

C.S.

NAVY & MILITARY	
(Reports)	
No.	523/22

1922

DEF/NCA/1#7

Governor

SUBJECT.

1922

18th March

Previous Paper.

Report by G. P. Hayes, civil Engineer to the Admiralty on costs of constructional work at Navy Point.

MINUTES.

Copy of report of 3rd August 1902 — Encl ①

*P.A.
22/7/23*

C.R. The enclosed although written twenty years ago contains a good deal of information of permanent value for purposes of record.

2 Will you be good enough to alter one of the copies as far as possible to present day conditions in relation to prices and also write all such comments as suggest themselves to you on the left hand page. You might do this on two copies retaining one for your office record.

19 July 22

Subsequent Paper.

The Hon. Col. Secy.,

Thank you.

2. One copy withdrawn for office file: One altered giving present-day prices.

3. The chief items in this report deal with constructional work at Navy Point and with imported labour, consequently, not having data, I am unable to make any comments.

Russell

Colonial Engineer.

16/10/23.

*Y.R. Submitted.
G.R. Dicker
19 Oct 1923*

P. G.

25. 6. 21

My dear Neave

Enclosed is the Report on Falkland Islands I spoke to you about - Remember it is 19 years old but it may give you some hints - do not trouble to return it & as to prices - remember, once again, its date

Yours truly

Henry H. Skipper

TEMPORARY

(D.W. 10541/02)

1103

(1)

From the Civil Engineer

FALKLAND ISLANDS.

23rd July, 1902. No.115.

To the Director of Works,

Admiralty,

London, S.W.

FALKLAND ISLANDS.

Notes on Materials, Labour and Cost of
Construction.

Report, or Submission to The Commodore,

S. E. Coast of America.

Herewith are submitted Notes on materials, labour
and cost of construction in The Falkland Islands, which may
be of use in the design and estimate for new works here.

(Signed) G. P. HAYES

Civil Engineer.

No. 5/14 The Secretary of the Admiralty.

Forwarded.

(Signed) FRANK FINNIS

3rd August, 1902.

Commodore

NOTES ON MATERIALS, LABOUR AND COST OF

CONSTRUCTION

in the

F A L K L A N D I S L A N D S.

MATERIALS.

Navy Peninsula
Stone.

A quarry has been opened quite close to the site of the works at Navy Peninsula to supply the stone for the breakwaters, wharf, embankment, etc.

The rocks here have a strike East and West, and dip to the North at an angle of about 80° , offering every facility for quarrying on the Southern slope.

They are composed of a hard metamorphic sandstone, passing in places into quartzite and mica schist.

The stone has a distinct stratification and comes out in irregular thicknesses.

It weighs 136 lbs. per cubic foot and from its composition it should weather very well.

USES.

Samples of it have been worked for doorsteps, and although expensive to work in ashlar, it would make excellent rubble masonry, dry stone walling, paving sets and road metalling.

Cost of

Cost of working
Navy Peninsula
Stone.

The following are the costs of working Navy Peninsula stone:

Cost of quarrying and getting out in sizes from 5 cwt. to 1 ton - $\frac{s}{3} \frac{d}{6}$ per cubic yard.

Cost of transport from quarry to lighter - $1 \frac{s}{-} \frac{d}{-}$ per cubic yard.

Port Louis
Sandstone.

A fine grained sandstone can be had from Port Louis - a harbour about thirty miles from Stanley.

It could be cheaply obtained in lighters, and it would be better to have the stone worked in the rough before leaving the quarries.

Uses.

The stone, which is easily worked, would be admirably adapted for fine ashlar work, mouldings, etc.

There is no trace of lime in this stone, consequently it should weather well, even in positions close to the sea.

Cost of Port
Louis Stone.

Cost per ton delivered in lighters at Stanley $15 \frac{s}{-} \frac{d}{-}$ per ton.

Cost per cubic foot dressed for ashlar, quoins, etc. $5 \frac{s}{-} \frac{d}{-}$ per cubic foot.

Fox Bay
Flagstones.

A hard flagstone is found at Fox Bay in the West Falklands, and occurs in beds which vary from 2 to 6 inches in thickness.

Uses.

Uses.

It would make very good paving, window sills, door-steps, etc.

Cost.

At present it can be delivered in Stanley at 25^s/_d- per ton.

