. W.	14

SURVEY
OF
PORT JACKSON.
New South Wales,
BY
John Spharimus Roe, Lieut. R. N.
in 1822.

*The Soundings are in Fathoms at Low Water
High Water on Full and Change days, about 1/2 to 3/4 in Spring tides*



MINUTES OF EVIDENCE
ON THE
STORAGE OF GUNPOWDER,
TAKEN BEFORE THE BOARD.

WEDNESDAY, 9 JUNE, 1875.

Present:—

CAPTAIN G. K. MANN,
LIEUT.-COL. RICHARDSON,

E. O. MORIARTY, Esq.,
J. BARNET, Esq.

CAPTAIN G. K. MANN IN THE CHAIR.

Commodore Goodenough, R.N., examined:—

1. *Chairman.*] We are very anxious to have your opinion upon certain points which have been under consideration in the course of our inquiry, and if you will allow me I will ask you a few questions. We wish to know, in the first place, whether you consider the proximity of Goat Island, as a depôt for the storage of gunpowder, to be dangerous to the city? I think the only danger which has been proved to exist with regard to a powder magazine, is that which occurs at the time of removing the powder. Certain explosions have from time to time taken place at such periods, but in the mere fact of powder being stored in a magazine there is very little danger indeed. I am not aware of any explosion having taken place, except at the time of removing the powder. Therefore there is that danger attached to the storage of gunpowder at Goat Island. As to the danger likely to arise from the reception of powder at that place I think it is advisable to look forward to the future, and to the certainty of houses being scattered over the shores of the bay immediately contiguous to Goat Island, more thickly than they are at present. And although that danger is not such as to necessitate the immediate removal of the powder stored there, I think the question of the removal of the magazine is one which might very well be entertained in connection with other arrangements at the present time.
2. What do you think would be the effect of an explosion of say 500 tons of gunpowder at Goat Island, the maximum quantity that has been stored there? That would depend in a great measure upon the direction of the wind. Supposing the explosion to take place in the summer, with a N.E. wind blowing, the damage would be very slight; but with a westerly or north-westerly wind, I should say there would be windows and roofs broken in all directions, and walls in many cases shattered.
3. Do you think that the storage of merchant gunpowder—without reference to Imperial and Colonial powder—owing to the insufficient character of the packages in which it is placed, is a source of danger? I do. To put it roughly and to express my opinion in figures, I should say that 95 per cent. or even more, attending the storage of gunpowder in magazines, is due to the presence of merchant powder often improperly packed, and to the way in which the various packages are handled from the time they are made up until they are stored. This powder passes through the hands of inexperienced persons, whereas Imperial and Colonial powder is in the hands of skilled persons throughout its existence, and is always put up in uniform and sound packages. I consider that by far the greatest part of the danger occurs when moving the powder—that is to say, merchant powder, not Imperial; and is due to the inexperience of the people who move it, and the absence of properly qualified men.
4. Do you consider that the storage of gun cotton, dynamite, and other explosive substances of that character, in the proximity of a gunpowder magazine, is dangerous? I don't think gun cotton, in the way it is manufactured at present, is, but there is danger from the presence of dynamite and any of those highly explosive compounds which you do not see here in general use at all at present, but which might be imported for commercial purposes. I think it has been shewn that gun cotton in its present manufactured state is only dangerous when placed in the middle of a large fire, so that the whole of its temperature is raised to a very high point; it then becomes explosive, but only then—that has been proved. The danger is therefore comparatively less—less than from gunpowder.
5. What is the quantity of gunpowder which, in your opinion, may safely be stored in any one establishment? That is a subject to which I have not directed my attention. I should say that would be better seen by reference to the storage of powder in different establishments in Europe. I should be loth myself, with the little knowledge I have of the subject, to put more than 200 tons at the outside into one magazine.
6. You were kind enough the other day to accompany the members of this Board on a tour of inspection to the Parramatta River, when we went to search for the most eligible site for a powder magazine. Did any point which you saw during that tour strike you as being eligible for that purpose? The point which struck me as the most eligible for storing merchants' powder—not our Imperial or Colonial powder—was one in Iron-stone Cove. That seemed to combine all the requisites—distance from habitations, and easy communication, and was the most eligible in every way, as far as I could judge from the plans we had then before us, and from what we saw. It would also be near a line of railway. (*Witness pointed the position of the site on a map.*) If you could secure such a position as that you would avoid the undoubted dangers which attend the transit of powder by cart or wagon through the town.

Commodore
Goodenough,
R.N.

9 June, 1875.

Commodore
Goodenough,
R.N.

9 June, 1875.

7. Could you suggest any further precautions, which it would be desirable to adopt in the removal and transport of powder beyond those which are usually taken at present? I should say, that to make you secure in the port of Sydney, you should have for the purpose of transporting gunpowder about the harbour a properly fitted boat belonging to the Government; and that boat should, as a rule, be moored off the magazine, and placed in the charge of the Superintendent. Then when any powder had to be landed a requisition should be made to the officer in charge of the department, and she would be towed by a steam-launch, with a tow-rope of proper length, and dropped when loaded at a certain distance from the magazine, and made fast to a buoy. She could then be warped alongside and cleared, and warped out again to her buoy. What should govern the size of that boat seems to me the probable amount of powder which might be imported in any one ship;—that is to say, if you considered 15 tons the largest quantity likely to be imported in any one ship, then make the boat of that size. It would be desirable to make her as small as possible; at the same time it would be advisable that in clearing out a merchant ship the clearance should be effected by one discharge. You would thus considerably limit the sources of danger. I would also suggest that the officer in charge of the magazine should have authority to inspect all consignments of merchant powder, and to insist that such consignments be accompanied by certificates of the nature of the explosive mixture; also, that in case of powder arriving improperly packed, he should at once report the matter to the Colonial Secretary, or whoever was head of the department, and obtain authority to throw such powder into the sea—outside the Heads.

8. What length of tow-rope would, in your opinion, be necessary to insure safety? For a good boat, properly covered, I should say about 25 fathoms would be quite sufficient.

9. Do you consider that the laboratories should be in close proximity to the magazine;—to what distance would you limit them? I think they should always be in a distinct and separate place.

10. You would not recommend that they should be under the same roof as the powder? No, not under the same roof. You are speaking of the laboratories for the use of the Colonial Defence Department?

11. I am speaking generally. As a rule there is usually a laboratory attached to every magazine; in some instances they are in very close proximity, and in others at a distance from it? The only laboratory here would be immediately under the Colonial Government; it would be in the hands of no one else, and there would be no other authority. It would not be in private hands, and that is the only one we could speak of. In that case I should say it ought to be in a distinct place, and at a distance of 500 yards from the magazine. Strict orders should govern the use of that laboratory, so that not more than a certain amount of explosive matter should be in it at the same moment.

12. Do you consider the storage of percussion shells and ammunition of that description—modern ammunition—in the proximity of a magazine—at all dangerous? No; I do not consider it at all dangerous. I consider that the present percussion shells have been so thoroughly proved, and are so thoroughly secured, that there is no danger at all from them. Nor is there danger from the Sneider or percussive ammunition for small arms. In former days, I may say about six years ago, it was considered that there might be danger from the use of small arms percussive ammunition, and we used to stow it in separate places on board ship. But we have now made it so thoroughly secure, that we can put it with the other ammunition. I am speaking, of course, of Imperial ammunition, which is made up with every possible precaution. I am not thoroughly acquainted with all the varieties of ammunition made up; but probably, very likely, it might be necessary to exclude from magazines some kinds of ammunition made carelessly by certain makers. There are certain makers, such as Eley, and other well-known firms, whose manufacture is so thoroughly good that it is above suspicion.

13. In the use of a steam launch for towing powder-barges, would it be necessary to use any particular class of fuel, such as coke, instead of coal, or any fuel of that kind? I think it would be desirable to use coke certainly. Speaking of Goat Island, there are one or two dangers which might be removed at once. There are two sources of danger at Goat Island: one is the existence of a little house to the east, on a rock, and the other is the great quantity of brushwood all over the island, which might catch fire. Last summer it might very easily have caught fire when there were fires all over the country.

14. Have you formed any opinion as to the advisability of storing powder in permanent buildings—bomb-proof buildings—in preference to more lightly constructed buildings? If you went to a great expense here in Sydney you might construct a magazine which would produce the minimum amount of danger by sinking it in the sandstone rock, but that would be very expensive, and I don't think it would pay you for your trouble after you had done it. I think it would be better to have as light a building as possible. If you had a magazine sunk in the rock it would be very difficult to keep it dry. You would have to excavate a much larger space than would be occupied by the building, in order to have a trench round it, and you would have to go to further expense to facilitate the carrying away of the water.

15. *Lieut.-Col. Richardson.*] Can you give the Board any information as to the construction of a fire-proof barge, and the appliances necessary to prevent possible accidents? I do not know that anything further is required than that the barge should have very good high combing, that the whole of her hold for the reception of powder should be lined with wood, so as to make a fair surface, covering all bolts and metal work, and be lined overhead also; and that the hatches should be very well fitted with fearnought. She should have a liberal supply of Wadmil tilts and hides to protect the cargo.

16. Would it not be desirable that the nails used should be copper? The Government lighters used in Portsmouth and Plymouth are very heavily built of wood, copper-fastened, and stoutly lined, and they have lasted for years, and are as good as ever.

17. *Mr. Moriarty.*] Is the danger of moving merchants' powder so much aggravated by the passing of steamers to and fro, and the close proximity of steamers in Balmain, as in your opinion to render its removal from Goat Island necessary? I think it is increased, by the fact of steamers being continually on the move, and the danger will increase rapidly in future.

18. Do you consider that the danger from this source has now reached such a point as to render the removal of this powder from Goat Island necessary? There is no positive danger, I think, at this moment; but I think the time has arrived when the total removal of all powder from Goat Island would be desirable.

19. That applies to Imperial and Colonial powder as well as to merchants' powder? Yes; but understand me: I don't think the danger is immediate, but that now is the time to plan for the removal of the whole.

20. *Mr. Barnett.*] You would not then allow your own powder—Imperial powder—to remain there? It might remain there, I think, for some years without any very great danger; but as the subject is now under consideration I think it would be desirable to plan for the entire removal of the powder at Goat Island.

Commodore
Goodenough,
R.N.

9 June, 1875.

Island. There is very much less danger there from Imperial powder than from merchants' powder, which, as I said before, comprises 95 per cent. of the danger.

21. *Chairman.*] I think you have answered this question before, but at all events I will ask you again: You think the merchants' powder should be stored in a distinct and separate magazine from the Imperial and Colonial powder? I think it is certainly desirable.

22. Do you mean in a separate establishment? I don't think it is *necessary* that it should be in a separate establishment. I think that would be *desirable* in connection with the transit of which I was speaking; but if Spectacle Island is large enough I don't see any objection to the merchants' powder being stored in the same establishment, but in a separate building by itself. But in view of the probable increase of merchants' powder in this Colony, and to the desirability of easy conveyance to the railway, I think it would be far better to have a separate establishment at the Point we looked at the other day—Ironstone Cove—which, as I have stated, appeared to me the most eligible site.

23. Looking to the variety of explosive substances used in the present day, and to the probability of their being multiplied to a considerable extent beyond their present number, do you think it would be advisable to have a separate and distinct magazine for their location? I do not know whether the very highly explosive substances are very much used in the Colony, but when you come to explosives like nitro-glycerine and picrate of potash, I think it is absolutely necessary that they should be stored entirely apart. But I apprehend that neither of these substances are imported into the Colony; you know better than I do.

24. Dynamite and lithofracteur are a combination of nitro-glycerine;—are they not? Yes.

25. Are there any other remarks which you would like to make, or can you afford the Board any further information upon any points which we may have overlooked? I think there is nothing else, except that where powder has to be conveyed on shore from one point to another, it certainly should be conveyed in a waggon provided by the powder magazine,—that is to say, in a waggon which has been fitted, if not constructed, under proper inspection. It ought not to be conveyed through the town. I am speaking of the town, and not the country—in an ordinary waggon, of which no one knows anything. The springs might break down in the middle of the street, and the powder might be scattered about.

26. *Lieut.-Col. Richardson.*] Would not the ordinary field waggon be sufficient? Yes, provided it were sound, and known to be so from inspection by a competent person.

27. *Mr. Barnet.*] And you would have it inspected by the authorities? Yes; it would of course be a cart sent from the powder-magazine, and of course a man would be sent with it.

28. *Mr. Moriarty.*] With reference to the different towns in the Colony to which powder is sent from Sydney, would you recommend that it should be kept in a magazine, under the charge of Government authorities? Well, I do not know what quantity is used there, and what quantity is allowed to remain there. My answer to that question would depend upon the quantity which would probably require storage at one time.

29. Because private individuals are frequently very careless in respect to the charge of powder, and a great deal of powder is used by the miners of this Colony. I observe in the Report of the Royal Artillery Institution that a similar recklessness is very common at Home. The report states that powder is frequently kept "at the back of the shop, and without any sort of special protection; and in the mining districts the miners are very fond of keeping a barrel (frequently not hooped up) *under their beds*?" Yes, they are very careless.

30. *Chairman.*] I should like to ask one more question, whether there is room, or whether room could be made, on Spectacle Island, for the storage of powder for the navy? It appears to me that there is ample room to complete storage for at least 100 tons more than there is now on Spectacle Island. (*Plan of Spectacle Island Powder Magazine produced.*)

31. In the event of abolishing the magazine on Goat Island entirely, there would be no difficulty then in finding a storehouse for your powder? I should say there would be ample room here (*indicating locality on plan.*)

32. *Mr. Moriarty.*] Would there not be an advantage in having all the powder in one establishment, and in charge of one set of trained officers? Certainly, as it is now on Goat Island. The only person who visits the magazine there on Imperial account is the gunner of the Naval Depot, and he has to ask for the keys from the officer in charge before he can go in. It is now effectually under one control.

33. *Mr. Barnet.*] I think you said that you would recommend two establishments if it were proposed to build on the site you pointed out on Ironstone Cove? Yes, a separate establishment for the storage of merchants' powder.

TUESDAY, 22 JUNE, 1875.

Present:—

CAPTAIN HIXSON, | J. BARNET, Esq.,
E. O. MORIARTY, Esq.

CAPTAIN G. K. MANN IN THE CHAIR.

Mr. J. T. Blanchard, Assistant Ordnance Storekeeper and Barrack-master, Goat Island, called in and examined:—

34. *Chairman.*] How long have you been employed in your present office? Since 1871.

35. You were connected with the department before that,—were you not? Yes, the department was brought under the Colonial Government in 1871. It was previously under the Imperial Government.

36. Mr. Paton, I believe, is the ordnance storekeeper? Yes, he is in charge of the department.

37. He is suffering from severe illness, and confined to his bed to-day, is he not? Yes, and unable to leave it.

38. And he has deputed you to give us information on his behalf? Yes.

39. We are desirous of obtaining some information from you, Mr. Blanchard, relative to the practice in force for the storage and transit of powder in the harbour. Will you be good enough to state the process which takes place when you receive the powder—what is the practice at the magazine? We have no control

Mr. J. T.
Blanchard.

22 June, 1875.

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Blanchard.
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control over the powder until it arrives at the magazine, when it is discharged by the lightermen, and handed over to our foreman at the Island, who stores it in the sheds. It is then transferred to the magazine and stored in bays.

40. Then the ordnance storekeeper has no control over the powder during its transit? The Act provides that the arrival of powder shall be reported to the Customs and to the ordnance storekeeper, who gives a permit for landing it, but they never do it; it is sent down in the lighters and discharged, as I tell you.
41. Then the first notice you have of the powder requiring to be landed is its arrival in the lighter alongside your wharf? Yes; of course we notice its arrival in the papers, but that is the first official notice we get.
42. In transferring Government powder or ammunition from one magazine to another, do you send an officer in charge of that transfer? No, sir, it is not usual to do so.
43. In whose charge is it then? The lighterman has charge of it in its transit from one magazine to another.
44. Then it passes from out of your control entirely for a certain period? Yes, for a short time. It is very rarely that we have to send powder from one magazine to the other. It is generally landed direct from the ship. There was a case tried in Court the other day where some powder—Government powder—was damaged in its transit.
45. There are some Government powder magazines in the country, I believe? Yes, there is a floating magazine at Newcastle, and there is one at Gulgong.
46. Are those magazines under the special control of the ordnance? Yes, they are, sir.
47. Will you describe the method adopted for the proper management of these outside magazines? When a vessel arrives at Newcastle the powder is discharged direct into the magazine. That magazine is placed under Captain Allen's supervision.
48. I allude more particularly to the officers in charge? Captain Allen has charge, and he has two men under him.
49. And with regard to the magazine at Gulgong, what establishment have you there? It consists of the foreman, Sellman, and two labourers.
50. Do you forward powder direct from the principal magazine to that establishment? No, the powder stored there is powder sent up by different merchants in Sydney. The magazine at Gulgong was established for the convenience of miners there.
51. Have you any knowledge of the daily or weekly average expenditure from these magazines, taking the Newcastle and Gulgong establishments separately? Yes, we get monthly statements from these places.
52. You can furnish the Board with that information? Yes, I can do so up to the end of last month; of course I understand by the term expenditure the issue from the magazines?
53. Yes, of course. Do you receive and issue dynamite, nitro-glycerine, and that class of explosives at Goat Island from the same jetty as you do the ordinary gunpowder? No, the gunpowder is landed at one wharf and the dynamite and nitro-glycerine at the other. They are on opposite sides of the Island.
54. If I understand you aright, only merchants' powder is stored in these country magazines? Only storekeepers' powder is stored at Gulgong. In the Newcastle magazine Government powder is stored as well.
55. Do you know anything of any other magazines? No, I do not. I have no control over them. I believe they exist, but I can give you no information about them.
56. Can you give us any idea of the average expenditure of powder in the Western district and in the Southern district? No, sir, I could not arrive at that information; we have no means of obtaining it at our disposal.
57. *Capt. Hixson.*] You have some idea, I suppose, where it goes to; for instance, when the Western Railway was being constructed there was a large expenditure of powder? No, they do not give us any idea where it is going to.
58. *Mr. Moriarty.*] Under what Act is powder landed and removed in this Colony? I believe the 7 William IV No. 7 is one of them, and 16 Vic. No. 47 the other.
59. Are there any codes and regulations laid down by the Government or the officers in charge of the powder as to precautions to be taken in moving it? Oh, yes; we have regular magazine regulations.
60. Do they apply to the removal of powder after it leaves your charge? No, they merely apply to the Island.
61. Then as far as you are aware there are no regulations applying to the treatment of powder after it leaves the Island? No; I know of none that exist.
62. You have been in the habit of dealing with powder for a number of years, have you not? Yes, for the last thirteen years.
63. Do you think the removal of powder and its treatment after it leaves the Government magazine should be subject to some regulations? I think so. I think it should be under some regular supervision, under the head of the department, and then there would be some hold over the people who deal in it.
64. Do you think the supervision by the department should continue after the powder is landed, and when it is conveyed into the interior? Yes, but that would cost a great deal of money.
65. Do you think it would be practicable, considering the variety of packages taken away, large and small, for the department to preserve any efficient control over it after it leaves Sydney? Not unless an officer were sent with it.
66. Are you aware whether there is any efficient control over it after its storage in the interior? Yes; the Act states that no one storehouse shall contain more than 2 cwt. of powder at one time, and it is the duty of the Police to see that the Act is not broken.
67. Do you think dynamite and lithofracteur should be stored in the same magazines, or at what distance from the gunpowder magazine would you suggest that they should be stored? It would be better if they were stored in separate places. In the absence of that we take the furthest distance from the powder magazine we can get.
68. Would you recommend that they should be kept in a separate place, so as to avoid any danger of explosion? Yes. These are kept in separate places.
69. But at sufficient distance to avoid any danger from explosion—so that the explosion of one would not cause the explosion of the other? Yes, I think so.
70. What quantity of dynamite and lithofracteur have you had? I think about 8 tons of lithofracteur and about 2 tons of dynamite is the largest amount we have had at any one time.

71. Have you observed any alteration take place in the material of these explosives from their being stored—any leakage from the cases, or anything of that sort—any exudation of oily substance? No; none whatever. But if the foreman were here he might give you more precise information on that point, as he deals with it every day.

Mr. J. T. Blanchard.
22 June, 1875.

72. Have you noticed whether the quantity of these explosives is increasing with any rapidity; are they coming into general use? No; I think it is just the reverse. I think they are likely to be discontinued. I know several firms who will not have anything more to do with them. They say there is too much trouble with them.

73. Are they afraid of them? No, they say there is no use for them. They cannot sell them, and they won't have them.

74. On what grounds do they object to them? I do not know. I believe it is all prejudice.

75. *Mr. Barnet.*] Are these regulations at the magazine published and printed? Yes, we have printed regulations. Of course they are only for the magazine.

76. *Mr. Moriarty.*] Beyond those regulations there are none existing that you are aware of, and the only guide is the Act itself as it stands? Nothing beyond the Act.

77. *Chairman.*] Will you state the capacity of the Gulgong and Newcastle magazines, each one separately—the quantity they are able to store at one time? I have never seen the magazine at Gulgong. In the magazine at Newcastle I should think they would be able to store from 15 to 20 tons of powder.

78. *Captain Hixson.*] Do you know if there is any dynamite or lithofracteur in the magazine at Newcastle? There may be a stray case there, but I am not aware of any.

79. Do you remember any being sent there? Yes, lithofracteur and dynamite goes there, but I don't know that it is put into the magazine. I know that fifty cases were sent there the other day. They asked if they might put them in the magazine, and I said certainly not.

80. Then you don't know what became of it? No, it goes to Newcastle for export, and is shipped from there to New Zealand and other ports.

81. Is there not some regulation that powder can only be landed at certain times and in certain places at Sydney? Yes, at Dawes' Battery.

82. And at certain times? Yes, before 10 a.m. That is with the view of getting it through the town by that time. We refuse to deliver powder in town after 9 o'clock.

83. And is there not some restriction as to the vessel or boat in which it is conveyed from the magazine; must there not be a tarpaulin to cover the powder, or some precaution against danger during its transit through the harbour? There should be, and I believe the foreman always sees that they are provided with these things.

84. From what I glean from your reply to Mr. Moriarty's question, you think it advisable that there should be some supervision exercised over the powder after it has been discharged from the magazines, during its transit through populous places, but you do not think such supervision necessary when it is conveyed into the country? No. I think that would answer in town very well.

85. I suppose you consider the town the most dangerous part of the journey? Yes, I do; there is more danger to be apprehended in town.

86. Do you think there is any danger in having the laboratories so close to the magazines as they are at present? The laboratory operations at Goat Island are very trifling; they are chiefly carried on at Spectacle Island, but it would be better if they were further away, if you could arrange it.

87. *Captain Hixson.*] You think then it would be prudent to have the laboratory so far away from the magazine that even if an explosion took place in the laboratory it would not affect the magazine? Yes sir. The regulation distance in the Imperial service I believe is 400 yards between the laboratory and the magazine.

88. Don't you think that would be a proper precaution here? Yes.

89. *Chairman.*] You say that the regulation distance from the magazine is 400 yards? Yes, according to Imperial instructions.

90. *Mr. Barnet.*] That is a laboratory for making cartridges? Yes, for making up cartridges.

91. *Chairman.*] All the laboratories here are considerably within that distance? Yes, they are within a few yards of the magazine.

92. Have any cases of gross negligence or carelessness on the part of the boatmen or lightermen during the transit of powder come under your notice at any time—have you had to check them at all? No sir, they have always attended to the regulations on leaving the Island. I have heard of no complaints.

Mr. Thomas Rogers, foreman at the Goat Island Powder Magazine, called in and examined:—

93. *Chairman.*] You are foreman of the Goat Island Powder Magazine I believe? Yes.

Mr. Thomas Rogers.

94. How long have you held that position? I have been foreman since April, 1871.

95. Did your previous occupation afford you any acquaintance with the management of powder? Yes sir. I belonged to the Royal Artillery, and I was generally at home in the manufacture of powder and work of that kind.

22 June, 1875.

96. Where you not in a subordinate position on the Island before you became foreman? Yes, for over six years.

97. Have you had experience in magazines before? Yes, in making up cartridges.

98. Will you describe the practice pursued in the receipt and issue of powder at the magazine? When the powder comes to me it is brought up in the lighter, and I take it and give a receipt for the number of packages received.

99. Do you supply the labour to hand it up from the lighter or boat? No, sir, the lighterman hands it up on to the wharf.

100. What height has he to hand it up generally? Well, that varies according to the state of the tide. Sometimes the wharf is level with his head, and at other times he can put a plank across from the lighter to the wharf.

101. Sometimes there is a difficulty in handing it up to the wharf? Yes, it has to be handed from one to the other.

102. Have you known any packages or barrels to fall and get broken in that way? No, I can't say that I have.

- Mr. Thomas Rogers.
22 June, 1875.
103. You consider that the powder is in your charge directly it is landed on the jetty? Yes sir.
104. What precautions do you take in landing dynamite, nitroglycerine, and explosives of that class? Similar to the powder.
105. You have a separate jetty for those I understand? Yes.
106. At what height from the floor are you in the habit of storing powder in the magazine? Well, it generally goes up to the top bays.
107. What height is the top bay from the floor? Well, the centre racks run four bays high, and the side ones three.
108. How many feet would that be—the centre one four bays high? I suppose it is about 8 feet by 5 feet; I could not say exactly.
109. What I want to know is the height at which the highest case of powder is stored in the magazine? About 20 feet, I think.
110. *Mr. Barnett.*] You have nothing to do with Spectacle Island, I believe? No.
111. There is a separate foreman there? Yes.
112. Do you ever use tackle for lifting the powder out of the vessels or lighters? Yes, sir, we use them for the larger barrels, but we always hand up the smaller ones. We are forced to use tackle for the large ones, and can-hooks.
113. Are there any trucks on the lower wharf? Only one.
114. *Chairman.*] Have you any ammunition stored at Goat Island besides gunpowder? None in the magazine, sir; there are some merchants' cartridges there, but they are kept down in the lower shed—the receiving shed.
115. *Mr. Moriarty.*] There is a great deal of merchants' powder at Goat Island occasionally, I believe? Occasionally.
116. Have you noticed any well marked difference between the way in which the merchants' powder is coopered and the way in which the Government powder is coopered? Oh yes, there is a difference; the Government powder has four copper hoops on each barrel, which the merchants' powder has not.
117. Have you ever had any trouble from the merchants' powder leaking out of the barrels? Yes, we have on different occasions; the barrels have become dry, and leaked.
118. Do you think that was from the imperfect way in which they were coopered? I think it is because the wood was not properly seasoned and shrunk.
119. Then you think it would be a good thing if a regulation were made that the merchants' powder should be coopered in the same way as the Government powder is? Well, it would make them more secure.
120. Do you think that at present the imperfect coopering is a source of danger? No, I can't say that. Any barrels that are leaky when I receive them are fastened up before they go into the magazine.
121. But do you find that any of the barrels are broken and the powder leaking out of them when they arrive at the magazine? Yes, I have seen them broken before they come out of the ship.
122. Don't you think that is a source of great danger? Well, it is.
123. Who has charge of the powder generally before it comes to you? *Mr. Bayliss*, generally.
124. I mean is it under Government control? Not that I am aware of.
125. Well, considering what you have just said, don't you think it is desirable that the Government should have some control over the powder from the moment it leaves the ship's side, by conveying it in their own barges for instance? I think it would be best to have one person responsible for it.
126. Would you suggest that the Government powder should be separate from the merchants' powder, in a different magazine;—do you think that would ensure safety? I could not say that.
127. You think all reasonable precaution is taken by yourself, in re-coopering the barrels, to ensure safety? I think so.
128. After you have delivered the powder do you take any further trouble about it, or do you merely give it to the persons who bring you an order for it, and have no further control over it? Yes, I give it to the parties who bring proper orders for it.
129. Then where is it taken to? It is taken away by the barges and put into the railway trucks at Darling Harbour, and some of it is landed at Daves' Battery.
130. Have the railway people proper trucks for carrying powder? I could not say, but I believe they have.
131. But as far as you are aware there is no Government supervision over the powder after it leaves your magazine? No, not that I know of.
132. It is left entirely to the lightermen or bargemen? Yes.
133. Do you think it judicious that it should be taken away so, without being subject to any Government control? No, what I would suggest is that one person should have the charge of it, and be responsible for it.
134. You mean in taking it from the ship and delivering it to the railway authorities? Yes, and also for consumption in Sydney; that would be much the safest way.
135. You have the dynamite and lithofracteur under your control? Yes.
136. Have you noticed any leakage from the cases or anything of that sort in connection with those explosives? I have not.
137. You have never had any accident with them? Never.
138. Have you ever heard of any accident from the explosion of those substances—from their storage there? No; I have seen accounts of accidents in the papers, but I have never had any.
139. What is the distance between the place where the dynamite is stored and the powder? About 210 yards, I think.
140. What sort of a building is it in? It is a wooden building with a galvanized-iron roof.
141. Has it a wooden floor? No; there is only an earthen floor in the dynamite shed; there is a wooden floor where the lithofracteur is kept.
142. There are a great number of steam-boats passing Goat Island;—have you ever seen any sparks—live sparks—light on the Island? No, sir.
143. Do you experience any inconvenience on the Island from the passing of steam-boats? No.
144. *Mr. Barnett.*] Is there any regulation as to the distance which vessels should keep from the Island in passing it? Steamers, sir?
145. Yes? Boats are not supposed to come within 50 yards, but I would not let steamers go by, if possible, within the prescribed distance.