There are no doubt many other excellent building stones in the Falklands, but the foregoing could provide very suitable stone for any class of building or heavy Engineering Works.

Sand.

No good freshwater sand has as yet been discovered in any large quantity for building work, so that at present the only kind used is that collected from the sea shore.

The latter sand is very suitable in concrete for foundations or in floors for stores, but would require a lot of washing with fresh water before being used in building of residences.

A fine sea sand can be obtained from York Bay in large quantities but it is not suitable for mixing with cement as it is not sharp enough.

A coarse sea sand can be got from the West Falklands.

Cost of Sand.

Sand collected about Stanley Harbour or York Bay usually costs about 7^s/_d- per ton, whilst that brought from the West Falklands would cost from 10^s/_d- to 12^s/_d- per ton delivered in Stanley.

For use in building houses the sand obtained from

sea

sea shores should be washed to remove alkaline salts otherwise there is a danger of having damp walls.

Brick earths.

There are various brick earths available on site of the works, judging from specimens which have been burnt, they would make excellent bricks.

The Colonial Government started a brick manufactory at Stanley for making bricks for the additions to Government House, but owing to unsuitable skilled workmen, and other causes, the project was not a success.

Price of English bricks.

As the price of English Stock bricks delivered in Stanley comes to £7 10s per 1,000, it ought to pay to make bricks locally, but of course the quantity required should justify a small expenditure in plant, and suitable workmen should be employed.

Cost of Chilean Bricks.

At Punta Arenas in Chili, where the brick earths are not as suitable as in Stanley, local bricks are made at £3 per 1,000. The standard sizes are 11" x 4" x 2", the bricks being generally soft and underburnt.

Where good stone is plentiful and cheap it is not economical to build in brick, one or two large houses in Stanley have been built in bricks brought from England, but it would have been much cheaper to have built them in rubble masonry.

Cost of Buildings in Brick.

The cost of building houses in English made bricks at Stanley has varied from 2 to $2\frac{1}{2}$ times cost of similar houses

houses at home.

Cost of
Building in
Masonry.

If these houses had been built in rubble masonry, rendered on outside with Portland cement plastering, the cost would not exceed once and a half English prices, that is if suitable labour was employed.

Timber.

The Falkland Islands owing to its bleak climate and heavy retentive subsoil produce no timber, so that all this material has to be imported.

Punta Arenas.
Timber.

For temporary work at Navy Peninsula almost all Punta Arenas timber was used, this in itself has made a considerable saving in cost, as in works of this description a large quantity of rough lumber is required for temporary purposes.

Uses of Punta
Arenas timber.

There are two kinds of Punta Arenas timber viz.- Antarctic Beech (*Fagus Antarcticus*) known in Punta Arenas as Coibo and the Antarctic Oak (*Quercus Antarcticus*) locally known as Robble.

Both these timbers are excellent for all kinds of temporary work, and can be used as permanent railway sleepers, posts, piles, etc.

Punta Arenas timber has a bad reputation for warping, but this is owing in a great measure to want of proper seasoning as it is very often used when taken direct from the saw mills.

Cost of

Cost of
Punta Arenas
Timber.

If purchased direct from Saw Mills in ordinary lengths, the price is about £6 per 1,000 feet of 1" thick delivered at Stanley, or at rate of about 1/6 per cubic foot.

But if bought in Falkland Islands it would cost about 2/3 per cube foot.

Cost of
English
imported
Fir.

The cost of timber imported from England is about 3/- per cube foot including freight and landing charges.

English timber should be used in all permanent work in residences, or else Punta Arenas timber seasoned and kept for three years after leaving Saw Mills, otherwise it is apt to shrink and warp.

Lime.

No limestone has as yet been discovered in the Falklands in sufficient quantity to pay for its conversion into lime. The latter can be had in Punta Arenas, but it is cheaper and better to import from England.

Other building
materials.

Other materials such as Bricks, Portland Cement, Lime, glass, paint, stoves, ironmongery and steelwork, drainpipes, slates, etc. should be imported direct from England.

Transport of
materials.
from
England.

In connection with the establishment of coaling Depot all Materials, with the exception of explosives were sent from England in the Pacific S.S.Co.'s vessels

The lighterage and landing being done for the most part by The Falkland Islands Co.

Freight

Freight.

Freight charges vary from 27/6 to 45/- per ton for ordinary lifts, these rates only apply to "lifts" not exceeding 2 tons weight, additional charges are made for "heavy lifts."