146. At what hours do you deliver powder at the magazine? At all hours in the day up to 4 o'clock, but that is generally for shipment. I do not deliver any for Sydney after 9 a.m.
147. And for the railway? Well, they generally leave it at the railway up to 12 o'clock.
148. Have you ever had any bush fires on the Island? No.
149. *Chairman.*] You have had instances of dangerous material being packed in the same packages as merchants' powder, I perceive by one of your regulations;—do you always examine the merchants' packages? Yes, packages which are doubtful, and where the contents are not stated outside, are generally opened. Sometimes it has been found that pistols and revolvers have been packed in the same case with cartridges.
150. Gunsmith's material? Yes.
151. In the event of finding packages of that description, what course does the Government take? The cases are opened and the contents separated; the arms are put into a separate case, and the cartridges packed by themselves.
152. At the expense of the importer? Yes.
153. *Captain Hixson.*] Do you remember an accident which occurred from dynamite or nitro-glycerine some time ago? Oh yes, sir, I remember that.
154. Do you know what was the cause of it? No, sir.
155. What is about the average size of the cases of merchants' powder—imported powder? 25 lbs., 48 lbs., and 50 lbs.
156. Which do you consider the safest—the smaller or the larger packages? The smaller packages are more easily shifted.
157. You think it prudent to pack powder in as small packages as are consistent with the carriage of a large quantity, I suppose? Yes, that would be 25 lbs.; the other sizes, 48 lbs. and 50 lbs., are pretty safe.
158. You don't consider them unsafe? No, sir, I do not.
159. What weight are the Government packages? 100 lbs. common powder and 125 lbs. pebble powder.
160. On the whole, do you think the Government powder or the private powder is the safest to deal with? Well, I think the one is as safe as the other.
161. Provided there is no leakage from the packages? Provided there is no leakage.
162. Did you ever have to cooper a Government powder barrel? No, I cannot say we have; not on receiving it.
163. Is the cooping of barrels of private powder a common occurrence, or is it only occasional? Well, I might say it is only occasional. Some shipments are as tight as can be, and other consignments would be just the reverse again.
164. *Mr. Barnet.*] In hoisting up powder from the lower to the upper wharf how many casks would you hoist at a time? Nine and sometimes ten.
165. And how many of the Government Imperial powder casks would you hoist? Well, we could put on five.
166. And you do put on as many as five? Four or five.
167. What is the height, do you know, between the upper wharf and the lower one? I believe it is about 14 or 15 feet—about that. I could not say exactly.
168. But you don't hoist more than one cask at a time with can-hooks in the magazine? No.
169. On the tray you hoist four or five? Yes.
170. Have you ever seen, or do you know of any, instance, in stowing casks in the magazine, of a cask falling from the can-hooks and breaking? No, sir, I never did.

Mr. Thomas
Rogers.
22 June, 1875.

THURSDAY, 1 JULY, 1875.

Present:—

LIEUT.-COL. RICHARDSON,
E. O. MORIARTY, Esq.,

J. BARNET, Esq.,
CAPTAIN HIXSON.

CAPTAIN G. K. MANN IN THE CHAIR.

Mr. William Marshall Jackson called in and examined:—

171. *Chairman.*] You are the representative of the firm of Lassetter and Co., I believe? Yes.
172. That firm, I believe, is in the habit of receiving large quantities of powder and sending it to places in the country? Yes, to all parts of the colony.
173. What are the particular localities to which it is usually sent? Chiefly to the mining localities—the coal and gold mining localities. Newcastle in the first place, and wherever mining operations are carried on in the colony.
174. Will you name those places more particularly? Yes—Newcastle; the districts around Goulburn; the districts around Bathurst, Mudgee, and Adelong, right away to Bourke—in fact to all mining districts.
175. Do you send the powder to these districts yourself, or is it taken from Sydney by the purchasers? We send it through carriers—by the railway as far as it will go, and then by teams.
176. Is it still your property while it is on the way;—until it is delivered are you responsible for it? No, after we have delivered it at the railway it goes on at the purchaser's risk.
177. Can you give the Board an approximate statement of the quantity of powder expended in—say the Goulburn and Bathurst districts? I have not the figures with me, but I could furnish the information from our books, so as to give you a tolerably correct idea of the quantity we send away in the course of a year.
178. The average annual expenditure? Yes; I will send it you. Railway works would add very much to the expenditure. I may mention that one railway contractor alone has had from us within the last three months 60 tons of powder—20 tons a month.
179. In what sized packages do you send this powder? Always in 48lb. packages.
180. You send it in casks, I presume? We send the blasting powder in casks, and the canister powder usually in cases.
181. The casks are the usual casks for merchants' powder—with hoops? Yes; wooden hoops, with copper fastening.

Mr. W. M.
Jackson.
1 July, 1875.

- Mr. W. M. Jackson. 182. Not copper hoops? No; merely copper tacks on the upper hoop, and that keeps the other hoops in their places.
183. Have you, in your experience, found that these packages are sufficient, or have there been instances in which the powder has been wasted through the breakage of the packages? When the powder comes from first-class makers the packages are always sufficient—such as Hall and Son, Curtis and Harvey, and firms of that kind. Some of the inferior makers send inferior packages. Hall and Son are always good; I have never known them to give way.
184. But there are inferior makers whose powder is sent out? Yes; I have seen their powder. We import Hall's powder chiefly.
185. You import as well as retail it? Oh, yes.
186. Do you import dynamite, nitro-glycerine, and explosives of that kind? Occasionally. We have occasionally dealt in them, but we have found that our customers do not appear to think there is so much benefit derived from the use of these explosives as they imagined at first, and we have not continued to import them.
187. Then the demand for these explosives is not on the increase? No, it is on the decrease.
188. Would it affect the trade much if the powder were packed after some fixed Government regulation; after some particular pattern different to that generally used? Not if you took the standard from some first-class English maker, such as Hall and Son—all packages to be exactly like theirs, which are sufficient to go all round the world, and are admitted into every port.
189. If the standard were taken from the Imperial Government packages, would that affect the trade—would it be an impediment in any way? It would not if a certain time were allowed for clearing off the stock on hand and orders on the water. The magazines should have a certain time to get rid of the packages on hand. There is always a considerable stock of powder on hand and to arrive. There should be a year's notice or something like it.
190. How do you send powder coastwise—by water carriage. I mean what precautions do you take? The casks are shipped loose on board the vessel by which they are going. They have to be shipped below Pinchgut Island, according to particular regulations. They are sent by boat and put on board just as the vessel is going away.
191. Do you send a responsible person from your own establishment to see that this is carefully done? Yes; we employ one man for that purpose exclusively. That may not be the case with every firm; but we employ one man who is accustomed to it.
192. What are the other principal firms who deal in gunpowder and explosives? All the ironmongers deal in powder more or less. There are the American Company, John Keep, Holdsworth, Friend and Sons; they all deal in it. It is an article of importation—most merchants import it occasionally.
193. You can furnish us, I think you said, with a return of the average annual expenditure of powder in each district? I can give you an approximate idea of the quantities. (*Vide Appendix.*)
194. *Lieut.-Col. Richardson.*] Do the other firms which you have mentioned deal in powder in the same large way that you do. Are their transactions equal to yours? Yes, they are of the same nature, more or less; they vary in extent.
195. And about the same in quantity? Perhaps not so much. The magazines' returns will show you the quantity.
196. Do those returns afford any information as to where the powder is sent? No, only to whom it is issued—the house which draws it from the magazine.
197. What we are anxious to ascertain is the average annual or monthly expenditure in these districts? I will furnish you with that in writing in the course of to-morrow—an approximate statement. (*Vide Appendix.*)
198. From your house only? From our own house.
199. *Mr. Barnett.*] What quantity of powder do you keep on your premises in George-street? Never more than 200lbs., the quantity allowed by law.
200. You do not keep dynamite at all? No dynamite at all, or any explosives of that kind—only 200lbs. of powder—nothing beyond that; we have always to be careful about the insurance.
201. *Chairman.*] Would an alteration in the site of the magazine at Goat Island for the storage of powder affect the trade in any way? If it were placed in a less convenient situation for the shipment of powder coastwise it would. Powder has to be put on board the ship at very short notice, sometimes not more than an hour or two, and it has to be taken below Pinchgut, generally when the vessel is under weigh. A less accessible place would incommode the shippers.
202. *Captain Hixson.*] What quantity goes coastwise in proportion to the quantity sent by railway? Well, most of it goes to the interior, as there are no mining localities along the coast, but Newcastle takes nearly as much as all the other places put together.
203. As much is sent to Newcastle for the collieries there and the mining districts inland as goes elsewhere? Almost as much as to all the other places. There is of course a magazine at Newcastle of which we now take advantage. We keep a stock there and find it much more convenient to send it there than to send it in small packages from Sydney.
204. Do you insure all your powder while it is in the custody of the Government in the magazines? No, we do not insure it at all.
205. Do you insure it on its way to the interior? No, only the marine insurance, when it is out of the Colony.
206. You accept the land risk yourself then, but when you send it to sea you insure it? Yes.
207. There is one point upon which I am not quite clear. Do you consider powder delivered to your constituents when you put it on the railway? As soon as we get a receipt from the railway we consider that it ceases to be our property.
208. And you ignore all further responsibility? Yes.
209. So that, in point of fact, if you have any responsibility it exists before you put it on the railway? Yes, whether it is sent by ship or by rail as soon as the receipt is signed our responsibility ceases.
210. Is much powder actually expended in Sydney in retail? The retail ironmongers keep a small quantity in their shops, but I should not imagine they keep more than one keg open.
211. *Mr. Barnett.*] Is not a good deal of powder used for blasting at Pymont? Yes, the retail shopkeepers at Pymont usually come to us for two casks at a time. I don't think any of them keep more than the legal quantity. We get it from the magazines for them and they take it as they want it. 212.

212. *Captain Hixson.*] Well then, if the magazine were removed away from Sydney, but nearer to the railway, it would affect the trade but very little? So that the powder could be brought each day by rail?

213. Yes, so that it could go by rail without coming to Sydney;—would that affect the trade? If the magazines were shifted, and you had a magazine for each railway, it would facilitate the trade. If you had magazines at the different railway termini, because a stock of powder could be kept in each magazine.

Mr. W. M.
Jackson.
1 July, 1875.

214. But what I want to know is this: Supposing the magazines were situated near the railway, so that all orders for the country could be delivered from the magazine on to the line without coming to Sydney at all, would that affect the trade? That would be convenient for inland powder, but not for powder which has to be shipped; it has to be shipped at all hours of the day and at short notice.

215. Then, in point of fact, you do not care where the magazine is for inland powder, but it must be in a convenient place for shipping? Yes, taking the quantity sent to Newcastle, more than half the powder goes by water.

216. Could you insure the powder at Goat Island now if you thought proper? No.

217. Is that because you think the powder is perfectly safe, and you do not think it worth while to insure it, or because it would be too much expense? We consider it perfectly safe.

218. Could you insure it if you thought proper;—would an Insurance Company take it? We have never made the attempt.

219. You do not know whether you could insure it? No, but we can make the attempt.

220. *Mr. Moriarty.*] You say then that you do not insure the powder at Goat Island;—do you know whether any other firms who deal in powder do so? I do not think any of them do; they may; I cannot say.

221. The powder, you say, is in your charge until delivery is taken by the railway;—now, at whose risk is the powder until it is delivered at the railway? At our own risk.

222. And do you see that proper precautions are taken during its transit to the railway station? Yes, we have responsible people to take it there; we place the casks of powder in bags and sew them up before we place them on the railway.

223. Where is that operation performed? At Darling Harbour.

224. Is it done on the land or on the water? On the land on this side.

225. Then it is taken from Goat Island by a person in your employ, brought to Darling Harbour, and then landed and sewn up in bags to be conveyed to the railway? Yes.

226. What is the object of putting it into bags? In case there might be a slight risk of damage from the teams. It is at the Government risk when it is on the railway, but it is apt to get knocked about by the teams. The men are careless and smoke their pipes, and there is a slight risk in that way.

227. Have you ever known accidents to occur to powder from its being carried in that way? Not to our own powder, but I remember one accident to Government teams, and since then we have always put our powder into bags.

228. Have you ever heard of any other accident besides that one? Never since that one.

229. Do you think the trade in Sydney would approve of the persons who convey the powder by water being under Government control, as a precaution against accidents? I think it would be a great improvement.

230. If properly constructed barges were used, and persons duly licensed and under the control of the Government, or officers of the powder magazines were employed to convey the powder, you think it would be an improvement upon the present system? I think it would be a decided improvement.

231. Now, with reference to the difficulty of sending powder coastwise, don't you think it would be easy to arrange, by giving due notice, that the powder should be delivered from a magazine some miles further out than Goat Island. It is generally pretty well known when a vessel is going to leave, and what powder she is going to take. Don't you think it would be easy to send it in properly constructed barges from a magazine, say 10 miles from town? There would be a difficulty with coasters unless the Government provided some magazines on the coast. At Clarence River, for instance, a magazine is required. Then the frequent shipment of powder would be avoided to a great extent.

232. But is it not known some days before a coaster leaves what powder she will take, and would there not be time to make arrangements to take the powder from a magazine, say 10 miles from Sydney? The vessel must be past Pinchgut—some miles off—before she can take the powder on board. The boat has to follow the ship, and the powder is generally taken while she is under weigh.

233. Do you take the powder from Goat Island at all hours of the day? At any hour for shipment. The vessels often are waiting a day or two for a wind, and then the powder has to be taken down at a short notice.

234. Then you think some inconvenience might be caused in that way with regard to powder sent coastwise, if it could not be shipped an hour or two after the order was received? Yes, the powder would very often have to be taken back again. The freight is a matter of small consequence, and they would not care to lose a wind for it; it is not like a whole cargo.

235. Now, if there were a magazine in some place accessible to the railway, so that the powder could be sent by cart direct to the railway, would not that be an improvement upon present arrangements which limit the delivery to 9 o'clock in the morning? No, it would not be so convenient as the present arrangement, because the barges can take it direct to the railway, at the head of Darling Harbour.

236. Is the powder always delivered at Darling Harbour now, instead of being carted through the town as we have heard it has been? Town powder is delivered at Dawes's Battery, and the railway powder is delivered at Darling Harbour.

237. Invariably? Invariably.

238. There is a regulation to that effect? -Yes.

239. And does that regulation state any limit as to the quantity of powder to be landed at Darling Harbour? Yes; the quantity is restricted to 8 cwt. That is all we can send at one time to the railway.

240. And how much can you land at Dawes's Battery? Well, there is some restriction as to the quantity, but we never want to land much. We only keep 200 lbs. in stock, and we never require more than that quantity.

241. Are you acquainted with the mode of storing powder in the towns in the interior? Yes. It is done in the most loose manner. Every storekeeper stores it the best way he can—on the rafters of his store, or down his cellar—in the most reckless way generally.

- Mr. W. M. Jackson. 242. Do you think it would be a good thing to bring the storage of powder in the towns in the interior under some proper regulations? There is no doubt it would.
243. Do you think there would be any difficulty in having magazines properly constructed which should be under the control of the police or some other authorities? I should imagine there would be no difficulty.
244. Have you ever heard of any accident occurring from the loose way in which powder is stored in the country? Never, of my own knowledge. It is a wonder accidents do not occur from the reckless way in which it is stored.
245. *Lieut.-Col. Richardson.*] What description of boat do the merchants use to bring their powder down from Goat Island? An ordinary boat, covered with tarpaulin.
246. A skiff—not a steam-launch, or anything of that sort? No; a large rowing boat.
247. Is that the case with every firm? I think so. I have never heard of anything different.
248. *Mr. Moriarty.*] What towns would you recommend as places where there should be magazines for storing powder? I think there should be one at each of the several termini. There should be one at the Clarence River, at the Richmond and Manning Rivers, and at Macleay. There is one at the Hunter River.
249. You say that 8 cwt. of powder is sent away at one time? Yes, that is the quantity allowed; that is to say, 8 cwt. is allowed to each person to go by train.
250. Then those persons to whom this powder is sent store it in the loose way you have described? Yes, in a very loose way—just as they like in fact.
251. Then 8 cwt. may be stored by one person in a town in the interior? It is not legal to do so. 200lbs. is the quantity allowed. They store it just as they can; probably they distribute it among themselves, but they get that quantity. The police now and then lay an information against them.
252. *Chairman.*] If magazines were established at the railway termini do you think you would make use of them to any great extent? We certainly should, as far as our own firm is concerned. I will give you an instance: Since the Newcastle magazine has been established we have sent large quantities there. We had a consignment yesterday of 400 casks by the "Alexander Duthie," and we sent 300 casks to Newcastle and 100 to Goat Island.
253. *Capt. Hixson.*] What is about the quantity you consider necessary to keep in your trade? Do you mean on the premises?
254. No, I mean for your trade altogether—for the house of Lassetter & Co.—10 tons? Well, we should not like to be restricted to that quantity; we should not like to be restricted to less than 20 tons; but we keep as little as we can on account of the rent; if it were larger people would keep less.
255. Do you consider the rent a tax upon the trade? I think it is exceedingly reasonable for the work that is done for it. In fact we were better satisfied when we paid double rent, because it prevented the English manufacturers from storing large quantities of powder here to the injury of legitimate business.
256. A higher rent than you think would prevent exporters in England from sending out their stocks to Sydney on speculation? Yes, they send their stocks to lie here waiting for a market, to the injury of legitimate business.
257. Do you know if there is much powder in Sydney now—English powder—coming under that category? I have no doubt there is a good deal lying here waiting for a market. Of course a larger amount of rent would deter the manufacturers from sending it; it would not pay them then.
258. *Mr. Moriarty.*] You say that there is a glut of powder sometimes. Do you think any inconvenience would be likely to arise from putting a stop to the forwarding of this powder to Sydney for purposes of speculation? No, I think not, and raising the rent would put a stop to it.
259. You mean that the importers of powder, knowing the demand for it, would always keep a sufficient stock on hand? Yes, it is frequently overdone now, to a great extent.
260. *Capt. Hixson.*] Do you import all your powder from England? Not all of it.
261. I mean do you import from any country besides England? It all comes from England, but we occasionally buy from the manufacturers' agents here, because we have sometimes an opportunity of doing so at a price which is a loss to them.
262. But all your powder comes from England? Yes.
263. *Mr. Barnett.*] What rent do you pay to the magazines for storing powder? A half-penny a cask, a cask under 50 lbs.; that is the reason they are always 48 lbs.
264. *Mr. Moriarty.*] What was it before the reduction? One penny.
265. When was it lowered? Within the last twelve months.
266. How was it done? By a Treasury order, I believe.
267. *Mr. Barnett.*] Did the merchants ask to have it lowered? It was some of the manufacturers' agents here.
268. *Mr. Moriarty.*] Who are the manufacturers' agents here? Mr. Wolfen, Scott, Henderson, & Co., are agents for powder manufacturers, and Tucker & Co., I think.

TUESDAY, 6 JULY, 1875.

Present:—

E. O. MORIARTY, Esq.,
LIEUT.-COL. RICHARDSON,

J. BARNET, Esq.,
CAPTAIN HIXSON.

CAPTAIN G. K. MANN IN THE CHAIR.

Mr. Henry Williams called in and examined:—

- Mr. H. Williams. 269. *Chairman.*] You represent the firm of Keep & Co., Mr. Williams, I believe? Yes; John Keep, of Barrack-street.
270. You have considerable mercantile transactions in gunpowder and explosives, have you not? Yes; I believe as large as any firm in Sydney.
271. You both import and retail gunpowder, do you not? Yes.
272. What are the principal localities to which you send it? In large quantities we send it chiefly to Queensland and to the contractors on the Southern and Western Railway lines; in small quantities we send it all over the country.
273. All the powder you receive is stored in the magazines here? Yes. 274.
- 6 July, 1875.

Mr. H.
Williams.
6 July, 1875.

274. It all has to pass through the magazines? Always through the magazines.
275. What is the practice you usually follow in removing powder for transit up the country? In sending it up the country we have our own men waiting at the Pyrmont railway terminus, where it is put into bags before it goes into the trucks. Of course we have the regular permit from the Ordnance Office and from the railway; and when we ship the powder we provide a boat for the next morning, and have a man waiting to put it on board the vessel below Pinchgut.
276. In whose charge is the powder during its transit from the magazine to the railway or to the vessel? In charge of the boatman only, and in charge of our own men when it goes by railway; they wait for it at the Pyrmont terminus with bags to put it in; then they deliver it and get a receipt for it.
277. In what sized packages is it sent? Always in 48-lb. kegs.
278. Packed in the ordinary way in which merchants' powder is packed? Just the same.
279. There are no copper hoops on the kegs, or any precautions of that sort? No.
280. Have you ever had any experience of the inefficiency of these packages? No; we have never had a complaint of them as long as I can recollect, and we have never had a package broken.
281. If such a thing had occurred you would have been likely to hear of it? Yes, certainly; either the boatmen or our own men would have come and let me know, so that the package might have been exchanged at once.
282. Have you any control over these packages during their transit up the country? None whatever.
283. Then injury might occur to them in the country without your being aware of it? Yes; when we have delivered it at the railway and taken a receipt for it we have nothing further to do with it. After that we considered the owner of the powder responsible for it in every respect.
284. Then the packages may be broken and damaged in their transit up the country, and you may hear nothing of it? We should be sure to hear of it, as the party to whom it was sent would probably make a claim against us and try to get something out of us. All our responsibility ceases when we have delivered it at the railway or on board ship. But in case of sending it by railway, we advise the carriers, Wright, Heaton, & Co., or whoever they may be, that we are sending so many packages in order that they may remove them as soon as possible, because according to the regulations they must be packed and sent off within twenty-four hours from their arrival at any station. When we have given this notice to the carriers' agents we consider we have done our duty, and there ends the matter.
285. Do you think powder barrels for merchants' powder, made with copper hoops, would add much to the cost of the powder? Very greatly; and as there would be little or no sale for these hoops in the interior, I know that our customers at least would grumble very much at having to pay for them.
286. But seeing that the hoops would not be expended, they would still be of value? But what would you do with them?—there is no market for old copper in the interior, although there is in Sydney. In Goulburn, Armidale, and other places up country, you could do nothing with these hoops, and the return carriage to Sydney would be almost as much as they were worth.
287. What would be about the cost of putting, say a ton of powder from the magazine on board the vessel? A ton of powder would be about 45 kegs. The boatmen charge 5s. a load. Our own boatmen would try to take it in two loads, but ordinary boatmen would probably take it in three loads, so that it would cost 15s. in one case and 10s. in the other.
288. And it would be about the same cost to send it to the railway? Yes, that is the charge we always pay, whether the powder goes to the railway or on board ship. The boatmen make the same charge for a single keg as they do for a boat-load, because they both take the same time.
289. What is the charge for freight per ton on powder sent coastwise? They won't take it by the ton. The freight to Newcastle would be at the rate of about 2s. per keg; to Grafton as much as 8s.; to Brisbane as much as 4s. to 6s.; and to the northern ports of Queensland, such as Cook's River, from 8s. to 10s., according to the number of vessels laid on for those ports.
290. What would be the cost of transit for the same quantity if sent by land carriage, exclusive of the railway charge? That I cannot tell you; we never pay the land carriage. The freight and boat-hire in Sydney is all we pay, and then it passes out of our hands. The carriage inland is paid by the carriers' agents, and we have nothing to do with it. I do not know what rate is charged.
291. In what description of boats do you send the powder off to vessels for shipment? A small quantity would be sent in an ordinary waterman's boat, but he would have a larger boat for shipping powder in rough weather, or if he had a large load to take. If it were only a question of taking only eight or ten kegs, it would go in an ordinary waterman's boat.
292. Do you think it would be an advantage to the trade if the site of the magazine were in closer proximity to the railway than it is now? It would, as far as regards the powder sent by railway; but it would be a disadvantage in cases where it had to be shipped.
293. What would be the requirements of the trade in selecting the site for a powder magazine? You would have to see that it was not too far down the harbour to make it costly to bring the powder to our stores and to the railway, nor so far up the Parramatta River as to make it too expensive to ship it on board vessels down the harbour, and to increase the difficulty of catching the vessel. The owners of vessels are very indifferent about taking small lots of powder, and sometimes if they can they will avail themselves of any excuse to avoid taking it, although we have arranged with them beforehand to do so.
294. If the removal of the powder from the magazine were conducted under the surveillance of the Government, these objections would not exist? Not if proper arrangements were made. If we could ship powder without any delay there would be no objection whatever.
295. Would the trade be prepared to pay any extra charge that might be necessary for the conveyance of powder by the Government? I should say they would certainly, because the expense would not probably be much greater if it were sent by the Government than by an ordinary boatman. If some arrangement could be made by which, when we have to ship powder by a vessel, we could send the receipts and all necessary documents to the Ordnance Office, and they would attend to the shipment and charge us for doing so, I do not think it would be in any way objectionable. I cannot see that there would be any difficulty in the Government delivering the powder at a proper railway receiving dépôt, if we left the necessary documents at the Ordnance Office on the previous day.
296. I understand you that at present the powder, if sent in a waterman's boat, is merely in charge of the waterman and no other person? No other person until it reaches the railway dépôt.
297. What precautions are taken in sending it by boat? I cannot say; I believe there is simply a tarpaulin thrown

Mr. H.
Williams.
6 July, 1875.

thrown over it. I look upon the conveyance of the powder from the magazine to the present railway terminus at Pymont as the most dangerous part of the transit. At no other time is there likely to be so much danger, as at the time it is generally sent all the Balmain and other steamers are passing up and down the harbour; in fact I look upon it as a most dangerous arrangement altogether. For instance, about six weeks or two months ago we sent 150 kegs of powder to one of the railway contractors—it was all sent in the course of one morning; of course it all had to go by railway and to be packed and delivered before 12 o'clock—although we generally get all ours packed and delivered before 9 o'clock, if possible. Well, just at the time that the different boats in which this powder was sent were on their way, most of the steamers were proceeding to town and crossing our boats, which I consider very dangerous.

298. Could you furnish the Board with an approximate return of the powder expended in the various districts which are supplied by your firm? I will endeavour to do so. For what length of time?

299. Say the monthly or annual expenditure—the quantity of powder supplied by your firm. I wish to know whether it would be advisable to establish local magazines, and what size these magazines should be—what their capacity for storing powder should be? I will furnish the information as soon as I can. (*Vide Appendix.*)

300. Do you think the establishment of local magazines would be an advantage to the trade? Not the slightest. There is no inland town that I know of where a sufficient quantity of powder is kept. The large quantities sent up by railway are mostly kept by the contractors on the lines, generally away from the towns.

301. *Lieut.-Col. Richardson.*] You spoke just now of putting these packages of powder into bags? Yes, we have to provide new three-bushel bags—ordinary cornsacks—and into each of these bags two kegs of blasting powder are placed and sewn up securely, and labels are attached to the bags. If the bags are in any way defective they are not received by the railway, and we have to provide new ones.

302. Is that one of the railway regulations or is it an arrangement of your own? No, that is the railway regulation;—that is for blasting powder. They will take canister powder without.

303. What is the object of putting this powder into bags? In case the hoops should move and the head should fall in and the powder escape.

304. In that case the bags would save the powder? Yes, it is done as a precaution.

305. You state that the powder packed in this way is quite secure now in its transit to the interior? Yes.

306. Would these packages stand the wear and tear caused by travelling on a dray over rough roads? In the course of twenty-five years experience I have never known but one accident where the hoops gave way, and that was eight or ten years ago, on the Western line; I never heard of an accident in any other case.

307. *Mr. Barnett.*] How long have bags been used for this purpose? About two years I think.

308. *Mr. Moriarty.*] Were the bags in use at the time of this accident on the Western railway? No sir; I think it was that accident which caused the regulation to be made.

309. Now do you think the ordinary bags are sufficiently close in the grain and properly made to prevent any powder from leaking out? Yes; I think they are sufficient for the purpose for which they are required—for blasting powder I think they are perfectly safe—they would not be suitable for canister powder.

310. In moving the powder in boats you do not adopt any of the precautions used at the magazines, such as laying down wadmilt tilts or leather hides? No.

311. You think then that if the Government were to undertake, by its own officers, the delivery of powder to vessels taking it coastwise, and also to the railway trucks, there would be no objection to remove the Powder Magazine from Goat Island and to place it further up the Parramatta River, or further from the town? No, I don't think there would be. There might be occasionally some little difficulty in shipping the powder, because we cannot always get information as to when the vessel is going to leave as early as we should like, so that we might find some little difficulty in giving sufficient notice to the Ordnance Office, but that would be only occasionally. And a great deal of that difficulty might be obviated by altering the present law, as I will show you. When a vessel takes a large quantity of powder there is no difficulty because the owner has sufficient inducement to make him conform to the regulations of the Ordnance Office, and to meet our wishes, but it would work badly when small quantities, such as two or three kegs, for instance, have to be shipped. There is as much trouble for a vessel to take two or three kegs as to take thirty. The same notice has to be given, and there is not the same inducement to the owner. They very often try to make excuses to avoid taking it, and under the new arrangement you speak of they would frequently slip quietly down the harbour without the powder, and excuse themselves by saying the boat was not there at the required time. That difficulty could be got over by allowing small quantities of powder, say up to four kegs, to be shipped from some wharf appointed by the Government—the present receiving wharf would perhaps be the best place—at any time during the day, in the same way that now they allow it to be sent to the railway. Under the present arrangements, if we shipped a keg of powder from any of the wharfs during the day it would be liable to be seized and we should be liable to be punished, but at the same time we may deliver four kegs to the railway, and I know of no law to prevent our sending the same quantity to Lassetter & Co., or to any one in town, without incurring any penalty. In short, if each of you gentlemen were to order a keg of powder we might deliver it to you during the day, but we must not deliver it at any of the wharfs. Now, to get over this difficulty, I think the Government should allow us to ship up to four kegs from some wharf during the day, and that would provide for the smaller quantities, which the owners of vessels are unwilling to take, while in respect to the larger quantities they would be quite willing to comply with the regulations.

312. You say that you may now deliver four kegs of powder to Lassetter & Co., or any other firm in town, at any time during the day? Yes, or to the railway at any time during the day. The railway will receive four kegs of powder, but any quantity beyond that we are bound to deliver in the regular way at the railway terminus at Pymont.

313. But up to that quantity you may send powder to any place in town, or to the railway, at any time of the day? Yes, we have done that for years.

314. And you would recommend that privilege to be extended so as to allow of four casks being shipped at the wharfs? No, from one wharf,—say the wharf at Dawes' Battery; it would be for the Board to determine the place—from two to four kegs. That would do away with the difficulty of asking the Ordnance Office to deliver every little trumpery package. Under the present arrangements we don't

care

care to sell these small quantities. If a person wants a couple of kegs we endeavour to decline the order, because we are expected to send it in a boat, and to put it on board the vessel below Pinchgut, and it does not actually pay us.

Mr. H.
Williams.

6 July, 1875.

315. Do you think the trade and the public generally would be satisfied to incur the additional expense which would probably be entailed by the Government taking the shipment into their own hands? I don't think there ought to be any additional expense, because if an ordinary boatman can deliver a load for 5s., the Government ought to be able to do the same, and if the boatman delivers four loads he charges £1.

316. And is the export of powder sufficiently regular to pay for keeping up—say a steam launch and a regular powder boat? Well, I do not know about a steam launch; I hardly think it is.

317. Even if there were some slight additional expense—even if the cost were doubled—do you think it would be felt as a serious tax upon the trade. Supposing the Government were to do all the shipping, and to charge a rate for it which would be about double what is at present paid for it, do you think it would be a serious tax upon the trade? Yes, in some cases, because in blasting powder very frequently the profit is only $\frac{1}{2}$ d. per lb., and certainly, I think I may say, never over 1d.

318. Yes, but then I assume that the additional charge would be added to the price of the powder, and it would be the consumer who would have to pay it? No, we always pay all the expense of putting it on board.

319. But if you were put to more expense in doing it you would charge a little more for the powder—of course you would pay for it in the first instance? No, we make no additional charge; we ship the powder on board the vessel at the same rate that we deliver it at the railway station.

320. Yes, but if the cost of putting it on board ship were increased, would you not charge $\frac{1}{2}$ d. more? If it were considered necessary to the safety of the public to increase the cost of shipment in that way.

321. Do you think it would be a serious tax upon the trade? No, I don't think so.

322. Have you ever formed any opinion as to whether the magazine at Goat Island is too close to the town? I think it is.

323. You think it ought to be removed? Yes, I have thought so for many years.

324. You have come to that conclusion from being acquainted with the risk attending upon powder and from considerable experience in the trade? Yes; and there is one thing I should certainly recommend; that dynamite and lithofracteur should never be kept on Goat Island at all, or in any new depôt in the same place with powder.

325. You do not deal in these explosives yourself, do you? We did; we imported them in the first instance, but there was so much objection made to taking them in vessels—even the boatmen did not like to take them—and from our own experience we did not like to keep them, that we left off importing them. When these explosives first came out I had a few dynamite cartridges, just as a sample, to show people; and I noticed after a short time that without exposure to the sun or to the weather the paper gradually began to get very oily. I kept them to see what further change would take place, and I noticed that the whole of the glycerine seemed to leave the earth and soak into the paper-wrapper. I tore off a piece of the paper-wrapper, about the size of a shilling, put it on an anvil and struck it, and the report was just as if a gun had been let off. Seeing that some chemical change was evidently taking place, and being utterly ignorant of what it might lead to I at once got rid of the whole of the stuff, and declined to have anything further to do with it.

326. Was that long ago? About twelve months, I think. Now if we are bound to get it we simply go out and purchase it and ship it from the magazine; we never have it on our premises at all.

327. From whom do you purchase it? From Alderson and Sons; I believe they are the only holders now.

328. *Chairman.*] Are you of opinion that the use of dynamite, nitro-glycerine, and that description of explosives is on the increase or on the decrease? I think it is on the decrease. At first there was a great demand for them; they were something new and people wanted to try them, but there has been very little demand for them for some time, and that is dying out now.

329. Would there be any means of increasing the size of the magazine at Spectacle Island;—would that be large enough? I am not sufficiently acquainted with the locality to know.

330. Would it be possible to deliver the powder, somewhere up at Iron Cove Bridge, past the chemical works at the back of Balmain, so that it would not go up the harbour at all? If you adopt the plan you have suggested it would be better to take it from there to the railway without having to go up the harbour, because I look upon that as the greatest risk of all.

331. *Mr. Moriarty.*] You think that would be the best place from which to take it to the railway? Yes, I think so, even if it became necessary to lay down a line from the nearest landing point on Spectacle Island to the railway.

332. *Mr. Barnet.*] Do you keep any powder in the magazine at Newcastle? Never; they have lately made such regulations at the Newcastle receiving ship that we have given our travellers instructions to take no orders for powder for the Northern districts at all.

333. Then you do not send any powder to Newcastle? No; we always decline orders if possible. If there are only a couple of kegs, and they reach there after 10 o'clock, we have to get a special permit and employ a special agent to take it out and to put it on the railway. These are special regulations which work so badly that we do not care to have anything to do with them, and we give our travellers instructions to take no orders for the Northern districts.

334. *Capt. Hixson.*] Would you suggest then that some such regulations should be made in respect to the Newcastle magazine as are now in force in the delivery of powder in Sydney? If the person in charge of the receiving ship at Newcastle would undertake to deliver the powder to the railway, and give a receipt upon our paying him, we should be very glad of it.

335. In the event of the magazine being removed to a distance from shipping places in Sydney, and taking into consideration the uncertainty as to the exact time at which vessels leave, do you think there would be any great risk in the powder remaining in the Government delivery boat until the vessel was ready to take it? I don't see that there would be any risk; but these little coasters are very uncertain. They tell you they will positively be off at 10 o'clock at night, and they have not sailed at 9 o'clock the next morning; but that does not signify now, because we hand over the papers to our boatman, who knows where the vessel is and keeps his eye on her, and if she sails at daybreak he takes the powder off and puts it on board.

- Mr. H. Williams.
6 July, 1875.
336. Then you do not think the magazine should be moved higher up the river to the injury of the shipping trade? Well, there is only one suggestion I can offer: You might have a depôt on Spectacle Island, or a large vessel might be moored there if necessary; and it might answer to give the Ordnance Office say three days notice that certain stocks were required to be brought down to the present magazine, so as only to leave a small stock there. It might work well if you thought proper to keep up the two establishments—some arrangement of that sort might be made.
337. You recommend that the larger or store magazine should be removed some distance from Sydney, and a smaller depôt in some locality to be decided upon nearer town? Either that, or your proposition to have only one depôt—say near Spectacle Island—and deliver the powder by your own boats, for which you would make the necessary charge.
338. Do you think the magazine at Goat Island would be suitable for the purpose—as a depôt? Yes.
339. For the smaller quantity of powder? For the smaller quantity.
340. Mr. Barnet.] What quantity of powder do you think it would answer to keep on Goat Island for mercantile purposes, supposing it to be the depôt? I should think twenty kegs for each house would be sufficient.
341. Capt. Hixson.] How many houses are there who deal in it? There is Lassetter's; our's; Holdsworth; Macintosh; Riley & Cohen; Wolfen; and Scott & Henderson.
342. About 100 kegs altogether then would be sufficient? Well, I suppose 100 kegs would answer the requirements of the trade. If we put in twenty kegs it would be with the intention of taking some of it out again. We always draw powder for storage purposes once a week, and sometimes twice a week.
343. Then you think that about 100 kegs would answer all requirements for powder sent coastwise? I think it would be sufficient for town consumption.
344. Can you give an opinion as to whether the storage of that quantity on Goat Island would even be dangerous? I could not tell you, for I do not know the distance from the magazine to the houses round about, or what would be the force of an explosion.
345. Mr. Moriarty.] Do you think if a regulation were made to the effect that all merchants' powder should be properly hooped with copper hoops, it would be felt to be a hardship in any way? I think it would be a great hardship. The cost of copper hoops for 500 casks of blasting powder would come to a good deal of money.
346. How much do you suppose? Each keg would require four copper hoops in addition to the wooden ones.
347. Only two copper hoops—one at the top and the other at the bottom of the keg—all the rest would be of wood? I suppose each hoop would weigh about 2lbs., and that would come to at least six shillings a keg.
348. Mr. Barnet.] Don't you think that if the regulations for delivering powder from the magazine to the vessels were the same as for delivering it to the railway, there would be no necessity for keeping a stock at Goat Island? I think if the Government undertook to deliver it by their own boats, upon our sending the requisite documents to the Ordnance office the day before, it would answer very well, especially if we were allowed to ship four kegs under the same regulations which apply to sending it to the railway—that is to say, at some particular wharf we might ship that quantity at any time of the day; then I think the other arrangements might very well be carried out.
349. Mr. Moriarty.] What is the ordinary price of powder here? Blasting powder averages 6d. for some brands, and 7d. for others. Sometimes it goes up to 9d., just now it is 8d., being rather scarce; but from 6d. to 7d. may be taken as the average price, according to the brand, all the year round.
350. Chairman.] Do I understand you that two kegs of powder are packed in each bag? Always, when it is sent to the railway.
351. That is the usual practice? It is always the practice in respect to blasting powder; canister powder does not require to be put into bags. At the present time you may say that it is almost impossible to send powder to the Clarence River district. There are not above two vessels in the year which leave Sydney for the Clarence district, and the steamers will not take it. Sometime ago I mentioned the matter to the Collector of Customs and pointed out that the owners of the Clarence River steamboats would be quite willing to take small quantities of powder—parcels containing perhaps 12 lbs., and would provide iron safes to put it in if they were allowed to do so, but he said he had simply to look to the laws as they were and not to make new ones. At present it is almost impossible to get a canister of powder to the Clarence River district at all.
352. Is the expenditure of powder in the Clarence River district considerable? No, it is simply gunpowder required for shooting purposes. The Government have lately required a little for the breakwater they are making up there, but not very much.
353. Mr. Moriarty.] Are not the steamboats allowed to take it under proper regulations? No; but the powder finds its way there somehow or other, so that these stringent regulations induce people to break the law and they act unfairly towards those who are inclined to keep it, as our correspondents write down to us and say that other houses pay more attention to their interests than we do.

TUESDAY, 13 JULY, 1875.

Present:—

LIEUT.-COL. RICHARDSON, | E. O. MORIARTY, Esq.,
J. BARNET, Esq.

CAPTAIN G. K. MANN IN THE CHAIR.

Mr. William Wolfen called in and examined:—

- Mr. W. Wolfen.
13 July, 1875.
354. Chairman.] You are an importer of chemical explosives I believe, Mr. Wolfen, such as dynamite, nitro-glycerine, and explosives of that description;—are you not? No; I am only an importer of gunpowder. Some years ago I had four cases of nitro-glycerine consigned to me, but they were not my property.
355. Then at the present time you have no dynamite, nitro-glycerine, or any explosives of that class? None whatever.

356. In what quantities do you generally receive the powder you import? I have asked my book-keeper to give me the returns for the last four years, and I find that in 1872 our importations were 2,500 kegs of blasting powder and 480 boxes of canister powder; in 1873 we imported 2,400 kegs of blasting powder and ten boxes of canister powder; in 1874, 1,500 kegs of blasting powder, and in 1875, up to the present moment, we have received 3,000 kegs of blasting powder and 240 boxes of canister powder.
357. Can you give the Board any information as to the localities to which that powder was principally sent? I believe it all goes to Goat Island. I have no certain knowledge where it goes to, but I think it all goes there.
358. I asked you the question with a view to ascertain its ultimate destination—the districts in which that quantity of powder is principally expended? We sell it to the contractors and ironmongers, and it passes out of our hands when we execute the order; we have nothing to do with the despatch of the powder, except in a few instances, where persons who live at a distance ask us to pay the Custom House duty and the rent, and fill up the necessary papers, in order to facilitate delivery. Practically, we sell it to the ironmongers, such as Lassetter and Co., Friend and Co., and to the large contractors, such as Watkins, Amos, and others.
359. Then you are unable to give the Board any information as to the localities in which the greatest expenditure takes place? I am unable to do so, but I know that the greater part—in fact nearly the whole—of the powder is sent either to the railway, or, if it is going north, by vessels to Newcastle.
360. In what sized packages does the powder usually arrive? Until recently it used to be sent in 48-lbs. packages, and sometimes in 24-lbs. packages; but lately, in consequence of some alteration in the rate for rent, it has been sent out in 50-lbs. packages.
361. Has any accident ever come under your knowledge caused by the deficiency of these packages? Not that I can remember; sometimes one or two packages appear to be damaged in some way or other, either from carelessness or from some other cause, but the packages sent out by the firm from whom we get our powder chiefly, are in very good order, and every attention is paid to them.
362. When you receive notice of the arrival of powder consigned to you, what steps do you take to remove it to the magazine? None whatever; the shippers provide for that. When a ship arrives with powder, they give notice to the authorities, and then the powder is lightered to the place where it is eventually deposited, which I believe is Goat Island.
363. Have you any knowledge as to how that is done? No; I have no particular knowledge of it.
364. In making sales of powder do you merely dispose of it in the magazine, and leave the purchaser to take it away? Yes, in most cases, except in such instances as I have already mentioned, where people who have no office in Sydney ask us occasionally—very rarely indeed—to deliver the powder and to send it by railway to its destination.
365. When you do remove it, what steps do you take for that purpose? First of all we pay the duty upon it, then we apply for a delivery order and we hand it over to the lighterman who does all that is necessary, and takes it from Goat Island to the Railway Station at Pyrmont, where the Government trucks receive it. The lightermen carry it during its transit from the wharf to the railway trucks.
366. Who are the lightermen you generally employ? We always employ Bayliss; we have employed him about 20 years.
367. Are tarpaulins or any other precautions against accident provided, or is that done by the lightermen? We usually send 3-bushel bags and the packages are put into these bags and sent on in that way.
368. How long have you been in the habit of placing these packages in bags? I could not tell you how long; I do not recollect the time.
369. It used not to be done formerly, I believe? No, I think not; in that part of the business I am entirely in the hands of my book-keeper. I know that of late we have sent it in 3-bushel bags. It has always been very unsatisfactory to me to place this powder in the hands of the lightermen; but that practice has been in existence a long time; we have been prevented from taking it into our own hands. We often of course feel that in landing the powder at the wharf it is impossible to say what they may not do to injure our property, but we have no power to do anything in the matter.
370. You never send anyone with it from your own establishment? No. I may state, while you are discussing this question, that I think it would be very desirable that no powder should be delivered, except under some Government regulations—I think some Government officer should attend to its delivery. That might entail some additional expenditure, but we should always be very glad to pay it for the sake of the increased security which would be afforded.
371. Do I understand you that you think the Government ought to superintend the delivery and transit of the powder? Yes, until it reaches its destination.
372. Would the trade, do you think, be willing to pay the additional cost of that supervision? Yes, I think they would be glad to contribute something towards the safety of the general public. The expense would not be much, and we should be relieved from the uncertainty which now attends the delivery of the powder, and the apprehensions we often feel that some accident may occur.
373. *Mr. Moriarty.* The whole responsibility in connection with the removal of the powder from the Government Magazine to the railway truck is now, you say, Mr. Wolfen, in the hands of the lightermen? Yes, till it reaches the railway trucks.
374. And you consider this to be an injudicious practice? I think so.
375. You think the powder ought to be under some more rigid control than that of ordinary boatmen? I think it ought never to be left unprotected until it reaches the Government truck. An officer should accompany each boat.
376. And you think any extra cost which such supervision would entail would be gladly defrayed by those persons who are engaged in the trade? It would be cheerfully borne, I should say; it would only be a question of a day's wages, or something of that kind.
377. You have no doubt given a good deal of attention to the consideration of this subject—as to the propriety of retaining the magazine at Goat Island? Yes, I have.
378. Now, what is your opinion;—do you think it is too close to Sydney or not? There is no question about it; I think we are in great danger from it.
379. And you give that opinion, having a thorough acquaintance with the mode in which the powder business is conducted? Well, I have no particular knowledge of how it is conducted at Goat Island.
380. I mean with regard to the shipping of merchants' powder generally? Yes.
381. And knowing how the merchants' powder is dealt with, it is your opinion that Goat Island is not a suitable

Mr. W.
Wolfen.

13 July, 1875.

Mr. W.
Wolfen.
13 July, 1875.

suitable place for the storage of gunpowder? Yes. I have been so apprehensive about Goat Island that I have made application, not once but several times, to the Government to allow me to erect a magazine of my own in some convenient place. From the very great apprehension which I have always had for the last twenty years of an explosion at Goat Island, I have always kept that object in view, and during that time we have been the largest importers of gunpowder. But the Government declined to accede to my application.

382. May I inquire, if I am not asking too much, whether you have ever selected a place which you thought would be suitable for a magazine? I have not; but as a preliminary consideration I have always thought some of these exposed heights near Sydney would be the most suitable, for as sound travels upwards the higher the site the better it would be.

383. You have not finally made up your mind on the subject? No.

384. But you are of opinion that it would be a good thing if the Government were to exercise a more rigid control over the powder, not only with regard to its storage but also in its removal from the magazine? Certainly. I think there is more frequently danger in the removal than in the storage, because the risk in delivering it may be frequent; but an explosion at Goat Island could only take place once.

385. And the danger arising out of these small quantities of powder being moved about is sufficient, you think, to warrant the Government in taking the matter into their own hands? Yes, I think so. The expense would bear no proportion to the advantage we should derive from it. The expense would be scarcely appreciable. The cost of a man's wages would be nothing to speak of in a sale of 5 tons of powder; it would not be enough per lb. to enable me to make any extra charge.

386. At any rate you think you would be willing to pay any extra charge which might be found necessary? Yes, I should be perfectly willing to pay it.

387. Of course the powder trade is likely to increase in this country. Have you found it increase rapidly during the last few years? Yes, it has increased.

388. And is likely to increase? Yes, I think so. As railways are constructed, and mining operations carried on, it will increase every year. I have noticed that within the last twelve months it has increased very much.

389. So that, if there exists at the present time any occasion for the removal of the magazine from Goat Island, the necessity will be growing every year? Well, I am not prepared to go quite so far as that, inasmuch as the railways have already been extended beyond the mountains, and I fancy the expenditure of powder further on will not be so great. The chief increase in the expenditure of powder will be, I think, in mining enterprises, when our quartz reefs come to be worked in a more scientific manner.

390. Anyhow, as the growth of the country increases, it is probable that the consumption of powder will increase, and that the necessity of removing the source of danger at Goat Island will grow every year? Certainly.

391. You ship a good deal of powder coastwise, I believe? Very little; that is done chiefly by the iron-mongers and retail dealers; they ship a good deal of powder in small parcels coastwise. We occasionally ship to Newcastle.

392. You sell to them in the first instance? Yes, we give them an order for a certain quantity and they take it as they require it.

393. You are pretty well acquainted with the neighbourhood of Sydney, I presume? Yes.

394. Have you ever considered a suitable place for a magazine? Well, there are two things to be considered—first where the powder goes to principally, and next the necessity of having it under the supervision of a Government officer during its transit from the magazine to the railway truck. I think then it should be delivered at two points on the railway lines, at such places as would be distant from any towns or villages, so that there would be no great danger from an explosion. Then I have sometimes thought that a hulk would be most suitable for storage—a hulk near the entrance of the harbour, which could be removed in the event of danger accruing either from invasion or from any other source. That inasmuch as most of the powder, in fact almost the whole of the powder, goes by a line of railway, it ought to be taken to the extreme points of the railways, from which places it could be conveyed to mining localities, or to Government contractors, or others who might have occasion for it.

395. Have you been for many years connected with the powder trade? For more than twenty years.

396. Some years ago, if I remember rightly, there was a great deal of powder stored in a hulk? Yes, off Goat Island.

397. Did you find any deterioration in the powder take place? None whatever.

398. Then you see no objection to storing powder in a hulk? None at all.

399. I suppose that would be about the cheapest way of storing gunpowder? Yes, I should think so. Goat Island is certainly a very convenient place for storing powder, and so would a place be for me if it were next door to my own premises, but it would be rather uncomfortable if an explosion took place, and I would rather put up with a little inconvenience for the sake of the public safety.

400. *Mr. Barnett.*] Do you import any other explosives—such as dynamite, or nitro-glycerine? No.

401. When you have occasion to send powder to Newcastle do you store it there? No; it passes out of our control altogether. It goes by sailing vessels, I believe; the steamers are not allowed to take it. I believe there is a magazine or depôt of some kind at Newcastle, but we have nothing to do with it.

402. *Colonel Richardson.*] You were speaking just now of the packages in which the powder is sent out;—do you think they are strong enough to stand the careless manipulation to which they are subjected? I think so; they are very carefully made up, especially the packages from Pigou & Wilks, the firm from whom we receive our powder chiefly.

403. Are they strong enough to stand the rough usage they receive on the drays which convey them up the country? I have always found them so.

404. Is there anything in your opinion to justify a recommendation from this Board that the powder should be packed in packages, similar to those in which the Government powder is sent out—with copper hoops? I am scarcely prepared to give an opinion upon that point, because it is almost a scientific question. I know that Pigou & Wilks used copper nails, but the hoops are of wood.

405. The Government packages have two copper hoops besides the wooden ones? Perhaps the Government packages are larger; we used to import powder in large packages of 100 lbs. each, but we found them very unwieldy.

406. Does dynamite require greater delicacy in handling and treatment than gunpowder? Well, from my experience,

experience, and from what I have read and heard from all parts of the world, persons who deal in these explosives have never been able to keep them under proper control. Sometimes a change of temperature affects them, and causes an explosion; sometimes it is the heat; at other times the damp. The cause of these spontaneous combustions has never been clearly and definitely traced. In Germany, in consequence of the disasters which have arisen from these explosives their importation has been prohibited. I hold in my hand a mournful memento of a disaster which occurred to me fifteen years ago, by which I lost more than £5,000. (*Handing paper to Licut.-Col. Richardson.*)

W. Wolfen,
Esq.
13 July, 1875.

405. That was from an explosion of nitro-glycerine? Yes.

406. That is just as treacherous as dynamite? Yes.

407. All these explosives are regarded with general mistrust? Yes; they are efficacious in their operation, but very dangerous. I have been in great fear for some years past in consequence of these dangerous explosives, that my property would be destroyed, and I have not been able to get any of the Insurance Companies to insure it. I would willingly pay the value of the whole of these explosives, and sink the money rather than store them in the Goat Island Magazine.

408. Is gun cotton much used in this Colony? I have no knowledge of it. If it had been used to any extent we should have been sure to have had some of it, as we are by far the largest importers of gunpowder. I have consulted with my book-keeper as to what he thinks it would be most desirable to do in connection with the magazine; and he is of opinion that the Government should undertake the duties now performed by the lightermen, and charge the consumers or the merchants for it. In that way the services of the lightermen would be dispensed with altogether, and we should of course be quite willing to pay the Government for doing their work, and it would be much safer. He estimates that by a charge of 2d. for lighterage from the ship to the magazine, and 2d. again from the magazine to the ship, the Government would derive a very considerable revenue from it.

409. *Chairman.*] 2d. per lb.? Per package. And it must be borne in mind that the transit from the ship to the magazine, or *vice versa*, from the magazine to the ship, takes only a short time, and 2d. per package would more than pay for the lighterage. Last week we landed 1,000 packages. The powder would then be under Government control.

410. You mentioned just now, Mr. Wolfen, something relative to the regulations in Germany;—are you aware of any regulations existing in that country for the storage and transit of powder—not Government powder? No. I spoke from hearsay only and from what I have heard and read in the papers of disasters which have frequently occurred.

411. Nor in any part of the Continent? No.

412. Are you aware that in France the transit of powder is entirely in the hands of the Government, and that it is always done by escort? I have not heard of it.