Heaviest
"lift" not to
exceed 3 tons
weight.

It is important to keep the weight of each package or piece below 3 tons weight, as otherwise there is no plant at present here to lift anything heavier with safety.

In the case of the 3 ton^{steam} cranes sent out here, one lift exceeded 5 tons which caused a considerable amount of expense and trouble in landing it.

Landing
charges.

To the cost of materials and the freight from home must be added the landing charges, at Stanley in order to arrive at the actual cost of work here.

The Falkland Islands Co. as Agents to the Pacific Steam Ship Co. have a monopoly on the landing of all goods sent out by this Line.

The charges for landing goods at Stanley is at rate of 6/6 per ton for ordinary weights.

At Navy Peninsula the charge has been 8/6 per ton for landing, or 3/6 per ton for lighterage alongside new Admiralty Wharf.

Information
required.
When sending
Stores from
England.

In sending stores from England it is very important that a complete shipping list be sent as well as the Ordinary Bills of Lading.

Whenever cases or boxes are sent they should be

numbered

numbered and a list sent by the same post giving in detail the contents of each case.

Very often it is found impossible to check the stores as they arrive, owing to the absence of a complete list of the materials shipped, as the Bills of lading only give general descriptions.

Method of Invoicing.

In this case the system adopted by the Army and Navy Stores in sending their goods abroad might be followed with advantage, as there is never any difficulty of checking the receipt of stores by their method of invoicing goods. Attention to such details save a lot of trouble and uncertainty when materials arrive at their destination, particularly when shipped to such a remote station as Falkland Islands.

Sketch plans to accompany Machinery etc.

It would be well if a reference plan for erection of all machinery or Steel structures such as Windmills, etc. were sent out with any such stores, in order to facilitate the putting together of the component parts.

LABOUR.

Kind of labour to be employed.

The most important question which had to be decided in carrying out these works was the nature of the labour to be employed.

Local labour

The local labour was limited, and was not sufficient or capable of carrying out the work of Establishing a coaling Depot here.

Rates

Rates of local labour.

The recognized rates for unskilled labourers at Stanley is 8d an hour and 1/- per hour for such trades as Carpenters, Smiths, Masons, etc.

Daily hours of labour.

The number of working hours throughout the year average $52\frac{1}{2}$ hours per week, the maximum being $54\frac{1}{4}$ hours during summer and minimum $45\frac{1}{2}$ in winter.

These working hours were adhered to as nearly as practicable in the construction of the Depot.

Method of supplying labour.

Owing to the insufficiency of the local labour at Stanley, it was decided to import labour from the Argentine, and about sixty Italians and Austrians were engaged at Buenos Aires, under an agreement to work in the Falklands for a period of twelve months.

The number of imported men was gradually increased up to one hundred and thirty. Before this was done, a suggestion was made by the Governor of the Falklands, to import workmen from the congested districts of Ireland and Scotland, but the cost of transporting such a long distance and housing a number of British workmen would largely outweigh any advantages which might have resulted from such a step.

Good conduct of imported labourers.

Besides from subsequent experience the Austrians and Italians proved in every way satisfactory, causing no trouble whatsoever, and it speaks well for these men, who have numbered at one time one hundred and thirty, living in a single hut, that with the exception of one

slight

slight stabbing affair, not a single row has taken place amongst them, neither have they caused any trouble in the Colony, as with the exception of one or two cases of drunkenness, no other complaints have been made.

This shows that when this class of men are especially selected, and engaged for a fixed period of time, they are very suitable for carrying out work of construction in the Falklands.

Trades to be imported.

Proposal for supply of labour if required at any future time.

The following trades should, however, be imported from England, viz:- Mechanics and Fitters. The local labour is not efficient for engineering construction on any large scale, and as the cost of transporting a large number of workmen from home would be excessive, it is suggested that if it is ever contemplated to carry on any additional work here the following plan of supplying labour be adopted.

That skilled Austrian labour be engaged at Punta Arenas, men of the following trades are plentiful there.- Masons, bricklayers, quarrymen, boat builders, carpenters, skilled excavators.

It would be necessary to engage a Capataz, or leading man with them.

Now that the Admiralty Works here are known in Chili and Argentine, there is no difficulty in getting men to come here at their own expense, but it is always better to have them especially selected.

On completion of six months good work in the Falklands free passages to Punta Arenas should be given to

any men

any men wishing to leave.

The men should be specially selected by an Admiralty representative as much depends on this.

Care should be taken that imported men are seen to with regard to supply of food, clothes, and medical attendance.

The Capataz, or any one engaged in any kind of supervision on the works, should not be allowed to cater for the men or supply them with provisions.

The general rates of pay for imported men are as follows:-

Rates of pay
for imported
men.

Capataz or leading man 10/- a day for seven days a week.

Carpenters, Smiths, Masons, etc. 7/6 per day of 9 hours, (or working during daylight in winter.)

Labourers 5/- per day.

Local labour
available for
working coal-
ing Depot
when completed.

On completion of Depot about twenty to thirty ^{good} local men would be available for coaling purposes, who could at the same time do any repairs necessary, or could carry on extension of roads which might be desirable.

It would also be desirable to retain a few skilled Austrian Masons and Carpenters if it is proposed to maintain a Works Department here after the present Works are completed.

Climate.

CLIMATE.

Climate.

The climate of the Falklands is cold and damp during the Winter months from May until September, and owing to the absence of the drying winds which prevail in Summer, the ground is generally sodden during the Winter.

Winter Temperature.

The temperature from May to August inclusive ranges from 26° Fahr. to 44° Fahr. with an occasional drop to 15° Fahr.

During these months work in the open is very trying for workmen accustomed to a temperate climate.

Building operations would be interfered with in one day in every eight, and it is not safe to carry on work in cement mortar during the months of June, July and August, as the temperature during the night during these months varies from 22° Fahr to 32° Fahr.

Temperature in Summer.

The range of temperature in Summer is from 40° Fahr to 60° Fahr, with an occasional drop to 32° Fahr and a rise to 70° Fahr.

Prevailing wind.

During this season the wind blows almost all day and every day, the prevailing points being from the W. to N.W.

It increases in force up to Noon and very often dies away at sunset.

This wind causing rapid evaporation, dries up the

ground

ground quickly, and it is no doubt owing to its disinfecting action and bracing effects that the health of Stanley is so good.

Climate generally.

The climate though generally bleak, chilly and unpleasant is healthy for those not disposed to pulmonary affections.

The prevailing complaints are colds and rheumatism.

Warm clothes required.

In importing workmen to this climate, ^{working} warm clothes are necessary, and the fearnought clothes sent out from home for use on Naval Works were of great use, being much appreciated by the Italian and Austrian workmen from South America.

This supply of clothes was supplemented by a quantity of warm reefer jackets and jerseys from H.M. Ships, which were sold to the imported workmen at Ships store prices.

Rainfall.

From observations taken by me from October 1900 to October 1901 the rainfall was 28 inches.

This amount is the average returned in Colonial Office reports.

The driest month was $1\frac{1}{2}$ inches
and the wettest " $3\frac{1}{2}$ inches

The water supply of Stanley depends altogether from rainfall collected from roofs, or from surface wells.

The Coaling Depot has to depend on a similar supply.

In estimating storage capacity, a two months supply

would

would be ample, as from records given by the oldest inhabitants there has never been a drought for more than that period of time.

Cost of
constructional
work in the
Falklands.

Previous to the construction of the Naval Coaling Depot at Navy Peninsula very little has been done in the way of Public Works, beyond the construction of a few pilework jetties, the foundation of a few roads, and the building of Government House and Offices.

Besides these, the only buildings of note are the Cathedral, and the residence of the Manager of the Falkland Islands Company.

Judging from what is said to have been the costs of these works and buildings, it was estimated that constructional work in the Falklands would cost from two to three times the cost of similar work at home.

A fair approximation could, however, be made from the following data:-

Cost of local labour in the Falklands may be put down at 50% more than that of English labour.

Cost of labour imported from South America costs about 40% more than English labour.

To the cost of Materials from home must be added freight, landing and insurance charges.

The climatic conditions in the Falklands would increase the cost of similar work done in the open at home by about 15%.

The efficiency of labour here is somewhat better than at home, owing to longer working hours in summer.

Taking the foregoing into consideration, work done in the Falklands should not cost more than from 50% to

60%

60% more than similar work at home.

But by the adoption of labour saving plant, and the employment of the most suitable labour and materials, work out here can be done cheaper than that.