413. Are there any other lightermen besides Bayliss who are employed in this trade? I do not know. We have always employed him, and we have had no occasion to make inquiries for any other.

414. You think 2d. for each package would cover the cost of transit? Yes.

415. What sized packages are they? Generally 50 lbs. I think, if you will allow me to say so, the cannister powder, of which there is always a large quantity imported, might be treated differently; that might remain at Goat Island with tolerable safety.

416. *Mr. Moriarty.*] You mentioned just now that your attention had been drawn to explosions on the Continent;—could you give us the particulars of any of those explosions? I could not. I only know of them from what I have read and heard of disasters arising from these explosive substances under different names. Pigou and Wilks, of London, told me that they were all the same substance but differently named. I have read of immense explosions in San Francisco, where a vast amount of property was destroyed, and I frequently hear of the danger arising from these explosives; sometimes it arises from a hot cellar—at other times from a damp cellar; no one seems to have discovered the real cause.

417. Have you had any dealings yourself with any other explosives besides nitro-glycerine? I have had no dealings of any kind with them, except in the case of the unfortunate occurrence which I have mentioned to you. A Swede, who was nephew of the man who invented nitro-glycerine, obtained the address of my agents in London, and asked to be allowed to send these four cases to them for despatch to Sydney. They were sent out consequently to my address here, pending their delivery to this Swede, and were stored on my premises without my having the slightest knowledge of the fact, and it was not until the explosion took place that I discovered it.

418. *Chairman.*] Are there any more suggestions which you would like to make? No; except that I would urge upon the Government to take some steps to relieve us from the anxiety we have been suffering for the last twenty years.

419. You mean with regard to the removal of the powder? Yes; I should be very glad to pay any extra expense which might be incurred. I would call your attention to the great danger which exists in removing the powder from Goat Island to the railway truck.

420. *Mr. Moriarty.*] You consider the removal dangerous under present arrangements? I think the danger is more frequent in moving the powder from the magazine without proper supervision. Bayliss is a very careful man, but he cannot always be looking after his men, and they may sit down to rest and have a smoke while they are taking the powder to the railway truck. Bayliss is, however, a very careful and trustworthy man.

FRIDAY, 16 JULY, 1875.

Present:—

LIEUT.-COL. RICHARDSON, | J. BARNET, Esq.,
E. O. MORIARTY, Esq.

CAPT. G. K. MANN IN THE CHAIR.

Mr. Wm. Bayliss called in and examined:—

421. *Chairman.*] You are a stevedore and lighterman employed in this port I believe? I am.

422. How long have you been engaged in that occupation? Upwards of thirty years.

423. During that time have you conveyed much powder about the harbour? Most of the powder that arrives in the harbour goes through my hands to the magazine, and comes back again through my hands, either for shipping or to the railway. For 100 barrels anyone else takes I take 2,000.

Mr.
W. Bayliss.
16 July, 1875.

Mr.
W. Bayliss.
16 July, 1875.

424. There are other persons employed in the same occupation, are there not? Yes, as lightermen; but very few in the powder trade; they get a job now and then to convey powder.

425. Have you any particular class of boat or lighter which you use for the conveyance of powder? No particular boat; that is to say, the lighters are strong and substantial, but not different from the usual hull of a vessel.

426. These boats are used for other purposes as well? They are sir.

427. Where do you mostly convey the powder to? From the ship to Goat Island, and sometimes to Spectacle Island; and sometimes from the ship with a Collector's order for transhipment to Newcastle or other places, but not without a Customs entry handed to me; and from the magazine to Darling Harbour to the Railway Station; or from the magazine to Dawes' Point, which is the only place where I can land powder at stipulated hours.

428. The transhipment to Darling Harbour and Dawes' Point takes place at specified hours? Yes sir, at Dawes' Point—every morning from sunrise to 10 o'clock is the hour laid down, but we are never later than 7 or 8 o'clock, on account of conveying the powder through the town, though the harbour regulations give us till 10 o'clock.

429. And you can take it to the other places up to 10 o'clock? Yes; the railway take it away at 12 o'clock.

430. What is the general size of the cargoes you have to convey on these occasions? Where to sir?

431. To the railway in the first instance—what is the usual quantity? Sometimes as much as 500 barrels. There are two days only in the week in which we are allowed to take powder to the railway—Mondays and Wednesdays. Some days I take 500 barrels—some days only eighty or ninety—some days perhaps none at all.

432. The cargoes you put on board vessels for shipment—are they generally larger or smaller than the others? No; much about the same. Sometimes I may have 150 barrels to ship. I consider that a very heavy shipment. In a small vessel, perhaps, going to Newcastle, I might have perhaps half that quantity and that might be going to three or four different merchants.

433. Of course you cannot always be present yourself on these occasions, and the powder has to be entrusted to your men to a great extent? Yes, or I am there myself, or one of my sons.

434. Have they had much experience in this business? Yes; I keep them looking after it.

435. How long have they been engaged in this occupation? I should say for six or seven years altogether. Sometimes the shipment is so small that they take it themselves—perhaps only two or three packages.

436. When you have the powder on board your lighters what precautions do you take to prevent accidents? When I take it from the ship to go to the magazine do you mean?

437. At any time when it is on board your lighters? Well, it is covered up with tarpaulins.

438. Does it ever remain in your lighters during the night? I have had it so.

439. Was any person in charge of it during that time? No, sir.

440. Where was the lighter then? Off the magazine, where I laid a buoy down myself to moor her to, but it is sunk now.

441. Have you ever had occasion, when you have taken powder in your lighter from the ship's side, or from the magazine, to observe anything defective in the barrels or packages? In taking it from the ship's side I have.

442. Have you observed that frequently? Yes, sir.

443. But from the magazine it is delivered in good order? Yes.

444. What precautions do you take when you see these defective packages? Why on one occasion I had somewhere about thirty casks lying in the bottom of the hold with not above 1lb. of powder in the lot of them.

445. The powder, I suppose, had leaked out of the packages? Yes, and the ship was loaded with railway iron. I never saw such a thing in my life.

446. How is the information conveyed to you that your services are required to remove powder from a vessel to the magazine? I get notice from the agents of the ship, and sometimes from the captain.

447. In the removal of powder from one magazine to another—from Goat Island to Spectacle Island for instance—that would be principally Government powder? The Government generally do that themselves.

448. But you have done it? Yes, I have done such a thing.

449. *Lieut.-Col. Richardson.*] You say that many of the packages are defective; that they are delivered from the ship in a defective state, but when you receive them from the magazine they are all right? I mean that the contents are deficient sometimes when I receive them from the ship, but they are always in good order from the magazine. They are in very bad condition sometimes when I receive them from the ship. If you will allow me I will explain what I mean: In some of the ships the powder is put into new casks, of which the wood is not seasoned. It is stowed under the hatchway, and the heat of the hold dries up the top tier, so that the cask shrinks and the powder runs out; at the same time some of the casks underneath in the same lot would be perfectly tight.

450. Now, in the case of these packages, where the powder had run out, what became of the powder? Well, I took away all the powder that was good, barring a pound of powder that was loose in one of the kegs, which I threw overboard. I cautioned the mate and the agents, and I then got buckets of salt water over the place where the powder had been stowed, and then went to Potts' Wharf to the hulk and discharged there. They told me there was nothing else in the ship but railway wheels and iron.

451. Then you drowned the powder? Yes, on that occasion. That was the only case where I have had so many packages in bad condition, though I have had others.

452. Do you think it would be an advantage if the merchants' powder were secured in the same way as the Government powder, with copper hoops? No, sir; I do not think so. I don't see any fault in it—one seems to be exactly like the other. From what I have seen the Government packages are just as bad as the merchants' powder, taking them right through.

453. You have seen no actual breakage of the packages then—only a shrinking of the casks? No, only on the one occasion I have mentioned.

454. In your conveyance of the powder from the magazine to the vessel or to town do you employ a steamer? No.

455. Your barges are all sailing vessels? Yes. I will tell you what I have done: I have had a vessel with perhaps 300 tons of powder at once, and there was no way to get up to the magazine except through a number of steamers going backwards and forwards, and I have had my vessel towed through the Needles because there was frequently such a pressure of tide that it was impossible to sail her through; but there was an order issued to prevent that from being done in future.

Mr.
W. Bayliss.
16 July, 1875.

456. Who gave the order? I believe it was Captain Hixson; it was Mr. Paton's doing.

457. And you have discontinued that practice? Yes; I have not done so since.

458. What precautions do you take in conveying powder through the town? I don't take it through the town. I only take it to Dawes' Point, where the draymen come and take away small packages for firms in town, such as Lassetter & Co., and others.

459. Do the draymen take any precautions to prevent accidents in carting the powder? Yes, they put each keg into a bag.

460. Have you had any experience in dynamite and nitro-glycerine? Yes. I don't think there has been a single package that has not come through my hands.

461. Have you observed anything extraordinary in the packages—any leakage or anything of that kind? No; only when I have taken it to the magazine they would not receive it.

462. *Mr. Barnet.*] Do you lighter Government powder? Yes, chiefly. They make the ships pay for it, but I do it. I am employed by the agent. The agent will perhaps give me instructions to be on the look out for a vessel that is expected to arrive with powder, and to take the powder to the magazine; because, according to the Act, it is only allowed to remain a certain time in the ship.

463. They hoist a flag I believe? Yes; the Union Jack is hoisted at the masthead.

464. You said just now that you have left powder in your barges moored to a buoy off the magazine? Yes.

465. Was that Government powder or merchants' powder? Merchants' powder. That was the very night the explosion took place in Bridge-street. I had two lighters lying there loaded with powder—off Goat Island.

466. What quantity of powder was there? I suppose there would be about 800 or 900 casks altogether.

467. And it was left there without anyone on board? It was in charge of the sentry; it was much better to keep people away from it. That was why I laid down the buoy.

468. What was the name of the vessel which had the loose powder on board to which you referred? I don't recollect the name; it is a long time ago. It was a matter that was not talked about much at the time.

469. Were the packages which you say were leaking made perfect before you took them away to the magazine? When I went to the ship and found the casks had shrunk, and the powder was leaking, I got the carpenter to take a mallet—I would not allow him to use a driver—and a piece of hardwood, and drive the hoops down, and perhaps put in a copper tack here and there before I took the powder to the magazine.

470. I think you said that the Government packages were quite as defective as the others? I was asked whether I thought the merchants' powder should be packed the same as the Government powder, and I said the one package was quite as good as the other.

471. In the case you mentioned you say the powder was lost in consequence of the timber of which the casks were made having shrunk? Yes, it was green wood, and the heat of the hold had dried it up.

472. There was no lining of any kind inside the cask? No.

473. Would it be an objection if the magazine were removed further up the harbour, as far as the lightering is concerned? It would be a great objection.

474. Would it interfere with the trade in the shipping of powder—say to Newcastle or to any other port? It would sir; that is my belief. The powder could not be got at at the hours laid down by the Government if the magazine were further off.

475. But the vessels lying below Pinchgut take it at all hours, do they not; they are not confined to a particular hour as you are when you take it to the railway station? No, but then we are limited in the time we have to do it in. The magazine closes at 4 o'clock, and we have to get there by 1 or 2 o'clock to get it down in time.

476. Supposing a vessel is lying windbound—? Yes, I have seen them for days together down at Malcolm's Folly, or towards Double Bay—that is where they generally lie—sometimes by Shark Island, or at the back of Garden Island.

477. Has she the powder on board then? Yes.

478. *Mr. Moriarty.*] You think there would be some inconvenience to the trade in having the magazine shifted from Goat Island further up the river? I do sir.

479. And you think that difficulty would arise in getting the powder on board outward-bound vessels? No, chiefly in delivering it to the railway and at Dawes' Point.

480. Why? Because it can only be delivered there within certain hours.

481. But supposing you started an hour later? Then you could not get it from the magazine.

482. Supposing the hour were altered to 6 o'clock? It would be all I could do to get it off if I went at 6 o'clock.

483. But supposing you had a proper covered barge and a steam launch? Of course that would make a difference, but it would be very inconvenient.

484. But don't you think, considering the danger there is in having such a large quantity of powder near the city, that it would be worth while to put up with some little inconvenience rather than keep it there? Well, I can't see that there is any danger. I have been lightering powder ever since the Government gave it up, and I have never seen anything but the greatest care used in connection with it.

485. Still, with the greatest care, an accident may occur? Well, I think I should stand the worst chance of an accident in bringing it to the magazine; it would be more exposed with me than it would be when it was there.

486. Your opinion is that the greatest danger is during the transit of the powder? I don't see the least danger sir; I have never seen any accident of any kind; depend upon it men are more cautious about powder than they are about other things. Nobody will make me believe that an accident will happen unless there is some one to blame. I don't mean to say that if the packages are not nailed up they should not be seen to, but I have had some very heavy shipments of powder, and I never had an accident.

487. I understood you to say that on some occasions you have left your barges with powder on board moored opposite the magazine? Yes.

- Mr. W. Bayliss.
16 July, 1875.
488. Did the persons in charge of the magazine take distinct charge of the powder on those occasions? No, they never took charge of it.
489. Then who was in charge of it? I was. The sentry would prevent any one from going on board.
490. Then he was in charge? I don't know how that would be if it came to a point of law. I put the buoy down myself, so that the lighter should swing round to the wind.
491. Do you think the persons on board the magazine would say they were not in charge on such occasions? Well, I think they would.
492. Then, in point of fact, no one was in charge of the powder? There was nobody sleeping on board the lighter. The powder was all covered up.
493. Still there was nobody in charge of it? There was nobody sleeping on board the boat.
494. Was it any part of the sentry's instructions to prevent anyone from going on board? Yes; the authorities in the magazine knew the powder was there, and of course they would tell the sentry to keep his eye upon it.
495. Yes, but the powder was not given into their charge, and they were not asked to be responsible for it. Would they admit, if the question were put to them, that they were responsible? No, I don't think they would, because once before, when I lightered some 300 or 400 tons of powder for the Government from the Heads, and took it to the Island, I lent them one of my punts to make a floating stage. I believe they called it "Bayliss's landing-place." I moored it with two anchors, and two lines from it to the quay, in order to get nearer to the magazine with the powder instead of having to carry it round. Well, the first load they received from me which was some ball cartridges they put into the punt; but it came on to blow; they did not let go the shore line, and the punt sank with a lot of powder in it, and they wanted to make out that they were not responsible for it.
496. They considered that they were not responsible, and you were? Yes; that was the opinion I formed. They took the powder from me and put it into the punt; I did not put it in; it was there in good time, but they had not the people to put it in.
497. You do not think that putting copper hoops on the kegs would be any extra guarantee of safety? I don't, sir.
498. And you think the only danger arises from the shrinking of the staves of the casks? That is the only way I have seen any loose powder escape. I have seen Government casks with copper hoops and wooden hoops as well, and the copper hoops have come off as well as the others. That was caused I consider by the heat of the ship's hold making the green timber shrink and dry up.
499. Then, from your experience, you do not think any extra precautions with regard to the packages could be adopted to render the powder safer during its transit? No, I don't think so. I cannot see how you could make them any better; they seem to be very carefully made up. The only difference is that the wood in some of them is not sufficiently dry. In some cases they are so tight that they swell the hoops, especially in what we call salted ships, where everything in the hold is kept damp, but in these new ships, especially when the wood is at all green, it dries up very much. But they are making great improvements now in having large ventilators in the ships.
500. Do you think there is much difference in iron ships? Iron ships are generally drier and better ventilated than the wooden ships.
501. *Chairman.*] When you let your lighters lay moored off the magazine with powder on board did you report the circumstance to the magazine authorities before you went away? Yes, I did sir; and it was the foreman who refused to take the powder because he said he had orders from Mr. Paton not to do so.
502. They refused to take charge of them? Yes.
503. And the powder was for delivery? Yes sir.
504. Did I understand you to say that powder when it was intended to be removed from the magazine was left on board your barges during the night? Yes, on one occasion, when the ship did not go down the harbour as she expected. In such cases I have always made a practice of running back and mooring the lighter off the magazine.
505. On those occasions do you go back and report to the authorities that you have moored your boat with the powder there? Yes, I go and tell them that the ship has not come down, and of course I have come back.
506. And they are fully informed that your lighter is lying off the magazine? Yes.
507. When you took that cargo from the ship that was so much injured, do you remember the brand of the powder—what maker it was from? No, I could not tell you the brand—there are so many brands. Sometimes I don't even know who it is consigned to, for the agent gives me an order to receive all powder on board or in the ship's stores.
508. Have you ever observed whether the packages from some makers are superior to those of other manufacturers? No, I cannot say I have observed it.
509. You have not paid sufficient attention to them? Yes, but I could not tell you; they all seem as if they came from one maker, so far as the exterior goes; the powder itself is very different.
510. *Mr. Moriarty.*] Have you described to the Board the kind of barges or boats you use for the conveyance of powder? Yes.
511. What kind of boats are they? The proper sailing lighters.
512. Have they any iron about them? Yes.
513. Iron rowlocks and so on? Well of course they have copper fastenings, but they have iron bolts about them, the same as other vessels.
514. What precautions do you take for the safety of the powder on board these lighters? We cover it with tarpaulins before we ever leave the ship, and it is not uncovered until the people at the magazine come and receive it.
515. Do you think any other precautions could be taken to insure the safety of the powder during its transit? I don't think so. I offered Captain Hixson to hatch a vessel for it, and he wanted to put a lightning conductor on it.
516. With regard to your barges being moored off the Island, what precautions were taken on such occasions to prevent accidents—were any additional precautions adopted besides covering the powder with tarpaulins. Of course when a boat is moored off the magazine some greater precaution should be used than if it were at a distance from it? We put the tarpaulins plainly over the powder when we are sailing; but when we moor the boat we put the boom amidships with the sail over it, and put the tarpaulin over that so as to form a tent.
517. And are the ends of this tent secured? Yes, there is a sort of apron at the end which falls down and covers the opening at one end; the other end is open, but the boat is moored so that she always swings with her head to the wind.

518. You do not apprehend any danger arising from sparks from passing steamers? No, we have always a flag flying, and we keep as much as possible out of the way of the steamers. The only danger I see is from the North Shore steamers. There are always boats running backwards and forwards from Lavender Bay and Potts' Point, and up and down the harbour at that point, and it is difficult to go by without getting among them. Of course we keep out of their way as much as we can; but I have often thought it would be a great advantage if we were allowed to take a steamer to tow our boats up. There would be far less danger, as we should be a much shorter time in the trip, and if there was a long tow-line, so that no one could cross our boat, and we had our flag flying, it would be a great deal safer.

519. *Mr. Barnet.*] Does not the same difficulty occur in Darling Harbour with the Balmain boats? No, the powder is taken at a time when the boats are not running so fast.

520. *Chairman.*] Have you any further suggestions to make to the Board which would tend to a more efficient and a safer way of conveying powder to and from the magazine? I have a suggestion which I will throw out to the Board. I have spoken about it to several persons who are interested in the matter—that Spectacle Island is no place to take powder to under present arrangements. You can't get there except at a certain time of the tide with a lighter—there is no water. I have laid there for a couple of days with Government powder. I consider that if the Government intend to keep powder on that Island they should run the jetty out further; and what is badly wanted again on Goat Island for the safety of the powder is the extension of that shed out to the end of the jetty; and if the wharf were extended so as to lap over sufficiently to allow lighters to go underneath, for which there would be plenty of room, and a trap-door were made in the wharf, the powder might be taken in without anyone getting a sight of a package, except those who were in charge of it, from the time the cover was taken off.

521. *Mr. Barnet.*] Would not the wharf at Spectacle Island be better on the upper side of the Island? Well, I have no objection to the present place, but there is not water enough.

522. How much water do you want? We want at least 7 or 8 feet of water. Now, with a boat drawing 6 or 7 feet of water, you cannot go in except at high tide, and by the time you have got your powder out the tide has gone out. I mentioned this at the time they were making the wharf, but they said it was deep enough. Of course it was for the ships in those days, but we are getting bigger ones now.

523. *Chairman.*] Have you had your lighters, with powder on board, moored off Goat Island since the removal of the military sentry? Yes.

524. Have you on such occasions reported the fact to the authorities at the magazine? Yes; I have always reported to the foreman or to some one on the Island that I was leaving my barge with powder moored off the Island.

525. Is your barge ever moored elsewhere when you have powder on board? Yes; it sometimes occurs that I am not able to reach the magazine with powder from vessels on account of adverse winds and bad weather, and then I am obliged to anchor the boat down below; but if I had a steamer or tug I could always manage to store my powder with much less danger.

526. You do not think there would be so much danger with a steam-tug? No, I don't think there would be any danger.

527. Is there any regulation which requires that a flag or danger-signal shall be hoisted by vessels having powder on board? There is for ships, but not for lighters—but I usually fly the Union Jack.

528. Do you think it is desirable that some danger-signal should be hoisted? Certainly, I think it is very desirable; I think some special flag should be hoisted both by vessels bringing and shipping powder, and also by lighters when removing it.

529. Is any danger-signal or special flag employed when powder is taken to the railway? None whatever. I merely put the powder in bags; that is the only precaution.

530. Is there any difference in the arrangements at the Powder Magazine at Goat Island, as at present carried out, and the arrangements which were carried out when the military had charge of it? Yes; when I took powder from the shipping while the military were in charge I had to report to the sentry and he reported to the foreman of the magazine that I was there with powder. He then gave orders to me to come alongside, hoisting a red flag on the Island. He made my men stand on the fore-castle and his men came and discharged the powder properly clothed with slippers and flannels; and when I came too late in the evening to get all the powder stored he ordered me alongside of the floating magazine, giving my boat in charge of the man on board the hulk and the sentry on the magazine. That shows that when the military had charge of the magazine every possible precaution was taken.

THURSDAY, 22 JULY, 1875.

Present:—

CAPTAIN HIXSON,
E. O. MORIARTY, Esq.,

J. BARNET, Esq.,
LIEUT.-COL. RICHARDSON.

CAPTAIN G. K. MANN IN THE CHAIR.

Mr. William M. Alderson called in and examined:—

531. *Chairman.*] You are a member of the firm of Alderson and Sons, I believe? Yes.

532. And you are importers of chemical explosives, such as dynamite, nitro-glycerine, and substances of that description, are you not? No; but when I was in England, having been asked by persons connected with the mining industry of this Colony, I made inquiries about these explosives, and I found that litho-fracteur was the best explosive of the kind, and I was requested by a gentleman with whom I was connected in England to become the agent for it here, which I have been. Litho-fracteur is an improvement upon dynamite.

533. Has any great quantity of litho-fracteur been used in this Colony? Oh yes, a good deal. I must tell you that we are not agents for it now. It is quite out of our way. I merely undertook the agency in order to introduce it into the Country for mining purposes. We have given it up because we do not profess to be commission agents.

534. But are you aware that explosives of that description are in general use in any particular locality? Well, it is used, because we have inquiries for it every day; there is not much of it to be had at present.

You

Mr.
W. Bayliss.
16 July, 1875.

Mr. W. M.
Alderson.
22 July, 1875.

Mr. W. M.
Alderson.

22 July, 1875.

You see there is one great drawback in being connected with this explosive: people are generally very ignorant on the subject. For instance, we can get no ship to take it without a very great deal of trouble; they imagine it is going to blow the ship up at once; that is one reason why we gave it up. I thought you would be inquiring into this subject, and I have brought some pamphlets which I will leave with you (*handing papers to Chairman*); they will give you all the information you require; they are from the manufacturers, and they go fully into the subject.

535. Have you any large stock of lithofracteur on hand at the present moment? I do not think we have any; if we have it is on the Island in the magazine.

536. Who are the principal merchants who deal in these explosives? As far as I know they are very few known at present. Lassetter & Co. may have some, but I think they have generally bought it from us. From what I understand of lithofracteur it is not dangerous until it is brought into contact with detonators. I recollect the first time I went to see it; a gentleman from London cut off a little piece, and set it on an iron shovel and lit it, and it burned until it was all gone; but it rather alarmed me at the time through my ignorance.

537. Are you importers of the ordinary gunpowder? No, we never had anything to do with gunpowder.

538. We wish to obtain some information as to the general use of these explosives in the Colony;—do you think the use of dynamite and that class of explosives is on the increase? I know nothing about dynamite, but I think lithofracteur is used, and I think it will be used more generally when people lose their fear of it.

539. *Mr. Barnet.*] You stated that you had given up the agency for lithofracteur; who has it now? I don't think anyone has the agency now? The principal agents for the Colonies are Jones, Scott, & Co., in Melbourne; in fact, one of the partners of that firm is in London, and they do the most of the business in lithofracteur.

540. Have they an agent in Sydney? We were the Sydney agents; we used to work with them. For instance, we have had a shipment for them brought into the Sydney harbour, and have had to forward it to Melbourne. It is greatly used in Victoria.

541. When that shipment came here did you send it to the magazine? We have always to send it to the magazine as soon as it comes into the harbour; it must be sent there for safety. I believe that is the case with all explosives.

542. *Captain Hixson.*] Have you heard of any accidents, Mr. Alderson, either here or in Melbourne, in connection with lithofracteur? I think I have read something about an accident, but I am not sure. There have been very few accidents, and, from what I have heard, they have been caused entirely by carelessness.

543. Can you remember any special case? No, I cannot remember; if my son were here he might be able to tell you more about it.

544. The introduction of this material into the Colony was accidental then, arising out of the fact of your being in England? No; I was requested while I was here, by gentlemen connected with the mining industry, to make inquiries about this explosive.

545. Then you were set in motion in the first instance by persons in the Colony? Yes.

546. Was the importation of lithofracteur due to the inquiries made for it on this side, or to the desire on the part of exporters to make a business for it in the Colony? To inquiries for it by persons connected with mining interests in the Colony. Of course the manufacturers wanted to do business if they could, but people in this Colony wished to have it. They are using it now up at Hill End when they can get it, and in Victoria it is used pretty generally; it is better known there than it is here. But it has been used here; in fact, if I am not mistaken, we supplied the Government with some; I think it was to blow up some rocks at Port Stephens.

547. *Chairman.*] Then a considerable demand for it may arise at any time? I think there can be no doubt the demand will increase as people come to know it better; especially for gold and other mining operations it is such a powerful explosive.

548. You do not consider it so dangerous; as ordinary gunpowder? I would not say that. I don't think myself it is so dangerous; but it is like any other explosive—it has to be used with caution.

549. *Lieut.-Col. Richardson.*] Is any particular manipulation necessary with this lithofracteur as regards storing and handling—for instance, would a heavy fall explode it? That I cannot say for certain; I have heard that it would, but I do not know it. I have also read in the papers that extreme heat will explode it.

550. You cannot tell of your own knowledge what precautions should be used. You are, in fact, blindly trusting a good deal to chance? No; the pamphlets I have given you contain full instructions as to its treatment under different circumstances; the manufacturers take every care to prevent accidents.

551. Do you think it is safe to store it in the same way as gunpowder? If I recollect right, we had to go to the expense of putting up a separate building for it on the Island, in order to keep it away from the powder—that was done while I was in England—so I suppose there must be some danger in storing it with powder.

552. What is the largest quantity you have had in store on the Island? I really could not say without referring to my books; we have had large quantities of it.

553. Can you give any idea—did it go into tons, for instance? Yes; it comes out in cases not in casks like powder; a very little of it goes a long way. The reason why I think it will come into more general use is that it is cheaper a great deal than gunpowder, and takes less room in transit, while it is much more powerful.

554. Have you any idea what has been the average annual expenditure of lithofracteur since you have been agent for it? I could not tell you without referring to my books, but I shall be happy to supply the information. (*Vide Appendix.*)

555. *Mr. Moriarty.*] Are you aware, Mr. Alderson, whether any specific regulations are enforced in England with regard to lithofracteur? I do not know.

556. Are there any regulations in reference to its being received on board ships for exportation? Oh yes, I am sure there are, for we had great difficulty in getting ships to take it.

557. Can you inform us what the arrangements are before it is taken on board ship? No, I could not explain them. I think they depend a great deal upon the view the captain takes of it? Some captains are more frightened about it than others. I believe the freight is much higher—in fact a special rate.

558. Have you ever known it to indicate any change in its condition or appearance either in transit or while stored here? No, not in my experience.
559. You have not noticed that any separation of its constituent parts has seemed to take place? No, I have not. I believe the reason that it is safer than dynamite is that some earth or clay is mixed with it, which acts as a check against explosion by concussion.
560. Would you say, from your general acquaintance with the subject, and also from your interest as a citizen that it would be a judicious thing to remove the magazines further from the city than they are at present—both powder and dynamite? I am sure I do not know; I cannot see why they should be removed. If the magazines are properly constructed and due care is taken, I do not see why there should be any danger. One thing is clear: the further you remove the magazines from the market the dearer everything connected with them will be. It would also have a tendency to check trade and commerce in those particular commodities.
561. Do you think any slight increase in the cost of moving them would be felt as a drawback to the trade? Well, it might not be the expense which would be felt so much as the trouble and inconvenience. You see, sometimes you get an order for these articles, and they must be sent away in vessels very quickly; and you are not allowed to keep them in your warehouses in town. Therefore it is much better to have the magazines as near as possible, taking safety as well as convenience into consideration.
562. I suppose you have occasionally to send away this lithofracteur at a very short notice? Yes, sometimes the captain of a vessel makes up his mind all at once to take it and we have to send it off immediately. We had an order for fifty cases to go to New Zealand for months on our books, and it was with the greatest difficulty that we could get it away; at last the captain of one vessel took it.
563. Did you send it in a steamer or sailing vessel? A sailing vessel; no steamer would take it; there are special regulations, I believe, with regard to steamers.
564. *Chairman.*] How long is it since you sent those fifty cases away? About a month or six weeks.
565. Where were they stored? In the magazine. When we had sent them away I think we had just ten cases left, and I think they are gone now, because I heard a person asking for some the other day in the office, and I believe there was none left.
566. What quantity of lithofracteur would there be in those fifty cases? I cannot tell you without referring to my books what one of these cases contains; they are only small cases. Each case is about £8 or £10 money value. (*Vide Appendix.*)
567. And you have no further quantity in stock at the present time? I don't think we have; if so it must be very trifling, and it will be in the magazine; but I don't think there is any left.
568. You stated that your son would be able to give better evidence on this subject than you can? Well, I think I have given you pretty nearly all the information he could give, and I will supply the figures you asked for.
569. *Captain Hixson.*] Do you happen to know what those fifty cases which you sent to New Zealand were used for? I think they were wanted for mining purposes, but I am not quite sure, or else for making railway tunnels.
570. You think there will be an increased importation of this commodity? I think there will be an increased demand, and that will lead to an increased importation. I know that Lassetter and Co. and other firms in Sydney have orders for it.
571. But you intend to give it up? Yes; it is not in our line. When I was in England I became agent for Burleigh's rock drill, and we gave that up. I merely took the agency in order to introduce it into the country. We are manufacturers, and we have not time to look after these things.
572. *Chairman.*] You sent those fifty cases of lithofracteur to Newcastle? Yes, and from Newcastle to New Zealand.
573. Were they taken into the magazine there before they were shipped to New Zealand? That I cannot tell; in fact I am not certain whether the vessel did not take it on board here, and had to go to Newcastle afterwards. But I know that every precaution is taken to get it into the magazine, because we are liable to penalties if we do not attend to that.
574. *Lieut.-Col. Richardson.*] This lithofracteur explodes with a detonating cap, does it not? Yes.
575. Do you know whether dynamite and lithofracteur are stored in the same magazine? I could not give you an answer to that question. There is no danger of the detonators doing any injury until they are placed in the lithofracteur and set fire to by means of a fuse. There is one great advantage in lithofracteur: you can fire it off under water, and it will remain there for some considerable time without being damaged. You will see in one of those books that in blasting some rocks on one occasion it was five or six days under water, and it was uninjured, and blew up the rocks when it was set fire to.
576. You do not know whether this lithofracteur is kept in the same magazine as the powder? I think not; it strikes me we had to put up a separate building—a wooden or galvanized iron building—for it on the Island.

TUESDAY, 27 JULY, 1875.

Present:—

LIEUT.-COL. RICHARDSON,
CAPTAIN HIXSON,

J. BARNET, Esq.,
E. O. MORIARTY, Esq.

CAPTAIN G. K. MANN IN THE CHAIR.

John Alger, Esq., called in and examined:—

577. *Chairman.*] It is understood by the Board, Mr. Alger, that you have taken an active part in the inquiry which was instituted by the Chamber of Commerce in reference to the storage of explosives. We shall be very glad if you will favour us with any information you may have obtained during that inquiry? I should like to place before the Board the report from the Chamber of Commerce on this subject. It was very carefully drawn up by Mr. James Powell, who moved for the Committee, although the matter was originated by me. (*Handing in paper. Vide Appendix.*) I may mention, that some two years ago, being very much struck with the fact that the powder magazine was within 2,000 yards of Government House

John Alger,
Esq.

27 July, 1875.

John Alger,
Esq.
27 July, 1875.

House and the Banks, which would certainly be levelled in case of an explosion, I wrote to the papers on the subject, and many persons having spoken to me about it, I called the attention of the Chamber of Commerce to the question. With the permission of the Board, I will read a few notes which I have made (*reads*): "I recommend to this Commission a careful perusal of the accompanying paper on modern blasting agents, which was read less than two months since by Mr. Alfred Nobel, the founder of the nitro-glycerine industry, before the Society of Arts, London, of which institution I may mention I had at one time the honor to be Treasurer. (*Vide Appendix.*) I think no one can read that important paper without believing that all nitro-glycerine compounds, whether lithofracteur or dynamite, as well as gun-cotton (as being all liable to spontaneous combustion), should be stored far away from gunpowder, and certainly not upon Goat Island, within 2,000 yards of our chief buildings. So lately as December last, before a Special Committee on gun-cotton, Colonel Younghusband, of the Royal Artillery, Superintendent of the Royal Gunpowder Factory at Waltham Abbey, stated that he had thoroughly examined the qualities of gun-cotton, lithofracteur, and dynamite, with regard to the manufacture, storage, and use of these several explosives. He says, "Gun-cotton, as it can be stored wet, may be warehoused without risk, and contrasts favourably with the other explosives, which, though tolerably safe to store and transport, *when fresh*, are not so secure from danger under all circumstances." I see we have on Goat Island 146 tons gunpowder, 4 tons 3 cwt. of lithofracteur, and over 8 cwt. of gun-cotton.

578. What is the date of the return from which you are quoting? It is a return furnished to Parliament at the end of last week—the very last return; it appeared in Saturday's paper. I was very much struck with it because I think our chief danger lies in the storage of these various explosives in the same place. The Explosive Committee recently appointed by the War Office, after being engaged in an investigation at the Royal Arsenal, Woolwich, as to the storage of gunpowder and other dangerous compounds, have recommended that a large quantity of gun-cotton, at present kept in the marshes adjoining the Royal Arsenal, should be removed to a floating magazine some distance from any occupied houses. The danger from lightning is considerable; therefore all lightning conductors should be periodically examined by a competent officer—they are often a great source of danger. On the 22nd December last the magazine of Scutari, in Albania, was struck by lightning; the city walls were blown down and 200 people killed and wounded.

579. May I ask if you know the quantity of powder that was stored there? No, I could not get at the amount. Boats for the removal of explosives should be painted red (like the lightship), and should always, when employed, carry a conspicuous distinguishing flag. I think they should never be towed by a steam-vessel, as I hear is often the case at Dawes' Point. All explosives for the railway, if from the magazines or from shipboard, should be taken by water, to the head of Darling Harbour, and thus save the appalling risk of being carted up George-street through the heart of the city. I have seen gunpowder running from a cask (one of a dray load) at the corner of King and George Streets. I rather think the Board has been furnished with the report of the House of Commons' Select Committee on explosives of 1874, which I obtained from England. It will be seen by that report that a quantity beyond 200 lbs. of powder cannot under any circumstances be kept within 2 miles of any place of residence of the Queen, nor within half a mile of any parish church. A short time since I saw the arrival in Sydney of a small schooner from Melbourne. Her sole cargo was—500 kegs blasting-powder, 40 cases gun-cotton, and 12 cases lithofracteur. Probably this assortment went together in one lighter to Goat Island. I state it as my deliberate opinion that the magazines at Goat Island might, from no fault whatever of those in charge, spontaneously explode at any time. What would then be the fate of Sydney and its western suburbs? I truly believe, in the words of a clever writer, that we are every instant of our lives exposed to the risk of a catastrophe which only an earthquake could equal.

580. Is there anything you would like to add to that statement, Mr. Alger? I do not think of anything further; but I should be glad to answer any questions you like to put to me to the best of my ability.

581. You are apparently decidedly of opinion that Goat Island is too close to the city for the site of a magazine? Altogether too close; and certainly you should never store anything on the Island but gunpowder. We know pretty well what the qualities of gunpowder are, although I believe it has been recently shown that copper is not altogether a much greater safeguard against accidents than iron, and that powder has even exploded from forcible contact with copper.

582. If the magazine were removed from Goat Island to a distance—say 5 or 6 miles from its present site—do you think that would interfere with the export of powder, in a mercantile point of view? It would slightly of course; but I have often thought if you had one or two hulks of a light draught of water, on account of the flats, for the storage of powder moored, say at Middle Harbour, vessels might take their powder on board lower down the harbour than they do at present, and they would be able to get at it more easily. According to the regulations, no vessels arriving with gunpowder on board are to proceed higher up the harbour than Neutral Bay until the gunpowder is landed, and vessels taking powder on board are not to do so higher up than Neutral Bay under a penalty of £10 in each case, whilst large quantities pass up and down in lighters with impunity.

583. Are you aware that a large portion of the powder imported into the Colony is sent inland? I am aware of it.

584. Of course that is a difficulty; you would probably have to send that up Darling Harbour? I do not know how you could get to the railway without, unless you sent it to Parramatta, to the head of navigation. But it appears to me that powder must unfortunately always pass near Sydney if it has to go inland.

585. You mentioned Middle Harbour as a place where floating hulks might be moored? Yes.

586. Would that not be inconvenient for powder going inland? Yes; but I fancy the most important question to consider is the safety of Sydney, and I cannot shut my eyes to the fact that at any moment these compounds of nitro-glycerine may go off, and I think you will incline to the same opinion, when you have perused that paper by Mr. Nobel; and as that gentleman is himself the inventor of one of the explosives there can be no doubt about the honesty of his opinions.

587. Did any other site besides Middle Harbour strike you as being a suitable place for a floating magazine? The upper part of Lane Cove might answer. It is I know very easy to find fault, but it is not so easy to point out the remedy. I think the first consideration with any Government should be the safety of Sydney.

588. If it were decided to remove the magazine to the Parramatta River where do you think would be the best site? I should think about Duck Creek would be a suitable place. The properties there are not very valuable; the population is sparse. Near Mr. Blaxland's boiling-down establishment, of course no one would approve of a powder magazine being brought near their property; residents in the neighbourhood would object; that will have to be considered by the Board wherever the magazine is placed.

589. That would be at no distance from the railway? No; that was my object in mentioning it.
590. In that case the powder need not go into the city at all, and it could still be sent to the railway? Yes; but the worst of it is, it would have to pass within a few hundred yards of the city in any case, and I have heard that powder is carried about the harbour in the most careless way. Mr. Ives, who is Mayor of one of the Suburban Municipalities, has told me that he has seen it quite uncovered, and men sitting alongside of it, smoking; of course you will easily obtain evidence on that point.
591. *Lieut.-Col. Richardson.*] Can you give us any information—the result of your own experience—in reference to the force of these explosives—nitro-glycerine and dynamite? Well, I have heard a great deal about them, but even at Home there does not seem to be much certainty about the force of dynamite. You will see some comparative figures in that paper; there does not seem to be any certainty about it.
592. With regard to this report;—was it based upon evidence taken by a Committee of the Chamber of Commerce? Yes, a sub-committee of the Chamber of Commerce.
593. Can you give us any idea of the evidence itself;—who was examined? I gave evidence myself. Mr. Ives also gave evidence, and several others. I will furnish the names.
594. Can you furnish a copy of the proceedings? They were very roughly taken down; you shall have everything there was.
595. The report then was drawn up on the evidence taken by the sub-committee? Yes; I think Captain Mann himself was good enough to give us some very valuable evidence.
596. *Captain Hixson.*] In the event of a magazine being established some distance up the Parramatta River, from which all the powder intended to go inland could be sent by railway, do you think any inconvenience would be experienced as regards the powder to be exported coastwise in consequence of the distance of the magazine from the seat of trade—from the metropolis? No doubt some inconvenience would arise. When powder is imported the importer frequently does not know in what direction it will have to go. Sometimes it will be sold to go by railway; at other times for transhipment (say) to Queensland. I myself am interested in the purchase of a great deal of powder to go to the Peak Downs Copper Mines; that goes by sea; but the importer does not know where it will go, and no doubt there would be some inconvenience in that respect and some trifling additional expense.
597. Would you recommend the establishment of a principal magazine at some distance from the metropolis, and a smaller depôt where the present magazine is at Goat Island, or at Spectacle Island, for immediate export purposes? You never can tell where the powder is going to. You see the powder is the property of private individuals, who sell a little to-day for one purpose, and perhaps a larger quantity to-morrow for a different purpose. It has occurred to me that the best plan would be to keep it in a floating magazine down the harbour. In case of war, of course, the hulks in which it was stored could be brought up the river. I have been reminded it would never do to let the enemy get hold of it. The boats would simply have to go 5 or 6 miles further than they do now—that is all; and in case of vessels going to sea they would be nearer the magazine than they are at present.
598. Do you happen to know whether there is any reluctance on the part of captains of trading vessels to take small quantities of powder? Do exporters experience any difficulty in sending powder away in consequence of the trading vessels declining to take it? Oh yes, there is that difficulty.
599. Then the more inconvenience there is attached to the shipping of powder the greater will be the difficulty on the part of exporters to get vessels to take it? I don't think the difficulty would be with the exporters, because they would be able to get the powder as easily from the hulks below as from the magazine above. Vessels might take powder on board at Bradley's Head for instance, or at the Sow and Figs; they would have no trouble about it; the trouble would be with the trade in Sydney requiring powder. My opinion, however, is, I repeat, that the safety of the city should be the first consideration in dealing with this question with the trades and with everybody else.
600. And in what do you consider now the chief risk lies—in the storage of the powder at Goat Island, or in the transit to and fro? In the transit to and from the Island. The main danger in gunpowder lying at Goat Island is from lightning, and anyone knows that lightning conductors are faulty. I had the pleasure of knowing Sir Wm. Snow Harris, the chief inventor of lightning conductors, and I have often heard him say that too much reliance must not be placed upon them. We know that since their invention men-of-war have enjoyed almost perfect immunity from danger by lightning, but still they are sometimes struck.
601. *Mr. Moriarty.*] You have just stated that, in your opinion, the principal source of danger is in the transit to and from the vessel? Yes.
602. Do you think it would contribute to the safety of transport if the Government were to take the whole matter into their own hands, had properly constructed barges, and employed their own men—if they took the whole control of the powder, not only while stored in the magazine, but also the receiving and shipping as well? I am afraid that would not help the matter.
603. I mean if they had barges properly constructed for the purpose? That would materially add to the safety of it, no doubt.
604. So that the causes of danger to which you have referred—such as the powder being uncovered and men smoking near it, and sparks from steamers exploding it—would be avoided? That would undoubtedly be a great safeguard. By-the-by I notice it is stated in the regulations that all boats for the conveyance of powder are to be provided with tarpaulins, and must be properly housed over. Now surely that is not done at present.
605. That is not the case at present? So far as I know it certainly is not. My storekeeper tells me he constantly sees powder going down the harbour perfectly uncovered, and Mr. Ives tells me the same thing.
606. You would advise that some more stringent measures should be taken with regard to the removal of powder in boats? Certainly; but I would especially impress upon the Board the desirability of having gun-cotton and the preparations of nitro-glycerine kept a long distance apart from the powder, in case they explode spontaneously.
607. Do you not think there would be some difficulty in obtaining the powder from hulks moored in Middle Harbour, seeing that the powder would frequently have to be shipped in rough water, near the Heads. Do you think there would be greater inconvenience in having it there than there would be if it were stored in a hulk on the Parramatta River? The Parramatta River would be the more convenient, but at Neutral Bay sometimes they cannot discharge powder when the weather is bad. With large boats properly

John Alger,
Esq.
27 July, 1875.

John Alger, Esq. properly housed over there would be no difficulty I think with such weather as we get here, except perhaps once or twice in the course of the year, when the sea breaks right across, and if we had weather of that kind no vessels would be going to sea even if they had powder on board.

27 July, 1875.

608. Do you think there would be any more inconvenience in having a hulk on the Parramatta River than there would be in having it at Middle Harbour? The inconvenience would be less, but the danger would be greater.

609. But if the powder were under Government control and conveyed in properly constructed barges, do you think there would be more danger? I am speaking of the danger in storage, not in transit.

610. In the hulk itself? Yes.

611. But if it were 5 or 6 miles up the river do you think there would be more danger? I should be afraid of it. Our experience of the danger does not happily allow us to be very good judges of it. Of course a hulk in Middle Harbour would be almost as near to us, geographically, as it would be 5 or 6 miles up the Parramatta River. The only difference would be she would be in a basin which she would not be on the Parramatta River, where there is not high land on both sides, for though there is high land on Ball's Head there is not on the other side.

612. But you would have the advantage of proximity to the railway? You would, certainly.

613. All things considered, would you be inclined to risk Parramatta River as the site for a floating magazine? I would be inclined to risk it; but, as a matter of safety, I would prefer Middle Harbour. There is one thing to be said: in Middle Harbour you would require a very shallow hulk, and you would have deeper water on the Parramatta River.

614. Then the bush fires at Middle Harbour are much more serious than at the Parramatta River, and they are a great source of danger. About the Parramatta River the properties of gentlemen residing there are partially cleared and better looked after than you could expect to find them at Middle Harbour? There is not much large timber there now. I can recollect when we had some very large bush fires on the Parramatta River.

615. But not so large nor so frequent as at Middle Harbour? No; of course the hulk would be properly covered and protected.

616. *Chairman.*] You advocate the use of a hulk I see, Mr. Alger. Have you considered that formerly it was a very general practice to store gunpowder in hulks, and that the practice was discontinued, and magazines were substituted on account of their being considered safer? I was not aware that they were considered more safe; of course there is one objection to a hulk—it may take to leaking and go down. I have had some experience of that myself; I fancy that is the chief objection to a hulk—it gets old, and some time or other may sink. There is also pumping in connection with it, which is always a trouble.

617. But in two instances, I think, in this Colony, the powder was damaged when stored in a hulk, before the Goat Island Magazine was established? Yes, I remember it well.

618. And when the original building was too small, a hulk was moored off Goat Island, and that was discontinued, and an additional building was put up. Was not that the case? That was the case.

619. I presume that was done with the idea of increased safety? I think in the first place they bought a very old hulk, which became leaky, and there was a great deal of pumping, which is always a difficulty. But now we shall perhaps be wiser and retrace our steps, as they are doing at Home. There, as I have said, they are putting their gun-cotton in a hulk, and taking it from the marshes and away from the neighbourhood of houses. There certainly is that difficulty with hulks—they do wear out; we saw that in the case of the "Harmony."

620. *Mr. Moriarty.*] Would not the powder be more liable to damp if stored in a hulk than it would in a magazine? I think it would; but I would rather you should obtain the opinion of some one more expert on the subject than I am.

621. *Mr. Barnett.*] Supposing the powder were kept in hulks moored in Middle Harbour, how would you propose to bring it to Sydney? By boats of the class described by Mr. Moriarty.

622. By sailing boats? Well, I would rather do that than have a steamer in front of them.

623. Is there much danger from a sailing vessel when she has to beat up the harbour from steamers crossing her? That is done now; Mr. Bayliss does it.

624. He tells us there is great danger from the steamboats crossing the bows of his vessel. Do you think there would be any objection to these boats being towed by steamers? I have always fancied there was danger from the steamers throwing sparks behind them.

625. But the steamer would have a long tow rope. You see the great objection to having the powder so far away would be the difficulty in getting it up the harbour? If the boats were properly housed there would be no danger in that. I apprehend that the boats which convey the powder to and fro should be as safe as the building in which it is stored.

626. There is one great danger in the hulks, that the men in charge of them must live on board and have fires to cook their food? Still there is no greater danger on board a hulk containing powder in that respect than there is on board the vessel which brings it out.

627. The Chamber of Commerce appointed a sub-committee to inquire into this matter I think you said;—were you the chairman of that committee? No; Mr. James Powell, of the Customs, moved for it, and he was chairman. I took an active part in it. The question of towing the powder boats is one which members of this Board could answer much better than I could.

628. *Mr. Moriarty.*] There are arrangements made now I believe to prevent sparks from steamers flying about. It has been found that sparks from locomotive engines on railway lines have set fire to corn fields and done considerable damage, and steps have been adopted to prevent it I believe? Yes, and the crops are still ignited I am sorry to say.

629. *Mr. Barnett.*] Have you ever known of a magazine for the storage of gunpowder only exploding;—do you remember such a thing taking place anywhere? During the last year at least two magazines have exploded in England. I tried to-day to put my hand on my notes of the places where these explosions occurred, but I could not find them. I will however send the information to you. Certainly two magazines exploded during the last year.

630. Were not they laboratories for the manufacture of powder only? No, they were magazines. Of course where the manufacture of powder is carried on, explosions take place occasionally, but in these cases they were magazines. I will try and send you the names of the places. I pledge you my word that two magazines exploded in England during the last year. I read an account of the explosions in the *Times* myself. In the paper I have handed in I have given you an account of one at Scutari, where the walls were blown down and 200 persons killed or injured.

631. Do you recollect an English man-of-war blowing up otherwise than in action? No, I cannot say I remember that. On board a man-of-war of course they have the means of flooding the magazine at once, which I believe is the first thing done in case of fire. John Alger,
Esq.
27 July, 1875.
632. *Chairman.*] Are you aware whether the importation of these chemical explosives, such as nitro-glycerine and dynamite, is on the increase or on the decrease? On the increase without a doubt.
633. And larger importations may be expected than are received at present? Certainly. The force of these explosives is so great that they are becoming in great demand; they would be more used in the mines if it were not on account of their smell. It is frequently a long time before the men can get back to their work after using them, and they experience great pains in their heads. You will find some very valuable hints in that paper of Mr. Nobell's; it will only be two months to-morrow since it was delivered in London.
634. *Lieut.-Col. Richardson.*] What was the date of this report from the committee of the Chamber of Commerce? I am not quite sure, but I think it was in February last. The first meeting at which the subject was mentioned was held on the 13th October, 1874.

TUESDAY, 3 AUGUST, 1875.

Present:—

E. O. MORIARTY, Esq., | J. BARNET, Esq.,
LIEUT.-COL. RICHARDSON.
CAPTAIN G. K. MANN IN THE CHAIR.

Mr. John Lang called in and examined:—

635. *Chairman.*] You are captain of the steam dredge "Samson," I believe? Yes. Mr. J. Lang.
3 Aug., 1875.
636. In the course of your duties do you use any chemical explosives, such as dynamite, gun-cotton, and explosives of that kind? I used dynamite at one time, when we were blowing up the wreck of the barque "Robert Sayers," in Darling Harbour.
637. Was it any peculiar description of dynamite that you used? It was Noble's.
638. How was it procured—from whom did you obtain it? From Reilly and Cohen.
639. How did you keep it stored? It was rolled up in small packets, about three quarters of an inch diameter, and about 3 to 4 inches long. It was done up in paper cases, and packed in boxes.
640. Did you observe any exudation from it? I put it in twice; the first time I put it in the blast failed and would not go off. I should tell you that previous to this I had taken it out of these cases and put it into a package altogether, covered with canvas and tar. The first time it failed in going off through a fault in the wire. I drew it out afterwards, and during the night there was an oil drained away from it. I preserved some of it in a small bottle, which I believe I brought to the office and showed to Mr. Moriarty.
641. The cartridge had then been broken up? Yes, the cartridges were all broken up and put together, or else we would have had to ignite each cartridge. I use 20lbs. in each package. I made inquiries afterwards, and I believe it was nitro-glycerine which was the principal explosive substance, and when we used it next day the blast was also a failure.
642. Have you ever used it since? No, I have never used it since. I made a memo. at the time in the log book, which is in the office, I believe.
643. That is all your experience, I suppose, of this explosive? Yes, sir, that's all.
644. *Mr. Moriarty.*] Can you describe the oily substance which exuded from the cartridge? It was thin, of an oily nature, and amber colour.
645. Was there much of it given off from the cartridge? There was a great deal. There was none came away until after it had been in the water and was taken out again.
646. When you say you had broken up the cartridges, you mean that you had subdivided them and put them all together again, so as to make one good large charge? Yes, so as to make them ignite together.
647. But each cartridge was not broken up in any way or disturbed? Yes, the papers were taken off them, and the dynamite all mashed together like one cartridge.
648. *Chairman.*] That is the only description of explosive that you have used? I used gunpowder for the same purpose after this failed—two torpedos that were made some time back.

Mr. Donald Vernon called in and examined:—

649. *Chairman.*] You are the traffic manager on the Great Southern Railway, are you not? Yes, on the Southern and Western Railway. Mr.
D. Vernon.
3 Aug., 1875.
650. The Board are desirous of obtaining information relative to the transit of powder by railway. You generally receive it from Darling Harbour, do you not? Yes, in quantities over 2 cwt. we do.
651. What description of trucks have you for that purpose? Covered vans, sir, with leaden floors, and the sides are lined with iron.
652. Do these vans remain at any time at the station after they are loaded with powder? Not at the Redfern terminus.
653. Are there not regulations applying to persons sending powder by railway, which provide that the powder shall be removed immediately upon arrival at its destination? It is one of the conditions upon which we receive it that they remove it within reasonable time, but not in any specified time.
654. What do you conceive to be a reasonable time? That depends very much upon circumstances. At these terminal stations carriers are not always to be procured, the roads are not always passable, and we take all these circumstances into consideration; but, as a rule, we do not have it in hand for any length of time.
655. But can you name any time it would be likely to be on hand—a maximum or minimum period? It is very difficult to do that—perhaps from three days to a fortnight. We may sometimes have it on hand as long as a fortnight.