Of course if there is much brickwork in a building, it increases the cost, as English bricks are very expensive here, and a house built altogether with brick walls would cost about twice what a similar house would at home.

A safe average estimate in General Engineering works is to add 50% to cost of similar work at home.

Building Contractors.

There are no Building Contractors in the Falklands, so that all works have to be carried out by Departmental labour, although British Contractors from Buenos Aires would no doubt be willing to take work here, if the work was of sufficient extent to make it pay them for coming here.

The Falkland Islands Company carry out repairs to disabled shipping which come in here from time to time, but the shop which they have fitted up for this purpose is small, and only the roughest sorts of repairs can be dealt with.

House accommodation in Stanley

There are no spare houses in Stanley, and married workmen find difficulty in getting accommodation, the usual price for a workman's house is £24 per year.

Before such men as Storehousemen, etc. are sent from England, it would be advisable to have accommodation

engaged

engaged for them before they arrive in the Colony.

The following information would be required:-
Whether the man is married, how many in family and
approximate size of house required.

Single workmen and others would have no difficulty
in getting lodgings.

Cost of
articles of
consumption
in Colony.

The following prices of the main articles of
consumption in this Colony are taken from the Colonial
Report for 1900.

Wheaten Flour, per bag of 100 ^{22 1/2} lbs	18/-
" Bread, " 1b	2 1/4d
Milk fresh per quart	8d to 1/- (the supply is limited)
Butter per lb	2/3 to 2/6
Beef " "	5d
Mutton " "	2d

All other articles from 50 per cent to 100 per cent
over English prices.

Cable com-
munication.
with the
Falklands.

There is no cable communication between the Falk-
lands and the rest of the World. Messages can be sent by
wire from England to Valparaiso or Monte Video and
forwarded by letter by the next Pacific Co's Steam ship
from these places to Stanley.

It saves considerable time if the time-table of The
Pacific Steam Navigation Co. be consulted before sending
Cable-grams from England. It can then be seen which of
the foregoing two places in South America it would be
best to wire through to Stanley.

(Signed) G. P. HAYES

Civil Engineer.

Altered copy
norm.
16/10/22

From the Civil Engineer,
FALKLAND ISLANDS,
23rd July, 1902, No. 115.

To the Director of Works,
Admiralty,
London, S.W.

FALKLAND ISLANDS.

Notes on Materials, Labour, and Cost of
Construction.

Report, or submission to the Commodore,
S. E. Coast of America.

Herewith are submitted notes, materials, and labour,
and cost of construction in the Falkland Islands which may
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NOTES ON MATERIALS, LABOUR, AND COST OF

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MATERIALS.

Navy Peninsula
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The rocks here have a strike East and West, and dip to the North at an angle of about 80° offering every facility for quarrying on the Southern slope.

They are composed of a hard metamorphic sandstone passing into quartzite and mica schist.

The stone has a distinct stratification and comes out in irregular thicknesses.

It weighs 166 lbs. per cubic foot and from its composition it should weather very well.

Uses.

Samples of it have been worked for doorsteps, and although expensive to work in ashlar, it would make excellent rubble masonry, dry stone walling, paving sets and road metalling

Cost of/

Cost of working
Navy Peninsula
Stone.

The following are the costs of working Navy Peninsula stone:

Cost of quarrying and getting out in sizes from 5 cwt. to 1 ton - $\frac{5}{6}$ per cubic yard.

Cost of transport from quarry to lighter - 1/- per cubic yard.

Port Louis
Sandstone.

A fine grained sandstone can be had from Port Louis - a harbour about thirty miles from Stanley.

It could be cheaply obtained in lighters, and it would be better to have the stone worked in the rough before leaving the quarries.

Uses.

The stone, which is easily worked, would be admirably adapted for fine ashlar work, mouldings, etc.

There is no trace of lime in this stone, consequently it should weather well, even in positions close to the sea.

Cost of Port
Louis stone.

Cost per ton delivered in lighters at Stanley 15/- per ton.

Cost per cubic foot dressed for ashlar, quions, etc. 5/- per cubic foot.

Fox Bay
Flagstones.

A hard flagstone is found at Fox Bay in the West Falklands, and occurs in beds which vary from 2 to 6 inches in thickness.

Uses.

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It would make very good paving, window sills, door-steps, etc.

At present it can be delivered in Stanley at 25/- per ton.