- Mr. D. Vernon. 656. In what position are the trucks left loaded with powder during that fortnight? We isolate them as much as possible from our goods sheds and the other trucks loaded with merchandize.
657. Still they are left on one of the sidings? They are left on one of the sidings.
- 3 Aug., 1875. 658. Is there any special guard placed over them? No. The ordinary watchman is in the yard during the day and night.
659. Do you consider that is sufficiently safe, or have you had any misgivings about it? Well, considering we always have powder on hand, I should certainly prefer something like a magazine at such terminal stations, as the western terminus for instance.
660. At particular stations you think there might be magazines? Yes.
661. What stations would you suggest as the most appropriate for that purpose? At the terminal stations to which the powder is chiefly consigned. Goulburn, Raglan, Wallerawang, are the principal stations.
662. But it does not follow as a matter of course that the powder is taken to the terminal stations? No, certainly not.
663. It might be left midway on the line—I mean at some station midway on the line? Oh yes, it may be consigned to any station; but it would be in very small quantities to other stations than those I have mentioned.
664. The larger proportion goes to the terminal stations? Yes.
665. Have you any idea in which direction the largest quantity of powder goes—westward or southward? To the west I should say. Of course we have a large quantity going to the south, in consequence of the extensions, but I still think, speaking roughly, that the greater consignment goes to the west.
666. That is merely caused by the extension of the railway works and that demand will probably cease to the south? Well, the extensions create the principal demand for powder; if there were no extensions going on the quantity used would be diminished very considerably.
667. Have you any other descriptions of explosives, such as dynamite, nitro-glycerine, and gun-cotton, travelling along the line of railway? No. The only other explosive worth mentioning—for I don't think we carry any dynamite—besides gunpowder, is a little lithofracteur.
668. Is that taken under the same precautions as ordinary gunpowder? Yes.
669. When these covered vans are on the sidings the ordinary trains are constantly passing them as usual? We isolate them as much as possible, and therefore, though they may be passed occasionally by the trains, you cannot say they are passed constantly.
670. But every train that travels along the line must pass them? Yes, at a certain distance.
671. They are only on the sidings? That is all. Of course they must be passed by trains going out and coming in to a station.
672. You don't remove them into a goods-shed or any shed? No. The vans are always kept on the sidings.
673. *Mr. Barnett.*] What trains do you send powder by? By goods trains invariably.
674. In what part of the train is the powder placed? We don't aim to put it in any particular place.
675. Do you put it near the engine, or at a distance from it? We have no rule about it.
676. Is dynamite carried in the same place as powder? No; dynamite is carried on the line, as far as I can recollect.
677. Is lithofracteur put into the same waggon as powder and carried at the same time? Yes; we do not make any difference; it is all packed in separate cases and separate packages.
678. You said it would be necessary to have a powder magazine at either terminus? I said I should prefer it; I did not say it was necessary. It would certainly afford greater security, especially in the case of lightning.
679. Would you have it constructed so that the truck could go right into it? Not necessarily.
680. You would take the powder out and store it in the magazine? Yes, we might do so.
681. *Lieut.-Col. Richardson.*] In what shape is the powder received at the Railway Station? In kegs and in cases for canister powder at the Railway Station; always in kegs at the Darling Harbour terminus.
682. But it is also packed in bags? Yes, it is always in bags.
683. At what hour do you receive it? At Darling Harbour Wharf from 6 to 12 on Mondays and Wednesdays.
684. And supposing it is consigned—we will say to Raglan—where does the powder remain in the interim, until the train starts? It would remain at the wharf until such time as it is taken to the Redfern yard, and would remain there until the goods train left.
685. I suppose the yard is exposed so far as locomotives running backwards and forwards? Yes.
686. You say these vans are lined with iron? The sides are.
687. Don't you consider that dangerous in case of a collision? Well, in case of a collision there might be a small amount of danger attending it.
688. Are the vans completely closed in so as not to be exposed to any danger of sparks from the engine getting in? I don't think there is any danger; occasionally we convey it in covered vans—"C" vans as we call them—and in such cases we always put a tarpaulin on the floor, to prevent the possibility of any sparks getting through the interstices in the planking of the floor.
689. But that is hardly an answer to my question;—are the vans completely covered in? They are completely covered in. At the same time I would not say that you could not see daylight between the doors.
690. But there are no venetians? No. They are completely covered in.
691. How much will one of these vans hold? About 5 tons.
692. How much powder have you conveyed by one train—how many vans? Not more than two vans. The quantity varies very much—from 1 cwt. to 5 tons. We may have carried more than 5 tons—perhaps as much as 8 or 9 tons. I could not say positively, but I think I am safe in saying that we may carry from 1 cwt. to 8 tons at any one time.
693. *Mr. Moriarty.*] Do you think there is any danger in allowing the powder-trucks to stand so long as a week or a fortnight at one of these country stations, with people smoking, bush fires, and other sources of danger about? I don't think there would be much danger from smoking or bush fires, but still I think there is a small amount of danger, and for that reason I should prefer a magazine in preference to the vans.
694. Do you think if a regulation were made to the effect that no powder would be carried on the railway until the dray or other means of conveyance was ready at the far end to receive it, which could be easily telegraphed,

telegraphed, it would get rid of this source of danger. Supposing a person in Bathurst wanted to get powder from Sydney, and there was a regulation providing that the powder would not be taken on the railway until a telegram had been received that a dray was ready to take it, do you think that would diminish the danger? No doubt about it, if it could be done.

695. But would there be any difficulty about its being done? I don't know that it would be impossible.

696. What is about the time occupied in conveying powder from Sydney to Bathurst or Goulburn? Something like eleven or twelve hours.

697. *Mr. Barnet.*] Can you tell us what quantity of powder you took during the last year, and the largest quantity taken at any one time? We carried about 131 tons for the twelve months ending say February last. About 7 tons would be the largest quantity taken at one time.

698. Are any passenger carriages attached to these goods trains? No.

699. Whereabouts are these powder-vans placed in the train;—they are not placed near the engine, for instance? No, I don't think you would find them there. The powder-van being a marked van would not be likely to be placed in such a position.

700. Is there any particular mark upon it? Yes. The whole construction is different. I may mention that powder in smaller quantities is not necessarily packed in a separate van. We may load small packages of powder with other goods, but it is always conveyed in a powder-van or covered van, which is equally secure. For instance, if we receive a couple of kegs at the Redfern terminus, or a case of canister powder, it is always consigned as powder, loaded in a powder-van or covered van, but with other goods.

701. But the powder-van when brought up from Darling Harbour is kept in the yard with the other goods? Yes.

702. With these locomotives passing and repassing all the time? Yes.

Mr.
D. Vernon.
3 Aug. 1875.

FRIDAY, 6 AUGUST, 1875.

Present:—

J. BARNET, Esq.,
CAPT. HIXSON,

LIEUT.-COL. RICHARDSON,
E. O. MORIARTY, Esq.

CAPTAIN G. K. MANN IN THE CHAIR.

Mr. J. T. Blanchard, Assistant Ordnance Storekeeper, called in and further examined:—

703. *Chairman.*] The Board are desirous, Mr. Blanchard, of being informed as to the guard and the authorities that exist at the magazine for the supervision of powder and stores there? We have a night watchman and a day watchman. Formerly we had a guard of soldiers, but since the Imperial troops were withdrawn that is the plan we have adopted.

704. What are these men—are they constables? No, laborers on the place; each man takes his turn.

705. Are they sworn in as constables? No.

706. What power have they to apprehend any person coming on the Island? There is no law that I am aware of that they can go upon; they apprehend a man and keep him under surveillance until they can place him in the charge of the police; when, if there were any proof of felonious intention, I suppose, of course, the man would be convicted.

707. Are these watchmen provided with special regulations to inform them how they are to act in these cases? There are no special rules beyond what I have stated; it is generally left to their own discretion.

708. But supposing a party of three or four men, or even a larger number, took it into their heads to land on the Island, what power have you to prevent them? The watchman would call the other laborers to his assistance if the intruders were too many for him; our men are provided with fire-arms.

709. Are their fire-arms loaded? No, but we have a supply of ammunition, and it would not take them long to load.

710. Is there no difference between the magazine at Goat Island and the one at Spectacle Island in this respect? No, they are both the same.

711. Has any case occurred where these men have taken trespassers in charge? I know of one that occurred; I think it was about three months ago, when a man was found on the Island. But nothing could be proved against him; he had merely drifted there in a boat, and there was no reason to suppose that he had any felonious intention.

712. Will you describe what was done on that occasion? He was taken in charge by the watchman, and handed over to the Water Police.

713. What time did this occur? It was early in the morning; I suppose about 3 or 4 o'clock.

714. Was he sober or not? He was intoxicated, I believe; he was found lying asleep and given in charge of the police.

715. Did the police take any action—was he punished in any way? No, they could not prove any improper intention.

716. *Mr. Barnet.*] Where did this take place? At Goat Island. It appeared that he got away from some vessel with the intention of being left behind; he had no oars in the boat, and had drifted with the tide.

717. *Chairman.*] And there was only one man on duty on the Island at the time? One man only.

718. And he was stationed near the magazine I suppose? He patrols the Island as well.

719. Then he might be at some distance on an occasion of this kind? He might; but a number of men would not prevent any person from landing more than one man. It is always possible for a man to land on Goat Island without being observed.

720. How many men are there on the Island capable of being brought together? There are six men, besides the foreman on Goat Island, and four on Spectacle Island.

721. And they are all at work during the day? Yes, they have their regular duties to perform.

722. And sometimes they are employed throughout the day entirely at fatiguing work? Yes.

723. Is there any path round the Island—along the shore—on which the watchman, who you say patrols the Island, can walk? There is no regular path, except for a portion of the way—the remainder is bush; and it is the same on Spectacle Island—there is no regular path.

Mr. J. T.
Blanchard.
6 Aug. 1875.

Mr. J. T.
Blanchard.

6 Aug., 1875.

724. Do you think that guard is sufficient for the magazine? I think it is under existing circumstances; but of course in time of disturbance it would be necessary to increase the watch, and give us extra labourers for that.
725. Do you know what instructions are given to these men when powder-boats are moored by the lightermen off the magazine—when there is not time to discharge them? Yes. That very rarely occurs, but it does occur at times.
726. What instructions are given to the watchman on such occasions? The boats are placed in his charge, and he would take such action as he might think necessary.
727. Are they placed under the charge of the magazine authorities? I could scarcely say that we are responsible for the powder if any damage should come to it from the boat springing a leak, or anything of that sort; but in other respects we are to watch and guard it.
728. Merely for the sake of safety? For the sake of safety.
729. Have you any means of communicating with these boats in case of necessity? Yes, there are two boats on each Island with the regular boatmen.
730. Are the men on watch supplied with an order to board the same as sentries are? There are the magazine regulations for each Island, for the guidance of the foreman and men.
731. And who sees that they are placed at their several posts? The watchman goes on at 6 o'clock at night, and remains till 6 o'clock the following morning.
732. Does the foreman see that he is at his post? Yes, and he occasionally visits him.
733. How are the men told off for duty? They report themselves to the foreman at 6 o'clock at night and at 6 o'clock the next morning.
734. Is there a regular duty roll kept? Yes—a duty roster.
735. Each man knows his tour of duty and takes it as a matter of course? Yes, and the orders are read to all the men each month.
736. Yes, but how does each man know his tour of duty for the day? They go by rotation.
737. Have you ever known an instance where, by mistake or otherwise, that there has been no watchman on duty? Do you mean by a mistake of the foreman?
738. Or of the men themselves; they do not appear to be regularly posted? No, there have been no such instances; but they have been found sleeping on their posts, and have been punished for it, either by being discharged or by loss of pay. I had a case myself, where I found a man sleeping at his post, and I took his rifle from him; he was discharged.
739. *Lieut.-Col. Richardson.*] These watchmen are furnished with rifles and ammunition? Yes.
740. What instructions are given to them as to the use of these arms? Not to use them except under very special circumstances, and to exercise their own discretion.
741. But supposing a man was shot, are you aware that the watchman would be liable to be tried for murder? If he could show sufficient cause, if he could show that he was acting for the public safety, I should think he would be exempted from any punishment.
742. He is not an enlisted soldier or a special constable, and he would assuredly be tried for murder? I thought the protection of the public would be a sufficient reason to exempt him. I understand that our department is a semi-military department and governed by the same regulations; when we could have them we always had military sentries.
743. Is gun-cotton stored in the same magazine as the gunpowder? Certainly not.
744. How is it packed? In ordinary deal cases.
745. Are they luted with tupe and marine glue? I believe they are.
746. Is there any store-tank in the magazine for the storage of gun-cotton? No.
747. It is merely packed in wooden boxes? Yes, and stored in a shed apart from the other explosives.
748. Are you aware that in the Imperial Regulations it is laid down that gun-cotton must be stored in tanks? I believe such a rule does exist.
749. Are you further aware that the safety of gun-cotton depends upon its being kept in a damp state, and that in the Imperial Service tanks are supplied for this purpose, and that the gun-cotton is inspected every three months? I cannot say that I was aware of that.
750. You have no appliances of that kind here? None at all.
751. Is there any clause in the Colonial Regulations to prevent the labourers employed in the magazine from carrying matches or other combustibles? There are plenty of regulations which prohibit that.
752. When strangers have access to the magazine are any precautions taken to relieve them of any matches they may have about them? They are interrogated and asked to hand them to the foreman, and they are obliged to change their clothes and put on goloshes.
753. Does the foreman ever absent himself from the Island without leave? I am not aware of it—not during working hours.
754. Are the workmen supplied with special clothing during working hours? They are, both with summer and winter clothing.
755. As laid down in the Imperial Regulations? As laid down in the Imperial Regulations—with two different suits.
756. On purpose for working in the magazine? Yes.
757. And they are shifted when they go in and out? Yes.
758. Are slippers invariable worn? Yes, always.
759. In removing powder from one part of the magazine to another, what precautions are taken to prevent accidents? Wadmills, tilts and matting are laid down, and rope tackle and can hooks and regular trucks, fitted with copper screws, are used in removing it.
760. Are barrels of powder rolled along the floor of the magazine? I have known it to be done in that way, but there are special trucks provided for that purpose, and the men have been warned against such irregularities.
761. If the head of a barrel containing powder should start when it is moved in the magazine what is done? A fresh package is procured to place the contents in from the broken one.
762. Do you remove the package at once from the magazine? Yes, certainly.
763. In heading barrels of powder what tools are used? The regular tools—all of copper.
764. Are any iron tools used in the cooperage? No, they are all copper.
765. Is every package carefully examined before it is taken into the magazine? Yes, I believe the foreman does it.

Mr. J. T.
Blanchard.
6 Aug., 1875.

766. If defective is it removed before going into the magazine? Most decidedly.
767. On the appearance of a storm or thunder what is done, supposing the magazine to be open? The watchman immediately reports it to the foreman and he has it closed.
768. Is breech-loading ammunition, which contains its own means of ignition, stored in the same compartment as gunpowder? No, it is kept apart in a separate store-room.
769. Are percussion caps kept in the same place as gunpowder? No, they are kept in a separate room.
770. Are percussion caps kept in any place where the manipulation of powder takes place? They are not.
771. Is there a thermometer in each magazine? Yes, we have been supplied with them, and I believe they are there now.
772. In each magazine? Yes.
773. Is there a fire-engine or hose in each magazine? No.
774. You have no means of putting out a fire? No, beyond ordinary buckets.
775. Are laboratory operations carried on in the same building? No, in a separate building.
776. About what distance is the laboratory from the magazine, in yards—50? Not so much as that; about 10 or 12 yards on Spectacle Island, and on Goat Island it might be 15.
777. Are you aware that according to the Imperial regulations no laboratory is permitted within 400 yards of a magazine? I am afraid our space would not admit of that distance.
778. What is done with any surplus powder which may be left in the laboratory when the day's work is finished? It is always placed in the magazine.
779. Mr. Bayliss has given us evidence that powder barges not discharged are sometimes moored off the magazine wharf;—how far, as a rule, are they moored? Within 50 yards; that is the distance.
780. Are you aware that under the Imperial regulations no boat can be moored within 900 yards of a magazine? If we had to do that they would be beyond our control; we consider 50 yards as much as we can allow.
781. Is there anything in our regulations to define the distance? No, except that that distance is approved.
782. Are lanterns used in the magazine? We never have occasion to use them.
783. At what hour are the workmen's lights extinguished on the Island? At 11 o'clock.
784. *Mr. Moriarty.*] Do you think the guard you have on the Island, considering the magnitude of the danger, is sufficient? Under existing circumstances I think it is. As I said before, in times of disturbance it would have to be increased. They only patrol the Island three or four times during the night; they remain near the magazine the chief part of the time.
785. What are the regulations to prevent persons approaching the Island from landing upon it; from what source do they emanate—from the Treasury? From the Treasury. They are prepared by the Ordnance Storekeeper, and the Treasurer approves of them. No person is allowed to land without special authority.
786. And if they do land, what then;—are they taken in charge by the police? They are quietly ordered off, and if they persist in landing of course we must take action.
787. And that action depends upon the judgment of the watchman? The watchman and foreman.
788. Now, supposing a man is arrested for coming on to the Island, what is the next step? We hand him over to the Water Police.
789. What do they do with him? I suppose they confine him.
790. Can they do so under any enactment? There is no provision in our Act for that.
791. I want to know what the law is on that point? Well, I suppose if it is proved that he is there with any felonious intention that is sufficient to punish him.
792. Supposing he is merely smoking his pipe? Then he is handed over to the police for trespassing, and if within the boundary-walls he has to extinguish his pipe.
793. But I want to know what the police can do supposing he is handed over to them? There is no special law that I know of; the Powder Act makes no provision for that.
794. Then do you consider that, in that view of the case, the Powder Act is insufficient? I do; I think there should be some special regulation to meet such cases.
795. You think the regulations should be made more stringent to meet that difficulty? Yes.
796. Are the regulations now in force presumed to be under the special authority of an Act of Parliament? They are.
797. What is that Act? 7 William IV No. 7, and 16 Victoria No. 47. It states that the Government can make such regulations as they may consider necessary.
798. Are the watchmen under these regulations vested with any power to resist to extremity? No, they receive no directions.
799. They are entirely on their own discretion? Yes.
800. Are these watchmen mere laborers, taken on at any time and dismissed at any time, or are they in any shape or form a constabulary or military force? They are chiefly pensioners and soldiers.
801. But they are laborers now? Yes.
802. Have they any military standing under the Powder Act? No, there is no provision for them in the Act.
803. *Lieut.-Col. Richardson.*] They are merely civilian laborers? Civilian laborers or pensioners appointed by the Treasurer, as the case may be.
804. *Mr. Moriarty.*] And they may be dismissed and taken on at any moment? Yes.
805. And any laborer may be taken on as a powder laborer? Yes.
806. You do not always look out for old soldiers? Yes, we do.
807. But if you cannot find them you take on any men? It is necessary to do so.
808. How are they paid? They get so much a day.
809. How often are they paid? Every month.
810. Now, when powder is brought back and moored near the wharf, I think I understood you to say that you undertake no responsibility further than instructing your men to do the best they can? We do not take any responsibility as to the safety of the powder until we get it on to the Island, beyond taking all the care we can.
811. Do you think it would be desirable to have more stringent regulations in this case? I do.

- Mr. J. T. Blanchard.
6 Aug., 1875.
812. So that when powder is brought back it should be directly under the control of the authorities;—would you advise that? No, because that would lay the Government open to claims against them if any damage should occur from the boats being defective—if they sprung a leak.
813. But supposing proper arrangements were made with regard to the boats? If the boats belonged to the Government I should say arrangements could be made.
814. In view of the public safety would you suggest that the authorities should be entrusted with the control of the powder and have proper boats specially designed for the purpose, in order to move the powder with safety? I think the boats should be provided by the department, and that would ensure safety.
815. Belonging to the department? Yes.
816. *Mr. Barnet.*] Do you think there is any danger in having these boats towed by a steam-launch? Not if they are properly covered-up boats with hatchways. Still it is not a desirable thing to move powder with steam-launches; it is always avoided if possible.
817. *Captain Hixson.*] Have you ever heard any complaints about the time it takes to convey powder under the present arrangements from the ships in which it arrives in the harbour up to Goat Island? No complaints of that sort would scarcely reach us, because we have nothing to do with it; the Customs police deal with the powder until it reaches us.
818. Have you any idea whether any such complaints are made? No, I have heard of no complaints.
819. Have you any Government gun-cotton in the magazine now? No, it is all private, belonging to merchants.
820. Have you much of it there now? No, only a very trifling quantity—only a few hundred weight.
821. *Mr. Barnet.*] Do you receive any notice of powder coming to you before it arrives? No; the Act states that the masters of vessels should report to the Customs and also to our department, in order to obtain a permit to land the same on the Island, but they never do it.
822. But supposing a person wants to remove powder from the magazine? He gets a permit from us.
823. He may come at any time? Yes, and if it is for shipment we deliver it after 9 o'clock, which we do not in other cases. If it is for town delivery, for instance, it is only delivered up to 9 o'clock, and to the Railway up to 12 o'clock.
824. *Captain Hixson.*] Do you think the transit of powder through the town is attended with danger? I do, because the men who have to deal with it are not proper persons to take charge of powder, and do not take proper precautions. But I believe arrangements are now being made in the department to have it under our own control.
825. To have the custody of the powder until it is actually delivered to the owner or to the railway? No, not to the railway;—to the merchants in town.
826. In fact an arrangement is now being made for the department to deliver all the powder for town use by land or waterwise? Yes; it should have been done long ago.
827. And you think this arrangement will tend to lessen the danger which now exists? Yes, considerably.
828. Can you tell us what the proposed arrangements are? Well, they are not consummated yet; there is to be a meeting of merchants next week about it.
829. Are they a proposal on the part of the merchants in Sydney? No, on the part of the Ordnance Storekeeper.
830. In fact there is to be a conference with the merchants as to the department taking upon itself the responsibility of delivering town powder? Yes.
831. But you are not at liberty to state what the proposed arrangements are? Well, I do not think there will be any harm in sending you a copy of them, as you could easily obtain them elsewhere. (*Vide Appendix.*)
832. *Chairman.*] Is there any other suggestion you would like to make to the Board before you leave? No, I can only reiterate the statement made in writing by the head of the department.
833. You do not wish to add anything to the evidence you have given to-day? No, I do not think anything else is necessary.

TUESDAY, 17 AUGUST, 1875.

Present:—

E. O. MORIARTY, Esq.,
LIEUT.-COL. RICHARDSON,

J. BARNET, Esq.,
CAPT. HIXSON.

CAPTAIN G. K. MANN, IN THE CHAIR.

Major Chs. Roberts, late R.A., called in and examined:—

- Major
C. Roberts.
17 Aug., 1875.
834. *Chairman.*] The Board are desirous, Major Roberts, of ascertaining the localities of the different powder magazines in England;—can you give us any information upon that point? Do you mean large magazines?
835. Perhaps you had better confine your reply in the first place to the Government magazines, and then refer to any magazines of importance of which you may be aware? There is a large magazine at Hounslow.
836. That is a Government magazine? Yes; there are large magazines at Plymouth, at Portsmouth, and at Dover, but I think about the largest magazine is at Purfleet, which is for the storage of powder.
837. Have you any idea of the maximum quantity of powder stored there? I could not say.
838. Could you approximate it? No; it has escaped my memory; I do not think they have more now than 300 tons there at any time, but go to the manufacturers when they require more; but that is only an idea, and I am not at all sure about it.
839. You mean that is the largest quantity they keep in one magazine? No. I don't think they have more than that quantity there altogether in the magazines, but it is nearly twenty years since I was at Purfleet; it is a great place for storing powder.
840. Would that 300 tons be the aggregate quantity of powder in the hands of the Government, or the quantity stored in a magazine? The aggregate quantity in the hands of the Government in those magazines.

841.

Major
C. Roberts.

17 Aug., 1875.

841. Then it might be distributed throughout a number of magazines? Yes; but it would be chiefly at Hounslow or Purfleet.
842. Can you give us any idea of the distance which these magazines are from habitations? The magazines at Purfleet are not more than half-a-mile distant.
843. Are there any public thoroughfares within the proximity of the magazines? As well as I remember there is a road going through the "compound" or Government enclosure at Purfleet, but then of course nobody can pass, except by certain permission.
844. Can you give the Board any information in reference to the conveyance and transit of powder or explosives at Home? At Purfleet, when they brought in powder from Waltham Abbey, they brought it in barges, and all fires were obliged to be put out during the transit from the barges to the magazines; the powder is put into barrels.
845. Will you describe the kind of barges used? Ordinary barges.
846. Are they covered in any way? Not those which I recollect; they were the ordinary Thames barge, with their usual covers and tarpaulins.
847. The operation of removing the powder was always undertaken by experienced hands, I presume? Yes; at Purfleet there was always a working party told off for it—in charge of an officer.
848. Men specially employed for the purpose? Yes; there was always somebody on the magazine staff connected with it.
849. The Imperial Government have several manufactories of their own, I believe? No, only at Waltham Abbey that I know of; I think the others merely belong to private individuals, who contract for the supply of powder.
850. Do you remember the account of the explosion which took place at Erith? Yes.
851. Do you know any of the details of that explosion? No, I don't think I was in England at the time.
852. Can you furnish the Board with any particulars as to the area of danger surrounding a magazine? That of course would depend upon the quantity of powder stored in it. I don't think you have any data to go upon.
853. What is your opinion as to the effect of an explosion of 500 tons of powder for instance? You must give me a locality, because that would make a good deal of difference. If the magazine were situated on a plain, for instance, the effect would be more extended.
854. I will put the question in a different way: 500 tons of powder have been stored at Goat Island. Supposing an explosion to have taken place, what do you think would have been its effect upon the City of Sydney? I think its effect would have been to destroy the better part of George-street north, and all to the west of the hill—westward of York-street at any rate. Anything open to the explosion would be damaged within a radius of a mile and a half—certainly within a mile, because there would be nothing to stop it. The effect would be worse this way than it would at the North Shore.
855. Why do you think so? Because, as well as I can remember, there is high land there opposite Goat Island, and there would be a sort of rebound of concussion from it in this direction; but the materials of the magazine might go almost any distance.
856. Do you think the effects of an explosion might be guarded against by substantial traverses in different directions from the magazine? I don't think that would have much effect; I think the greatest security would be in sinking the magazine into the solid earth as much as possible, so as to force the force of the explosion upwards and prevent its extension laterally.
857. What is your opinion with respect to the construction of a powder magazine; do you think it ought to be a lightly constructed building, or a more solid bomb-proof erection? With regard to Goat Island I should say the lighter the building the better.
858. A magazine for the storage of ordinary mercantile powder? Certainly it should be a light building, something like the field magazines, which have little more than wooden sides covered with earth and well covered with earth on the top. Of course that would be rather dangerous here on account of bush fires, and you would have that to consider. So that perhaps it might be better to have a light brick building.
859. *Mr. Moriarty.*] You are acquainted of course with the position of the magazine at Goat Island? Yes.
860. We have it in evidence that there has been as much as 500 tons of powder stored there at one time. Having regard to all the circumstances of the case, do you think it judicious to store such a large quantity of powder close to the city? Certainly not; I don't think while we were here we had that quantity stored; our largest quantity was at Spectacle Island, we had a guard at Goat Island, but I don't think we had much powder in the magazine.
861. I am speaking of merchants' powder chiefly. From your knowledge of the magazines at Home and of the subject generally, should you think that Goat Island was in dangerous proximity to a town? Well I think all large magazines near towns are dangerous to a certain extent.
862. Do you think there is extra danger attached to the storing of merchants' powder in conjunction with Government powder? That depends upon what right there is to go near it and to inspect it—how do they receive it?
863. Well we are told that the mode of receiving and delivering powder is very far from efficient, and that the storing of merchants' powder adds very much to the danger of keeping Imperial powder? It depends greatly upon whether there is a good superintendent—a good magazine man; there ought not to be much danger as long as the rules are carried out rigidly.
864. And as long as the superintendent has full power? Yes, as long as he has full power.
865. Do you think a magazine should be under military authority, so that strict discipline can be enforced and all orders promptly carried out? Yes, certainly; at Home the officer commanding the Artillery is responsible; every magazine in the garrison is placed under his charge. I was just thinking that one of the magazines in Plymouth is quite as near the town as Goat Island is to Sydney. That in the citadel.
866. Have you any idea of the average quantity of powder stored there? No, I do not remember exactly. I should think there would have been about 300 or 400 barrels—say from 10 to 15 tons; but then that was all in barrels or in rectangular cases; a great deal of it was made up for service.
867. Having regard to the peculiar circumstances of this country, its distance from Home, and the difficulty there would be in obtaining an adequate supply of gunpowder if England were engaged in war with any other country, do you think it would be judicious to have all our powder in one magazine? Certainly not.
868. Then you would recommend a separation of the powder and to have it stored in two magazines at least? Yes, or even more.

- Major
C. Roberts.
17 Aug., 1875.
869. You would diminish the risk by separating the powder? Yes, considerably, as far as the amount of damage likely to be done.
870. *Lieut.-Col. Richardson.*] With reference to the magazine at Goat Island, Major Roberts, one consideration now before the Board is to use it as a magazine for naval purposes; their average quantity is about 40 tons. The question I should like to ask you is, whether with that quantity stored at Goat Island under strict regulations there would be any appreciable danger to Balmain and the surrounding places? I think not, with ordinary strict precautions—and naval powder *only* stored there.
871. Under the naval regulations? I do not know what the naval regulations are. Under military regulations—what we used to call storekeeper's regulations—if they were strictly carried out, I don't think there would be much danger; but no laxity must be allowed.
872. Supposing an explosion occurred of 40 tons of gunpowder there, what do you think would be the effect? Well, I think Balmain would be in danger, because the magazine is backed by high ground. I think, looking at the way the houses are placed, Balmain would suffer first.
873. Do you recollect the Inkermann windmill explosion? Yes.
874. Have you any idea of the quantity of powder ignited on that occasion? No. I believe there were about 300 Russian shells on the top of the magazine in the French gun park, but what was inside it I could not say.
875. Do you know what was the area of destruction? Well, it was chiefly composed of camps—tents and wooden huts. Do you mean by destruction, things actually blown down?
876. Blown down and actually injured? I should think about $\frac{1}{2}$ a mile. The hospital huts, which were of wood, belonging to the right siege train, and $\frac{1}{4}$ of a mile distant, were all blown down, but injury to a greater extent was done.
877. Do you know how the accident occurred? Yes, as far as report goes, two Frenchmen were emptying shells—Russian shells; one of them was smoking and the other was not, and curiously enough the man who was not smoking was killed while the other escaped. The body fell on him and saved him; but that is only hearsay.
878. Were they emptying shells into the magazine? Yes, I believe so. It was stated that a piece of one of the shells went as far as Mother Seacole's hut, which was 7 miles off, but of course that is absurd.
879. *Chairman.*] Are you aware of the class of package into which merchants' powder is generally put? They used to be very rough; I don't know what they are now.
880. Do you think the package in which powder is kept is a point of considerable importance? Yes, it is the point of importance, I think.
881. You think that the danger is considerably increased by the inferiority of the package? Yes, from any leakage which may take place from defective packages.
882. Have you had any experience of the other explosive substances which are now coming into use—chemical explosives I may term them? No, I have had none; I know that gunpowder is considered the safest of these explosive mediums.
883. Is it the practice in magazines at Home to store ammunition in the same magazine as gunpowder? Do you mean small-arm ammunition?
884. The various kinds of ammunition—ammunition which carries its own means of ignition with it? No, it is unusual.
885. Is it not always stored in the same magazine? Hardly ever.
886. But it is not unusual to store them in the same magazine? Yes it is; it would not be done at Purfleet.
887. But in expense magazines it is necessary? Almost necessary.
888. There is always a laboratory attached to a magazine, is there not? No, not a regular laboratory.
889. But a building which is designated a laboratory? Well no, I think not as a rule.
890. But where they do exist what distance are they generally from the magazine? Do you mean the place for making up cartridges?
891. Yes, and repacking? The repacking rooms are very often at the end of the small magazines. The magazine is generally or at least frequently made in three rooms, and the powder is issued through a trap door from one room to the other.
892. Would the repacking room be under the same roof? As a rule it is not; in large magazines of course these filling rooms would be as handy to the batteries as is consistent with the distance from the large magazine.
893. You are speaking now of expense magazines? Yes, what I call magazines in fortifications.
894. Our attention is directed more to large storing magazines? Certainly where there are 500 tons of powder it would be desirable to have the making up rooms at a very considerable distance from the powder stored, because that is where the leakage or damage caused by grit is likely to occur, and the whole of the powder might be endangered.
895. The magazines at Home, are they all lined with wood? No, I don't think all of them are; some are, but I know some that are not. Of course they have wooden floors—at least nearly all of them; they are protected as much as possible with hides and cocoon or hair fibre.
896. *Lieut.-Col. Richardson.*] Powder is liable to ignition by concussion merely, is it not—the concussion alone will ignite a shell without fuse? Yes, it has been found to do so.
897. Apropos to that, would not a railway collision, if the train was going (say) 40 miles an hour, be likely to cause an explosion? Yes, very likely.
898. Or even at a less degree of speed? Yes; a horse running away might cause an explosion if the powder-cart were brought in contact with something which caused great resistance.
899. Are you aware of the construction of the powder-vans and the mode of conveying powder by railway? I think it is generally sent away in iron casks, viz., iron cylinders, the tops of which are screwed down and removable; they use a particular varnished barrel for railway travelling which is put into another water-proof or canvas case before it is put into these cylinders, and very often the loose powder is put into a serge bag before it goes into the barrels. Powder has been known to explode from an ordinary leaden bullet striking it against wood—the mere concussion of lead fired against powder. As far as I can remember, when experiments were made with the tumbrils for small-arm ammunition, to see whether the bullets going through would explode the powder, they found that it did.
900. *Mr. Moriarty.*] The heat generated by the concussion would cause the explosion? As far as I can recollect about 600 degrees is the heat required to ignite gunpowder. Of course, the quality of the powder has a great deal to do with it; inferior powder is more likely to explode. 901.

901. *Capt. Hixson.*] Have you any idea of the quantity of powder stored in the different magazines at Home? No. I was just thinking of the name of an island near Plymouth where there is a large magazine—Drake Island.

Major
C. Roberts.

902. Is that island close to the mainland? It is about the same distance as Goat Island is to Dawes' Point—about half-a-mile, or something like that. 17 Aug., 1875.

903. Do you think, if a properly-constructed boat or barge were used for conveying powder about the harbour, there would be any danger attending the towing of the powder-boat or barge by an ordinary steamer? Not if the powder is properly packed; the great danger lies in the defective packages.

904. Do you think the advantage of having the powder conveyed expeditiously across the harbour, by having the boats towed by a steamer instead of being subjected to the delays attending ordinary sailing-boats, would counterbalance any danger which might arise;—do you think it would be safe? I think, of course, that there would be extra danger in the sparks from the steamer. It depends entirely upon the construction of the powder-charge.

905. I mean with properly constructed boats—do you think there would be any danger? Not if the powder be properly packed—that is the greatest security.

LIST OF APPENDIX.

	No. 1.	Page.
Memoranda in reference	No. 1.	36
Jackson's letter	No. 2.	37
Alderson's addenda	No. 3.	37
Alger's addenda	No. 4.	38
Blanchard's addenda—Rules and charges	No. 5.	38
Paton's—Quantities of gunpowder	No. 6.	38
Ordnance Storekeeper's return of gunpowder	No. 7.	39
Regulations for Magazines	No. 8.	39
Military Store—Memorandum	No. 9.	40
Government Notice, 1862	No. 10.	40
Government Notice, 1872	No. 11.	40
"Gleaner" Notice	No. 12.	40
Blue Book—Tabular Statement	No. 13.	41
List of certain Explosions, with special extracts and references	No. 14.	43

No. 1.

MEMORANDA in reference to the inspection of the Magazines at Spectacle and Goat Islands, as per Board Minute of the 13th May, 1875.

SPECTACLE ISLAND.

Arrangements for delivery and receipt of powder.

There is a covered wooden shed at the end of the jetty, the floor of which is from (5) five to (8) eight feet above the level of the water according to the state of the tide; powder barrels and packages are slung and hoisted in from this height by means of an ordinary tackle and can-hooks; a covered way with a cemented floor upon which trucks run, leads from the end of the jetty to the magazine.

Magazine walls and floors.

The magazines are substantially built of sandstone masonry with slated roof, not bomb-proof. The floors are cemented, and are covered with coir matting along the centre of the ways; the walls are not lined or plastered, being merely the sandstone whitewashed.

Storage.

The powder is packed in the usual copper-hooped barrels and approved cases of the Government pattern, and is stored in racks or bays to the height of about 10 ft. 4 in. from the floors, and 13 ft. from the roofing in the middle of the building.

Laboratory and Ammunition Store.

This building is about 11 ft. only from the principal magazine, and is similar in construction to it; the doors of it and of the magazine are directly opposite one to the other, having a covered way between them, with a cemented floor. The door-sill of the laboratory is about 1 in. above the level of the cemented way, and the sandstone of which it is formed shows evidence of abrasion from the passage of the powder trucks. Charged percussion fuzed shells are stored in this building. The small arm store is distant 27 ft. from the magazine.

Lightning-conductors.

There are (12) twelve in all, viz., ten tri-pointed with copper connecting rods leading through the earth to the water, and two single-pointed or detached staffs with connecting rods also leading to the water; these two are distant from the main magazine buildings 7 ft., the other ten are attached to the buildings, and rise to a height of 34 ft. above the roofing.

Ventilation to Magazine and other buildings.

Windows or openings fitted with inside and outside wooden shutters, but without wire gauze.

Laboratory or Store for small-arm ammunition of the old pattern cartridges.

This building is of similar construction to the principal magazine, from which it is distant 27 ft.

Officers' quarters and labourers' dwellings.

These are separated from the principal magazine buildings partly by a stone wall and partly by an open fence. The distance of the nearest residence from a magazine or laboratory is 17 feet, the furthest 218 feet.

GOAT ISLAND MAGAZINE AND BUILDINGS.

Arrangements for delivery and receipt of powder and other explosives.

There is a covered wooden shed with a slated roof at the end of the jetty, the floor of which is of wood, and of a height enabling the packages of powder to be handed from or to the boat alongside; the floor of the way leading to the magazine, which

which is also of wood, is about 14 feet above the level of the jetty. All packages are hoisted and lowered on a sling frame by means of a rack and pulley to and from level of the trucks for transport to the magazine or otherwise; the ways to the magazines and laboratory have a slated roofing over them throughout.

Principal Magazine.

This is a very substantial building of sandstone masonry, having an arched bomb-proof roof, old style, slated on the exterior. The floors are of hardwood, the walls are whitewashed, without any lining, as is also the interior surface of the bomb-proof roof.

Storage.

Powder stored in barrels and cases; that of the Colonial Government and of the Royal Navy or Imperial Government in the approved copper-hooped barrels or cases; merchants' powder in the ordinary wooden-hooped barrels and cases. The magazine is fitted with ordinary racks or bins, and the powder is stored to a height of about 12 feet from the floor, and 3 to 5 feet from the roof. Powder and other ammunition belonging to the Colonial Government, Her Majesty's ships of war, and merchants' powder, is stored at this establishment.

Laboratory.

This is a substantial building of sandstone masonry with a slated roof; it stands 51 feet from the principal bomb-proof magazine, and about 25 feet from the additional magazine, being between these buildings. It is approached by a covered slated roof way with wooden flooring both from the landing jetty and the two magazines.

Windows, doors, and openings for ventilation.

There is a window at the south end of the principal bomb-proof magazine fitted with inside and outside shutters, and also with a permanent wire-gauze filling; apertures are also made in the side walls. There are double doors to all the buildings. The windows of the laboratory are of the ordinary kind with shutters.

Lightning-conductors.

There are four lightning-conductors in all, viz.:—Three single-pointed on detached staffs, distant from the magazine 6 to 13 feet, and one tri-pointed at the landing shed. The single-pointed conductors have an iron conducting rod, copper tipped, leading to wells in which it is reported that there is a constant supply of water. The tri-pointed conductor leads direct into the water.

Storage of other explosives.

There are two wooden sheds of a temporary character on the north-eastern portion of the island, distant from the main magazine about 210 yards, and from each other 35 yards. In the first shed dynamite and other nitro-glycerine explosives are stored, in the second gun-cotton.

General remarks with reference to Goat Island.

The principal magazines and laboratory are built on an excavated portion of the island towards the south-west, and the elevation of the scarped rocks towards the north-east and east forms a protecting traverse in those directions. On the eastern summit of this rock there is a weatherboard or stone building, occupied by one of the labourers. The general surface of the island is covered with a thick underwood and long grass.

No. 2.

Sydney, 21 July, 1875.

Sir,

Memorandum from F. Lassetter & Co. to Captain Mann.

Having been requested by the Powder Board to give an approximate idea of the quantity of powder which our firm might require to send by each of the railway lines, I consider that it is probable about 200 kegs, each 48 lbs., per month would be about the quantity for the Northern line, Newcastle upwards, and 200 kegs between the Western and Southern lines per month.

Having stated in my evidence that I consider an additional number of powder magazines throughout the Colony would benefit the trade, I now beg to add to the localities I then named that magazines be also established at Wollongong, Shoalhaven River, Clyde River, Bateman's Bay, Twofold Bay.

I have, &c.,

WILLIAM MARSHALL JACKSON.

No. 3.

From Mr. Wm. Alderson, 27th July, 1875.

THE following quantities of Lithofracteur have been imported or received by us since we began the agency in 1872:—

Transhipped to Melbourne.	From whence.	Ship's name.	Quantity.
.....	Melbourne	Rachel Cohen	Cases— 15
.....	London	Mendoza	„ 50
Cases—450	„	Cleta	„ 500
.....	Melbourne	Leonidas	„ 200
.....	London	Guorm Castle	„ 100
Cases—184	„	Glengower	„ 284
			Cases—1,149

Each case contains 55 lbs. of lithofracteur, which is packed in ten 5½-lb. boxes. The lithofracteur being in cartridges of prepared paper, no absorption can occur.

Our clients are principally Messrs. Lassetter, Keep, and Friend.

It has been used at—

Locality.	How employed.
Hill End	For mining.
Great Northern Railway	„ tunnelling, &c.
Kiama	„ quarrying.
Queensland Government	„ railways.
Gympie	„ mining.
Townsville and Cooktown	<i>id.</i> in the interior.

If some regulations were made to facilitate its transport by sea-going vessels, and for its storage and transit in the harbour, the trade in this article would considerably increase. It could be taken as safely on board from any of the wharfs, from Pinchgut, &c. There is no danger whatever in handling it.

[Taken by J. H. L. Scott, Sec., Gunpowder Board.—27/7/75.]

No. 4.

EXTRACT from the Report of the Sydney Chamber of Commerce for the year ending 31st December, 1874.—Transport of Gunpowder.

"Your Committee have reason to believe, on very reliable assurance, that many and serious irregularities frequently occur in the transport of powder to and from the Sydney magazines. It is quite likely that the irregularities referred to are violations of the existing laws, but it does not appear that an active supervision prevails, and consequently the law is disobeyed, to the manifest peril of many of our fellow-citizens."

No. 5.

Mr. Blanchard's evidence.

Proposed Rules and Charges. Submitted by the Ordnance Storekeeper, 28th July, 1875.

1. That all powder required for the town should be applied for by permit, with cards of address for each package, before 3 o'clock p.m. the day previous.

2. That the Powder Clerk will, on receipt of the permit, enter the applications in detail in order book for the Foreman of Magazines' guidance, in the presence of the person who presents the permit, to ensure a fair turn of delivery to each merchant—the boat and cart being limited to a ton.

3. That the Foreman of Magazines will be responsible for the delivery of the powder in the covered-in boat at Miller's or Moore's Wharf by 8.30 o'clock a.m. each day, to the Government carter, with book received from the office.

4. That the carter will be responsible for the delivery of all in the cart to address given by 9.30 o'clock a.m., taking receipt for same.

5. Any portion of day's demand not delivered through want of room to become the first in turn next day.

6. That any mistake, non-delivery, lateness, or carelessness observed by the merchants or their employes to be at once reported to the Ordnance Office, otherwise no notice can be taken.

7. That the scale of charges be as follows:—

	For every package—	Example.
1 lb. to 50 lbs.		
1 to 10 at 6d. each	5s. for 10
11 to 20 at 4d. each	8s. 4d. for 20
21 to 30 at 2d. each	10s. for 30
51 lbs. to 100 lbs.		
1 to 10 at 1s. each	10s. for 10
11 to 20 at 8d. each	16s. 8d. for 20
21 to 30 at 4d. each	20s. for 30

8. These charges to be paid to the Powder Clerk at the time of giving order, and receipt given.

9. One-fourth to be retained as departmental expenses, the other paid into the Public Revenue.

10. Monthly statements, to show all work done and distribution of money, to be rendered.

11. No clerk, foreman, or labourer to receive extra pay for this additional duty but those noted as approved by the Honorable the Treasurer.

12. The foregoing rules and charges to remain in force as long as the merchants' powder remains at Goat Island.

No. 6.

STATISTICAL information supplied by Mr. A. S. Paton, Ordnance Storekeeper, in accordance with a requisition by the Board of the 19th May, 1875.

QUESTIONS.

ANSWERS.

Goat Island.

1. The quantity of powder, ammunition, and other explosives capable of being stored on Goat and Spectacle Islands respectively.

Description.	Quantity.	
	Tons	Cwts.
1. Gunpowder.....	300	0
Lithofracteur	23	0
Gun-cotton.....	12	0
Dynamite	12	0
Shell and fuze	5	0

Spectacle Island.

Gunpowder.....	150	0
Shell and fuze	5	0

Goat Island.

2. The greatest quantity that has been stored at any one time on each of these islands?

2. Government Imperial powder.....	100	0
Do Colonial do	200	0
Do Shell and fuze	5	0
Merchants' gunpowder	200	0
Do lithofracteur	6	0
Do dynamite	2	0
Do gun-cotton	0	10

Spectacle Island.

Government Colonial powder	150	0
Do do shell and fuze	5	0

Goat Island.

3. The quantity at present stored in each of these islands?

3. Government Imperial powder	50	0
Do Colonial do	37	10
Do Shell and fuze	2	10
Merchants' gunpowder	61	0
Do lithofracteur	3	0
Do gun-cotton	0	7
Do dynamite	nil	
Do shell and fuze	nil	

Spectacle Island.

Government Colonial powder	110	0
Do do shell and fuze	3	0

A. S. PATON.

No. 7.

RETURN of Gunpowder in Stock, with Receipts and Issues, from 1st January, 1871, to 1st July, 1875, inclusive.

Gunpowder.							
Colonial Government.—Half-yearly.				Merchants'.—Quarterly.			
Date.	Stock.	Receipt.	Issues.	Date.	Stock.	Receipt.	Issues.
	lbs.	lbs.	lbs.		lbs.	lbs.	lbs.
Jan. 1, 1871 ...	131,426	Nil.	Nil.	Jan. 1, 1871 ...	214,066	Nil.	Nil.
July 1, " ...	52,037	25,708	110,496	April 1, 1871 ...	136,340	52,081	129,087
Jan. 1, 1872 ...	75,318	24,262	981	July 1, " ...	68,869	25,323	92,767
July 1, " ...	72,584	1,328	4,626	Oct. 1, " ...	62,152	141,513	148,257
Jan. 1, 1873 ...	69,002	2,280	4,062	Jan. 1, 1872 ...	112,218	133,749	83,683
July 1, " ...	180,112	111,750	640	April 1, 1872 ...	47,169	60,336	125,385
Jan. 1, 1874 ...	174,900	Nil.	5,287	July 1, " ...	153,199	237,085	131,055
July 1, " ...	164,991	Nil.	9,908	Oct. 1, " ...	172,318	238,101	218,982
Jan. 1, 1875 ...	199,758	35,013	208	Jan. 1, 1873 ...	422,558	430,497	180,257
July 1, " ...	221,488	135	2,575	April 1, 1873 ...	549,535	286,021	159,044
				July 1, " ...	585,040	207,864	172,359
				Oct. 1, " ...	580,456	119,221	123,805
				Jan. 1, 1874 ...	572,254	136,367	144,569
				April 1, 1874 ...	453,158	61,318	180,414
				July 1, " ...	427,390	128,805	154,573
				Oct. 1, " ...	314,675	63,981	176,696
				Jan. 1, 1875 ...	231,485	51,454	134,644
				April 1, 1875 ...	128,388	97,956	201,053
				July 1, " ...	108,073	130,635	150,950

Ordnance Office,
13 July, 1875.

For Ordnance Storekeeper,
J. THOS. BLANCHARD,
A.O.S.

No. 8.

REGULATIONS for the Magazine Establishments at Goat and Spectacle Islands.

1. It will be the duty of the Assistant Superintendent of Military Stores to inspect the islands from time to time; inquire into the manner in which the duties are discharged, the cleanliness of the quarters, and as to complaints. He will receive monthly reports from each Foreman; inspect their duty rosters and return of daily work.
2. The Foreman in charge of the Island Magazines are to consider themselves as under the orders of the Assistant Superintendent of Military Stores, who is held responsible for the proper maintenance of discipline and regular conduct.
3. The Government boats are not to be used, except by special permission, on other than legitimate work. The boatmen for the day must always consider themselves bound to convey the inhabitants of the island on which they are stationed, and their friends landing with permission.
4. No persons to be allowed on the islands except those duly authorized by the Honorable the Treasurer, the Officer Commanding the troops, the Military Store Officer, and the Foreman of the Magazines.
5. Boats shall not be allowed to anchor within fifty yards of the islands, except powder barges, when they will be under the supervision of the sentry, and also the orders of the establishment.
6. Ammunition to be received at any time between 6 a.m. and 6 p.m.; but the ordinary working hours to be from 9 a.m. to 4 p.m.
7. No person to be permitted within the Magazines or laboratories without wearing proper Magazine shoes, and the labourers of the department to use the Magazine dresses provided for their use.
8. No smoking to be allowed within the boundary walls of the Magazines and laboratories, or near the landing-places for powder; nor lights or smoking on board the barges containing powder.
9. No spirituous liquors to be introduced upon the islands, except for the use of the Foreman and his family; any disobedience of this order to be reported.
10. No boats to be allowed to come to or leave the islands, nor the department boats to be used on any pretence without the knowledge of the Foreman; and when the department boats are not in use they are to be well secured.
11. The following orders relative to laboratory operations to be strictly obeyed:—
12. No barrels containing gunpowder are to be opened unless in the presence of the Foreman, who will also, at all times, superintend the manufacture of gun-cartridges.
13. Not more than two (2) barrels of gunpowder at Spectacle Island, and four (4) at Goat Island are to be taken from the Magazine to the laboratory at one time, and they are to be returned as soon as made up into cartridges, neither powder or cartridges being allowed to remain in the laboratory during the dinner hour.
14. The men to wear the proper dress and shoes for laboratory whilst at work, the floor being covered with hides and wadmiltits, and only copper tools used; the laboratory to be properly cleaned and watered each day after work.
15. All Imperial orders relative to hours, dress, material, and carefulness, to be observed.
16. A day-watchman will be on from 6 a.m. to 6 p.m., when he will be relieved by the night-watchman. The following orders are for their guidance:—
17. The watchman has charge of all the buildings, which he will patrol round from time to time; he will see that no fires are made or naked lights carried outside the buildings, and will not allow smoking or matches within the Magazine yard.
18. Powder barges anchored off at the jetty are under his charge, and he will see that neither smoking nor lights are on board; and at night he will allow no one to board them.
19. He will see that no boats anchor or come within 50 yards of the island, except those visiting the island on proper authority; and will report the arrival and departure of all boats to the Foreman. The night-watchman will hail all approaching at night; he has also charge of all the island boats, and will allow none to be lowered without permission from the Foreman.
20. On the approach of a thunderstorm, rain, or strong southerly wind, he will communicate with the Foreman, and see that the Magazine is properly closed, and all the boats secured.
21. Anything extraordinary occurring during his watch he will at once report to the Foreman in charge.

Military Stores Office, January, 1872.

Approved,—
Geo. W. LORD,
Colonial Treasurer.

A. S. PATON,
Supt. of Military Stores.

No. 9.

Memorandum.

Military Store Office,
Sydney, 12 December, 1872.

PURSUANT to instructions received from the Treasury, the following orders are issued in addition to those on the Board of Regulations for the guidance of the men on Goat and Spectacle Islands:—

1. The men are to consider themselves as belonging to a semi-military establishment, and must submit to these orders should they wish to retain their present employment; and are informed that any neglect of theirs, either wilfully or through carelessness, will be dealt with severely and likely with dismissal.
2. No person to absent himself from the island without leave, and all are to be on the island, unless granted special leave, by 10 o'clock—reports and the names of all persons landing after that hour to be rendered to this office as hitherto the following morning. On return of leave he will report himself to the Foreman or the watchman on duty, who will take notice of his condition, taking requisite action if necessary.
3. No spirituous liquors to be introduced on the island, except for the use of the Foreman and his family, or such as may be ordered by medical authority; and all boats coming to the island previous to landing are to be inspected by the Foreman, or in his absence by the watchman of the day or night. In the case of the latter, he is to be respected and supported in this his duty. Any neglect on his part will be dealt with in the most severe manner, either by loss of pay, stoppage of leave, or dismissal.
4. The Foreman is expected to visit the quarters of the island residents, and should he have any grounds to suspect that spirituous liquors are in the room, he is authorized to search, reporting such proceeding as early as possible to this office.
5. The watchman will see that all the lights are put out, with the exception of the Foreman's, the Guard-room, and those granted permission in case of sickness or special request, by 11 o'clock p.m.
6. He will also call the "All's well" every half-hour till 6 o'clock a.m.
7. The Foreman is empowered to suspend and take all requisite action for the safety of the Magazine establishment under his charge, always reporting such as early as possible to his superior officer, and attend the office the following morning.
8. This Memo. to be read to each man on the Magazine establishment, and signed by him.
9. The Foreman to retain a copy, and will read it on the last day of each month to the men, reporting the same in his monthly report.

A. S. PATON,
Supt. of Military Stores.

No. 10.

NOTICE.—It having come to the knowledge of the Government that importers of small arm ammunition have rifle implements of iron and steel packed in the cases containing the cartridges, which implements are thus introduced into the Colonial Gunpowder Magazine, contrary to the rules of the service: Notice is hereby given, that from and after the date hereof, any case or package containing gunpowder and iron or steel which shall be removed from any ship or vessel to the Colonial Gunpowder Magazine will be opened by the Ordnance Storekeeper, and the gunpowder contained in such case or package will be by him removed into a secure and proper package, and the expense attending such removal will be charged to the importer or proprietor of the gunpowder so removed and repacked.—Dated this 8th day of February, 1862.

E. C. WEEKES.

The Treasury, New South Wales.

No. 11.

The Treasury, New South Wales,
11 July, 1872.

NOTICE.—The attention of the Government having been called to the practice of importers of sporting powder and small arm cartridges importing the same packed in cases fitted with iron bands and iron nails or with iron nails: Notice is hereby given, that from and after the date hereof, any case or package containing gunpowder or small arm cartridges, and being fitted with iron bands or nails, or with any iron about such packages, which shall be removed from any ship or vessel to the Colonial Gunpowder Magazine, will be opened by the Ordnance Storekeeper, and the contents of such case or package removed into a secure and proper package, and the expense attending same charged to the importer or importers thereof, under the provisions of the Act of Council 7 Wm. 4 No. 7. The lowest charge for such removal will be (10s. 6d.) ten shillings and sixpence per case or package.

W. R. PIDDINGTON.

No. 12.

Rules and Regulations for the Magazine vessel "Gleaner."

A constant watch to be kept by night and day, and on no account is the man on duty to leave the vessel until properly relieved.

The hatches are to be opened daily, weather permitting, for airing the vessel; during stormy weather, thunderstorms, rain, or wind, all is to be made secure.

The vessel is to be swept daily, and decks washed at least three times a week; the vessel to be pumped out by the two men at the morning relief.

The red flag to be hoisted at sunrise, and a signal lamp to replace it at sunset,—a second one being kept in readiness in case of the accidental getting out of order or breakage.

The bell during thick weather to be kept sounding at intervals, the half-hours being struck as is usual in vessels.

No smoking to be allowed on board the vessel, nor matches or lights taken into the hold or cabins.

The Magazine dress and slippers to be worn during receipt or issue of powder, or during any laboratory work.