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No good freshwater sand has as yet been discovered in any large quantity for building work, so that at present the only kind used is that collected from the sea shore.

The latter sand is very suitable in concrete for foundations or in floors for stores, but would require a lot of washing with fresh water before being used in building of residences.

A fine sea sand can be obtained from York Bay in large quantities but it is not suitable for mixing with cement as it is not sharp enough.

A coarse sea sand can be got from the West Falklands.

Cost of sand.

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Cost of Buildings in brick.

The cost of building houses in English made bricks at Stanley are varied from 2 to 2½ times cost of similar

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houses at home.

Cost of building in Masonry.

If these houses had been built in rubble masonry, rendered on outside with Portland cement plastering, the cost would not exceed once and a half English prices, that is if suitable labour was employed.

Timber.

The Falkland Islands owing to its bleak climate and heavy retentive subsoil produce no timber, so that all this material has to be imported.

Punta Arenas Timber.

For temporary work at Navy Peninsula almost all Punta Arenas timber was used, this in itself has made a considerable saving in cost, as in works of this description a large quantity of rough timber is required for temporary purposes.

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But if bought in Falkland Islands it would cost about $\frac{3}{6}$ per cubic foot.

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The cost of timber imported from England is about *(Worked flooring = 9/- per cubi ft.)* 3/- per cubic foot including freight and landing charges.

English timber should be used in all permanent work in residences, or use Punta Arenas timber seasoned and kept for three years after leaving the saw mills, otherwise it is apt to shrink and warp.

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No Limestone has as yet been discovered in the Falklands in sufficient quantity to pay for its conversion into lime. The latter can be had in Punta Arenas but it is cheaper and better to import from England.

Other building
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Other materials such as bricks, Portland cement, lime, glass, paint stoves, ironmongery and steelwork, drainpipes, slates, etc., should be imported direct from England.

Transport of materials In connection with the establishment of coaling depot from England.

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The charges for landing goods at Stanley, is at rate of ^{10/-} 6/6 per ton for ordinary weights. *or -/3 per foot.*

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LABOUR.

Kind of labour to be employed.

The most important question which has to be decided in carrying out these works was the nature of labour to be employed.

Local labour.

The local labour was limited, and was not sufficient or capable of carrying out the work of establishing a coaling depot here.

Rates.

Rates of local labour.

The recognized rates for unskilled labourers at Stanley, is 8d an hour and $1\frac{1}{4}$ per hour for such trades as carpenters, Smiths, Masons, etc.

Daily hours of labour.

The number of working hours throughout the year average $52\frac{1}{2}$ hours per week, the maximum being $54\frac{1}{2}$ hours during summer and minimum $45\frac{1}{2}$ in winter.

These working hours were adhered to as nearly as practicable in the construction of the depot.

Method of supplying labour.

Owing to the insufficiency of the local labour at Stanley, it was decided to import labour from the Argentine, and about sixty Italians and Austrians were engaged at Buenos Aires under an agreement to work in the Falklands for a period of twelve months.

The number of imported was gradually increased up to one hundred and thirty. Before this was done, a suggestion was made by the Governor of the Falklands to import workmen from the congested districts of Ireland and Scotland, but the cost of transporting such a long distance and housing a number of British workmen would largely outweigh any advantages which might have resulted from such a step.

Good conduct of imported labourers.

Besides from subsequent experience the Austrians and Italians proved in every way satisfactory, causing no trouble whatsoever, and it speaks well for these men who have numbered at one time one hundred and thirty, living in a single hut, that with the exception of one

slight/

slight stabbing affair, not a single row has taken place amongst them, neither have they caused any trouble in the Colony, as with the exception of one or two cases of drunkenness, no other complaints have been made.

This shows that when this class of men are especially selected, and engaged for a fixed period of time, they are very suitable for carrying out the work of construction in the Falklands.

Trades to be imported.

Proposal for supply of labour if required at any future time

Trades like these following should however be imported from England, viz:- Mechanics and fitters. The local labour is not efficient for engineering construction on any large scale, and as the cost of transporting a large number of workmen from home would be excessive, it is suggested that if it is ever contemplated, to carry on any additional work here the following plan of supplying labour be adopted.

That skilled Austrian labour be engaged at Punta Arenas, men of the following trades are plentiful there:- Masons, bricklayers, quarrymen, boat builders, carpenters skilled excavators.