Ships' stores and Magazine's and merchants' powder to be received between the hours of 6 and 6, but the ordinary working hours to be from 9 o'clock to 4 o'clock.

Powder to be landed only between the hours of 6 o'clock and 10 o'clock a.m.

The men, though belonging to the Ordnance Department, will be under the supervision and orders of the Harbour Master.

The person hereafter appointed will give receipts for powder received, and collect rents due, keeping record of same in books provided for the purpose,—paying the money so collected into the Bank of New South Wales, Newcastle, to the credit of the Ordnance Storekeeper whenever the amount arrives at £2, more than which sum he is at no time to retain in his possession; a detailed statement to be forwarded to the Ordnance Storekeeper on the regular printed form, not later than the 3rd of each month.

The watchman is also held responsible that no boat leaves the vessel with powder unless covered with a tarpaulin.

A. S. PATON,
Ordnance Storekeeper and Barrack Master.

Ordnance Office,
Sydney, 13th October, 1874.

Approved,—GEO. A. LLOYD.

No. 13.

REPORT from the Select Committee on Explosive Substances, before the House of Commons, 26 June, 1874.—Appendix No. 1.
Papers handed in by Major Majendie, R.A., 5 May, 1874.

STORE MAGAZINES FOR GUNPOWDER.

TABLE showing distances in yards of existing Inspected Store Magazines from nearest House, &c., when under half a mile.—
(From Inspection Reports.)

Index Number of Magazines.	Approximate Capacity.	Distance from nearest							Remarks. If marked* Mineral Railway only.	
		House.	Factory.	Charitable Institution.	Road.	Railway*.	River or Canal Bank.	Sea-wall.		
1	Tons. 50	.....	.....	.....	.....	.....	.....	150	.....
2	.....	.....	.....	.....	.....	.....	.....	.....	.....
3	75	.....	.....	.....	.....	.....	.....	.....	.....
4	.....	.....	.....	.....	.....	.....	.....	.....	.....
5	.....	.....	.....	.....	.....	.....	.....	.....	.....
6	12	600	.....	.....	15	.....	.....	.....	close to	
7	15	180	.....	.....	.....	70	.....	.....	.....
8	50	450	.....	.....	450	500	.....	500	.....
9	15	200	.....	.....	15	100	.....	.....	.....
10	15	.....	.....	.....	.....	.....	.....	.....	.....
11	25	300	.....	.....	.....	80*	.....	.....	.....
12	20	80	.....	.....	15	80*	.....	.....	.....
13	30	128	.....	.....	450	168 ^(a)	.....	.....	.....	(^a) But in cutting.
14	.....	.....	.....	.....	.....	.....	.....	.....	.....
15	30	200	.....	.....	165	.....	.....	.....	.....
16	40	.....	.....	.....	.....	.....	.....	.....	.....
17	.....	.....	.....	.....	.....	.....	.....	.....	.....
18	.....	.....	.....	.....	.....	.....	.....	.....	.....
19	.....	.....	.....	.....	.....	.....	.....	.....	.....
20	.....	.....	.....	.....	.....	.....	.....	.....	.....
21	10	.....	.....	.....	.....	.....	.....	.....	.....
22	20	.....	.....	.....	.....	.....	.....	.....	.....
23	.....	.....	.....	.....	.....	.....	.....	.....	.....
24	15	144 ^(b)	.....	.....	190	.....	.....	.....	.....	(^b) Village beyond, about 160 to 190 yards.
25	.....	.....	.....	.....	.....	.....	.....	.....	.....
26	75	300	.....	.....	700	700	.....	.....	.....
27	30	450	.....	.....	25	.....	.....	.....	.....
28	35	250	.....	250	200	.....	.....	.....	.....
29	.....	.....	.....	.....	.....	.....	.....	.....	.....
30	12	37 ^(c)	.....	70 ^(d)	37	450	.....	.....	.....	(^c) Others at 150 and 260 yards. (^d) Another at 183 yards, and another at 170.
31	8	250	.....	.....	22	.....	.....	.....	.....
32	.....	.....	.....	.....	.....	.....	.....	.....	.....
33	15	.....	.....	.....	.....	.....	.....	.....	.....
34	80	.....	.....	.....	.....	.....	.....	.....	.....
35	15	180 ^(e)	.....	.....	500	.....	.....	.....	.....	(^e) Others 200 to 300 yards.
36	30	15 ^(f)	.....	.....	20	450	.....	.....	.....	(^f) In the middle of a village. Well sheltered on slope of a hill.
37	15	150	70	.....	150	300	.....	.....	.....
38	15	250	.....	.....	150	.....	.....	.....	.....
39	250 300	60 ^(g)	.....	500	450	200	.....	close to (^h)	.....	(^g) Others at 100, and about 450 yards. (^h) But on higher level.
40	.....	.....	.....	.....	.....	.....	.....	.....	.....
41	30	.....	.....	.....	.....	.....	.....	.....	.....
42	.....	.....	.....	.....	.....	.....	.....	.....	.....
43	.....	.....	.....	.....	.....	.....	.....	.....	.....
44	.....	.....	.....	.....	.....	.....	.....	.....	.....
45	.....	.....	.....	.....	.....	.....	.....	.....	.....
46	.....	.....	.....	.....	.....	.....	.....	.....	.....
47	.....	.....	.....	.....	.....	.....	.....	.....	.....
48	.....	.....	.....	.....	.....	.....	.....	.....	.....
49	.....	.....	.....	.....	.....	.....	.....	.....	.....
50	.....	.....	.....	.....	.....	.....	.....	.....	.....
51	.....	.....	.....	.....	.....	.....	.....	.....	.....
52	.....	.....	.....	.....	.....	.....	.....	.....	.....
53	.....	.....	.....	.....	.....	.....	.....	.....	.....
54	30	.....	.....	.....	.....	.....	.....	.....	.....
55	.....	.....	.....	.....	.....	.....	.....	.....	.....
56	50	.....	.....	.....	.....	.....	.....	.....	.....
57	.....	.....	.....	.....	.....	.....	.....	.....	.....
58	.....	.....	.....	.....	.....	.....	.....	.....	.....
59	8	450	.....	.....	20 ^(a)	.....	.....	.....	.....	(^a) Bye road.
60	8	50 ^(b)	.....	400	50	400	.....	.....	.....	(^b) And others thenceforward.
61	10	450	.....	.....	300	400	.....	.....	.....
62	.....	.....	.....	.....	.....	.....	.....	.....	.....
63	15	.....	.....	.....	.....	.....	.....	.....	.....
64	45	200	140 ^(c)	.....	25	.....	.....	.....	.....	(^c) Another at 200.
65	.....	.....	.....	.....	.....	.....	.....	.....	.....
66	5	.....	.....	.....	.....	.....	.....	.....	.....
67	20	.....	.....	.....	.....	.....	.....	.....	.....
68	20	.....	.....	.....	.....	.....	.....	.....	.....
69	20	.....	.....	.....	.....	.....	.....	.....	.....
70	20	275	.....	.....	100	36	.....	.....	.....
71	40	250	.....	.....	.....	50	.....	.....	.....

N.B.—In the case of those magazines of which the index numbers only are given, the distances have not been ascertained or recorded with sufficient accuracy to justify their insertion in this return.

Index Number of Magazines	Approximate Capacity.	Distance from nearest						Remarks. If marked* Mineral Railway only.	
		House.	Factory.	Charitable Institution.	Road.	Railway.*	River or Canal Bank.		Sea-wall.
72	Tons.	.....	.....	.....	.....	.....	.....	.....
73	10	.....	.....	.....	.....	.....	.....	.....
74	.....	.....	.....	.....	.....	.....	.....	.....
75	.....	.....	.....	.....	.....	.....	.....	.....
76	.....	.....	.....	.....	.....	.....	.....	.....
77	2	300	.....	.....	100	.....	.....	.....
78	3	192	.....	.....	400	700	.....	.....
79	2	250	250	.....	80	.....	.....	.....
80	12	104	.....	550	550	180	.....	.....
81	3	87 ^(d)	130	103	83	.....	.....	.....	(^d) Another at 110 yards, 333 yards to parish church.
82	12	250	450	.....	.....	.....	.....	.....
83	2	25 ^(e)	.....	.....	5	.....	120 ^(f)	.....	(^e) A row of houses. (^f) Dunkeld Bridge.
84	1	30 ^(g)	.....	.....	40	.....	.....	.....	(^g) And opposite side of street, 50 yards.
85	8	173 ^(h)	.....	.....	250	700	.....	.....	(^h) A row of cottages.
86	5	82 ⁽ⁱ⁾	200	90	.....	.....	.....	(ⁱ) Other cottages 200 to 250 yards.
87	100	210	400	.....	close	.....	.....	.....
88	15	150 ^(j)	2350	150	close	300	.....	.....	(^j) More at 200 yards.
89	150	80 ^(k)	250	.....	.....	.....	10	.....	(^k) Others 200 to 250 yards. (^l) Southern outfall about $\frac{1}{4}$ mile.
90	300	100	300 ^(m)	.....	.....	.....	close	.....	(^m) Other works about $\frac{1}{2}$ mile.
91	20	310	.....	.....	close	.....	.....	25	
92	2	300	.....	.....	30	.....	10 ⁽ⁿ⁾	(ⁿ) Above the level of the canal.
93	20	170 ^(o)	300	.....	.....	.....	.....	.....	(^o) Village about 300 yards.
94	.....	.....	.....	.....	450	.....	.....	.....
95	10	.....	.....	.....	400	.....	.....	.....
96	.....	.....	.....	.....	100	.....	.....	.....
97	5	28	.....	.....	41	.....	.....	.....
98	250	.....	.....	.....	.....	.....	.....	.....	Floating magazine in the Thames.
99	20	700	.....	.....	30 ^(p)	.....	close	.....	(^p) Bye road. Main road 450 yds.
100	8	60	.....	.....	250	200	.....	.....
101	5	600	.....	.....	95	.....	.....	.....
102	25 ^(q)	2350	.....	.....	.....	.....	450	.....	(^q) Limited by license to 20 tons. Well screened.
103	10	170	.....	.....	close	.....	.....	.....
104	15	100	.....	.....	.....	300	.....	.....
105	24	174	.....	.....	154	.....	.....	.....
106	5	.....	.....	.....	.....	.....	90	.....
107	25	150	.....	.....	.....	.....	70	.....
108	2	2250 ^(b)	.....	.....	.....	250*	.....	.....	(^b) Village.
109	4	close	.....	.....	close	.....	.....	.....	(^c) Others about 100 yds. scattered about.
110	35	21 ^(c)	.....	.....	100	450	.....	.....
111	7 $\frac{1}{2}$	2250	500	.....	.....	.....	close	.....	? License limited to 3 tons.
112	10	.....	300	.....	.....	.....	close	.....	(^d) 120 yds. from a row of cottages; only 33 paces from No. 114 magazine.
113	100	46 ^(d)	200	.....	.....	.....	close	.....	(^e) Many cottages 50 to 70 yards. (^f) But-a double river wall.
114	125	50 ^(e)	150	.....	.....	.....	close ^(f)	.....
115	100	50	.....	.....	.....	.....	close	.....
116	35	.....	.....	.....	100	300	.....	.....
117	40	2500	.....	.....	250	.....	.....	.....
118	5	2150	.....	.....	100	450*	.....	.....
119	40	200 ^(g)	.....	600	250	200	30 ^(h)	.....	(^g) Several cottages. (^h) Canal bank strengthened by 30 feet of refuse.
120	25	.....	150	.....	300	.....	Canal below	.....
121	50	.....	450	.....	15	.....	5	.....
122	15	2350	.....	.....	.....	.....	.....	.....
123	10	250	.....	.....	400	.....	.....	.....
124	20	450	.....	.....	.....	2120*	.....	.....
125	20	2350	.....	.....	100	2350	.....	.....
126	15	450	.....	.....	.....	.....	(ⁱ)	.....	(ⁱ) Outside an embankment, apparently above high-water mark, except very high tide. Six magazines near one another on bank of river Usk.
127	150	400	.....	.....	.....	.....	(^j)	.....
128	200	400	.....	.....	.....	.....	(^j)	.....
129	30	400	.....	.....	.....	.....	(^j)	.....
130	60	90	.....	.....	.....	.....	(^j)	.....
131	45	150	.....	.....	.....	.....	(^j)	.....
132	?	.....	.....	.....	.....	.....	.....	.....	Closed.
133	14	300	.....	.....	.....	.....	5 ^(j)	.....	(^j) Not liable to inundation.
134	15	.....	.....	.....	.....	.....	(^k)	.....	(^k) On sea bank above high-water.
135	40	400	.....	.....	150	.....	.....	.....
136	40	100	.....	150 ^(l)	40	70	.....	.....	(^l) Primitive Methodist Chapel built since Magazine.
137	35	200	.....	.....	450	.....	.....	.....
138	20 ? 30	250	.....	.....	200	.....	.....	.....
139	(?)	300	.....	.....	300	.....	.....	.....	Closed.
140	15	300	.....	.....	450	.....	.....	.....
141	25	.....	.....	.....	.....	.....	.....	.....
142	50	100	.....	100	90 ^(m)	.....	.....	.....	(^m) A mountain road passes close to magazine.
143	40	400	.....	.....	400	.....	.....	.....

N.B.—In the case of those magazines of which the index numbers only are given, the distances have not been ascertained or recorded with sufficient accuracy to justify their insertion in this Return.

Index Number of Magazines.	Approximate Capacity.	Distance from nearest							Remarks. If marked* Mineral Railway only.
		Houses	Factory.	Charitable Institution.	Road.	Railway.*	River or Canal Bank.	Sea-wall.	
144	Tons. 7	53 ⁽ⁿ⁾	150	.....	.....	120*	.....	.....	(ⁿ) Two cottages; more 100 yards, and from 300 to 400 yards.
145	12	300	.....	.....	50	450	.....	.....	Screened.
146	4	.....	.....	.....	20	.....	.....	.....	"
147	30	100	.....	.....	40	260	.....	.....	"
148	15	40	.....	.....	.....	20	.....	.....	Cottage and Railway built since magazine.
149	25	150	150	.....	150	150	.....	.....	} A few yards apart.
150	40	150	150	.....	150	150	.....	.....
151	30	65	.....	.....	.....	50	.....	.....	} Very near together.
152	20	150	.....	.....	.....	150	.....	.....
153	20	150	.....	.....	.....	150	.....	.....
154	10	.....	.....	.....	300	200	.....	.....
155	30	100 ⁽ⁿ⁾	50 ⁽ⁿ⁾	600	.....	.....	(ⁿ) Others at 200 yards, and more at 300 to 400 yards. (^p) Bye road. High road at 200 yards.
156	6	500	.....	600	400	700	.....	.....	Sheltered.
157	4	75	.....	.....	450	.....	.....	.....
158	30	100	.....	.....	50	.....	110	.....	Sheltered.
159	50	150	.....	.....	40	.....	70	.....
160	30	450	.....	.....	450	.....	50	.....	(^s) Railway on a 50-foot embankment. Magazine below.
161	35	450	.....	450	450	50 ⁽ⁿ⁾	
162	15	300	.....	.....	10	.....	.....	.....	Magazine in a hollow.
163	10	200	.....	.....	200	450	.....	.....
164	2	400	.....	.....	.....	.....	200	.....	Magazine in a hollow.
165	10	2250	.....	.....	250	{ 200* 450 }	.....	.....
166	4	300	.....	.....	.....	450	200	.....	Magazine in a hollow.
167	20	450	.....	.....	450	.....	10	.....
168	40	150	80	.....	400	450	.....	.....	Magazine in a hollow.
169	8	450	.....	.....	120	.....	.....	.....
170	20	180	.....	.....	200	.....	10	.....	(^t) A few cottages.
171	.....	120 ^(t)	100	.....	close	.....	30	.....
172	30	400	.....	.....	100	.....	.....	.....	} Only 7 yards apart.
173	40	.....	.....	.....	100	.....	.....	.....
174	40	.....	.....	.....	100	.....	.....	.....	} Only 7 yards apart.
175	5	400 ^(e)	.....	.....	150	450	.....	.....
176	50	160	.....	.....	100	.....	.....	.....	(^e) Houses newly erected.
177	40	2300	.....	.....	250	250*	.....	.....	Sheltered

Home Office, Whitehall,
April, 1874.

V. D. MAJENDIE,
Major, R.A.,
Her Majesty's Inspector of Gunpowder Works.

No. 14.

Synopsis of certain Explosions of Gunpowder and other materials.

	PAGE.
(No. 1)—Explosion of Gunpowder at Erith. 1 October, 1864.....	43
(„ 2)— Do. Do. on the Blue Mountains, N.S.W. 16 November, 1865	44
(„ 3)— Do. Nitro glycerine, Sydney. 4 March, 1866	44
(„ 4)— Do. Do. near Carnarvon, Wales. 30 June, 1869	44
(„ 5)— Do. Gunpowder at Waltham Abbey. 16 June, 1870	44
(„ 6)— Do. Gun-cotton at Stowmarket. 11 August, 1871	44
(„ 7)— Do. Gunpowder at Hounslow. 6 September, 1872	45
(„ 8)— Do. Punshon's Patent Controllable Cotton Gunpowder at Oare, near Faversham. 1 January, 1874	45
(„ 9)— Do. Gunpowder on the Regent's Canal. 2 October, 1874	45
(„ 10)— Do. Gun-cotton at the Royal Arsenal, Woolwich. 24 May, 1875	45

(No. 1.)

Extract from the "Illustrated London News," 1st October, 1864.

ERITH.

"EARLY on Saturday morning, at twenty minutes to 7, a.m., two gunpowder magazines on the south bank of the Thames, 2 miles west of Erith, in the Plumstead marshes, exploded, killing eight or nine men and wounding many others. The shock was felt severely at Charing Cross, 15 miles distant, and throughout the metropolis. The concussion was distinctly audible as far as Newmarket and Cambridge on the one hand (40 and 50 miles), and at Windsor and Guildford on the other.

"The explosions occurred in the Gunpowder Depot of Hall & Sons, and that of the Lowwood Cos.'s property (formerly Day & Barker's). Both almost simultaneously.

"The quantity exploded = 1,040 barrels or = 104,000 lbs. Of this, 75,000 lbs. were stored in the magazine of Messrs. Hall & Sons, 20,000 lbs. in their barges, which were being unloaded at the time; and 9,000 lbs. in the depot of the Lowwood Company.

"Their magazine at Belvedere was 40 x 30 feet—two floors—and about 65 yards from that of the Messrs. Hall. Both these were used solely for the storage of powder.

"The gunpowder is conveyed from the mills, at Faversham, in sailing barges; navigated usually by two men. Each two of these were discharging, and it is believed that the first explosion occurred on board one of the barges; that the concussion produced tore asunder the larger magazine, and that some burning fragments alighting in it caused the explosion, instantly followed by that of the smaller depot.

"Of

"Of the magazines themselves not a single stone remained one upon another; large fissures and chasms were torn in the earth, and immense lumps of soil scooped out and hurled about the adjacent fields.

"The barges with the adjacent jetty were split into fragments, and an enormous rent made in the embankment—exposing miles of country to the peril of inundation. This was by great exertion prevented, the tide being low at the time, otherwise the consequences must have been most serious.

"Hall & Sons' magazine was about 50 feet square—with two floors—and stood on 20 acres of ground. Thirteen men were killed."

(No. 2.)

Explosion of Blasting Powder, 16 November, 1865.

ON the 16th of November an explosion of blasting powder occurred on the Blue Mountains, about 2 miles from the "Weatherboard Inn" on the Bathurst side.

A dray driven by George Gamble, of Windsor, and loaded with two tons of blasting powder, packed in casks of 48 lbs. each, was proceeding along the high road, when from some unexplained cause the load exploded.

George Gamble was instantaneously killed, his body being blown a distance of 40 feet—no traces of the dray remained, and four out of six horses were killed.

The defective state of the casks, viz., the looseness of the hoops, had been noticed and complained of by the carriers upon its delivery at Mr. Watkins' store at Penrith. These complaints however met with little notice from the parties in charge, and the powder was sent forward without being properly secured.

There can be no doubt but that the leakage from the casks caused the explosion (*vide* evidence at an Inquiry held at the "Weatherboard Inn," Bathurst Road, on the 17th November, 1865, before Thomas Brown, Esquire, Coroner).

(No. 3.)

Explosion of Nitro-glycerine in Bridge-street, Sydney.

Cause—Spontaneous combustion. *Vide* Report of Board of Inquiry. Ordered by the Legislative Assembly to be printed, 20 March, 1866.

(No. 4.)

Explosion of Nitro-glycerine 6 miles from Carnarvon, Wales, 30 June, 1869.

Extract from the Annual Register for 1869.

A cargo of 4 tons of nitro-glycerine was forwarded from Hamburg to Messrs. de Winton & Co., for Messrs. Webb & Craig sole agents.

The ship was moored in the river Menai, a portion of the cargo was stored in the Llanddwyn Magazine, and the rest brought in lighters and placed on the quay at Carnarvon.

Two carts loaded from the latter place at 4 p.m. on the 30th June, when about 400 yards beyond the village of Cwm-y-glo, and 5½ miles from Carnarvon, a terrific explosion occurred, blowing the carts, men, and horses to atoms, raising clouds of dust, hurling stones to a great height, and throwing down the walls within a radius of 2 rods.

Four (4) men were killed and twelve injured at the spot where the explosion occurred; the ground was marked by two deep perfectly circular holes 7 feet 6 inches in diameter and 7 feet deep and a horse length apart.

The stones appeared to have been subjected to a fierce rotary motion, the holes being in the shape of inverted cones.

The damage from the concussion of the air extended fully 2 miles, and the shock was experienced more or less for many miles around.

(No. 5.)

Explosion of Gunpowder at Waltham Abbey, 16 June, 1870.

Extract from the Annual Register for 1870.

"Shortly before noon, an explosion occurred in the corning-house, at the Royal Gunpowder Works at Waltham Abbey, which stand in the centre of the village, near the Abbey. The shock was felt for miles around."

"From the fact of an underground magazine being directly under the corn-house, great apprehension was entertained of a further explosion of a still more fearful character, and at first people were afraid to render assistance to those who were wounded."

Four men were killed and eight seriously wounded.

No cause could be assigned.

(No. 6.)

Explosion of Gun-cotton at Stowmarket, 11 August, 1871.

Extract from the Annual Register for 1871.

"A terrible explosion or series of explosions took place at Stowmarket. It was believed that the precautions taken at the manufactory secured immunity from explosion. Experiments had been recently conducted by Government officials which, it was said, showed that gun-cotton cartridges, made and stowed away as they were, could not accidentally explode.

"The Messrs. Prentice, or rather the Limited Liability Company, were executing a large order for Government, and had as much as 15 tons of gun-cotton stored up." The number of persons employed was about 130; of these twenty-four were killed and missing, and seventy-two wounded.

"A dense column of smoke rose several hundred yards into the air, and spread out gradually into a fan-like shape; then there came a deafening roar, the explosion being felt in every corner of the town.

"Soon after the first explosion two of the Messrs. Prentice arrived, and collecting as many other persons as possible, they set to work to save such of the remaining buildings as were still standing, but which had taken fire. These sheds contained a number of boxes of cartridges, and though some warning voices were raised, Mr. E. Prentice continued to draw some of the boxes towards him, while his nephew assisted in pushing them farther from the flames. The result was that one of the boxes caught fire, and a second explosion followed which blew the two Messrs. Prentice to atoms, and completed the wreck of the premises."

On September 6th the Jury returned the following verdict:—"That the explosion causing the deaths of persons on whom the inquest was held, was produced by some person or persons unknown adding sulphuric acid to the gun-cotton subsequent to its passing the tests required by Government. At the same time we consider from the evidence adduced that there is no danger in the manufacture of gun-cotton in the wet process, but that the drying and storing of gun-cotton should not be allowed near a town. Also, we consider that gun-cotton works should be subject to constant Government inspection."

(No. 7.)

Explosion of Gunpowder at Hounslow, 6 September, 1872.

Extract from the Annual Register for 1872.

"At twenty-five minutes past 10 o'clock this morning, one of the most terrible explosions which has happened for several years occurred at the Gunpowder Works of Messrs. Curtis & Harvey, commonly called the Hounslow Mills, resulting in the loss of four lives.

"It appears that the composition mixing-house first blew up, followed in a few seconds by the press-house, both of which buildings were completely destroyed; but, strange to say, although the press-house had blown up, none of the powder that it contained went off; there was, it is said, from forty to fifty barrels on the floor of the building, and had it ignited, it is thought the loss of life would have been enormous, as in that case no doubt some of the mills and other stores would have been fired.

"The cause of the calamity is at present shrouded in mystery, and there is the usual difficulty in obtaining information from the officials in charge."

(No. 8.)

Explosion at Oare near Faversham, 1 January, 1874.

Extract from the Annual Register for 1874.

"On the 1st January, an explosion took place at the works recently erected at Oare, near Faversham, for the manufacture of Punshon's Patent Controllable Cotton Gunpowder. The accident occurred in the graining-house. The only person in the building at the time was a man named Hickford, who was very seriously injured. The building itself was demolished, and the granulating machine shattered to atoms. A remarkable circumstance, and one which shows the great strength of this explosive, is the fact that there was no more than five pounds of gun-cotton in the machine when it exploded."

(No. 9.)

Explosion of Gunpowder on the Regent's Canal, 2 October, 1874.

Extract from the Annual Register for 1874.

"THE explosion occurred shortly before 5 o'clock on the morning of the 2nd October. Five small 'fly barges' started from the City Basin in charge of a steam-tug. The middle boat, 'Tilbury,' being stored with four tons of blasting powder and six barrels of petroleum. Near the North Lodge Bridge the 'Tilbury' exploded, blowing it to atoms. The bridge (iron and brick) was destroyed, the debris choking up the stream. Three men on board were killed, and several men on the other barges wounded. For more than half a mile around, windows, venetian blinds, window sashes, and even furniture were broken. It put out the lamps at the King's Cross Railway Station, and shook the St. Pancras Station of the Midland Railway. It was severely felt at the goods station at Camden Town, breaking the windows; it also much damaged the glass houses in the tropical department of the Botanical Gardens.

"All property within a mile suffered more or less from the effects of the shock, and but for the two steep banks between which the explosion occurred the effects would have been much more disastrous.

"The wave movement of the air crossing Primrose Hill Park fell with a peculiar force on the north-eastern angle, near the Chalk Farm Tavern.

"Although 1,000 yards distant, only one shop in the Regent's Park Road escaped without some damage.

"It should be remarked that no restriction as to the lighting of fires on board these barges appears to have been in force.

"The Jury, after a long and patient investigation, considered: 'That the three men were killed by the explosion, and that this was caused through the ignition of the vapour of the benzeline on board the 'Tilbury' by the light or fire in the cabin of the barge. They added an opinion that the Canal Company were guilty of gross negligence in the matter, and that the existing laws were inadequate to secure the public safety.' 19th October, 1874.

(No. 10.)

Gun-cotton Explosion at the Royal Arsenal, Woolwich, 24 May, 1875.

Extract from "The Mail," London, 24 May, 1875.

"THE explosion occurred on Monday, at 4 p.m., in the so-called paper factory in the Royal Laboratory Department of the Arsenal.

"Three men were preparing a 7-inch Palliser shell—filling it with gun-cotton in a damp condition, and compressing it by hydraulic force.

"Hitherto it has been considered impossible to explode gun-cotton by mere ignition in the open air, and that smart detonation was required to fire it. It is not so well known, however, that when closely compressed and ignited it will, in the effort to find space, explode with terrific force."

"While being rammed home the shell (120 lbs. weight) exploded, pieces flying in all directions, killing one man and severely injuring two others, besides tearing the bars of the hydraulic machine asunder and injuring the building.

[Taken by J. H. L. Scott, Sec., Gunpowder Board.]

[One Plan.]