It would be necessary to engage a Capataz, or leading man with them.

Now that the Admiralty Works here are known in Chili and Argentine, there is no difficulty in getting men to come here at their own expense, but it is always better to have them especially selected.

On completion of six months good work in the Falklands free passages to Punta Arenas should be given to

any men/

any men wishing to leave.

The men should be especially selected by an Admiralty representative as much depends on this.

care should be taken that imported men are seen to with regard to supply of food, clothes, and medical attendance.

The Capataz, or any one engaged in any kind of supervision on the works, should not be allowed to cater for the men or supply them with provisions.

The general rates of pay for imported men are as follows:-

Rates of pay
for imported
men.

Capataz or leading man 10/- a day for seven days a week.

Carpenters, Smiths, Masons, etc, 7/6 per day of 9 hours, (or working during daylight in winter)
labourers 5/- per day.

Local labour
available for
working coal-
ing depot
when completed.

On completion of Depot about twenty to thirty good local men would be available for coaling purposes, who could at the same time do any repairs necessary, or could carry on extension of roads which might be desirable.

It would also be desirable to retain a few skilled Austrian masons and carpenters if it is proposed to maintain a works department here after the present works are completed.

Climate/

CLIMATE.

Climate.

The climate of the Falklands is cold and damp during the winter months from May until September and owing to the absence of the drying winds which prevail in summer the ground is generally sodden during the winter.

Winter Temperature.

The temperature from May to August inclusive ranges from 26° Fahr. to 44° Fahr. with an occasional drop to 15° Fahr.

During these months the work in the open is very trying for workmen accustomed to a temperate climate.

Building operations would be interfered with in one day in every eight, and it is not safe to carry on work in cement mortar during the months of June, July, and August, as the temperature during the nights during these months varies from 22° Fahr. to 32° Fahr.

Temperature in Summer.

The range of temperature in summer is from 40° Fahr. to 60° Fahr. with an occasional drop to 32° Fahr. and a rise to 70° Fahr.

Prevailing wind.

During this season the wind blows almost all day and every day, the prevailing points being from the W. to N.W.

It increases in force up to Noon and very often dies away at sunset.

This wind causing rapid evaporation, dries up the
ground/

ground quickly, and it is no doubt owing to its disinfection action and bracing effects that the health of Stanley is so good.

Climate generally.

The climate though generally bleak, chilly and unpleasant is healthy for those not disposed to pulmonary affections.

The prevailing complaints are colds and rheumatism.

Warm clothes required.

In importing workmen to this climate, warm working clothes are necessary and the fawnought clothes sent out from home for Naval use on the works, were of ~~great~~ great use, being much appreciated by the Italian and Ausrtian workmen from South America.

This supply of clothes was supplemented by a quantity of warm reefer jackets and jerseys from H.M. Ships, which were sold to the imported workmen at ships store prices.

Rainfall.

From observations taken by me from October 1900 to October 1901 the rainfall was 28 inches.

This amount is the average returned in Colonial Office reports.

The driest month was $1\frac{1}{2}$ inches

And the wettest " $3\frac{1}{2}$ inches.

The water supply of Stanley depends altogether from rainfall collected from roofs, or from surface wells.

The coaling Depot has to depend on a similar supply.

In estimating storage capacity, a two months supply

would/

would be ample, as from records given by the oldest inhabitants there has never been a drought for more than that period of time.

Cost of
constructional
work in the
Falklands.

Previous to the construction of the Naval Coaling Depot at Navy Peninsula very little has been done in the way of Public Works, beyond the construction of a few pilework jetties, the foundation of a few roads, and building of Government House and Offices.

besides these, the only buildings of note are the Cathedral, and the residence of the Manager of the Falkland Islands Company.

Judging from what is said to have been the costs of these works and buildings, it was estimated that constructional work in the Falklands would cost from two to three times the cost of similar work at home.

A fair approximation could, however, be made from the following data:-

Cost of local labour in the Falklands may be put down at 50% more than that of English labour.

Cost of labour imported from South America costs about 40% more than English labour.

To the cost of Materials from home must be added freight, landing and insurance charges.

The climatic conditions in the Falklands would increase the cost of similar work done in the open at home by about 15%.

? The efficiency of labour here is somewhat better than at home, owing to longer working hours in summer.

Taking the foregoing into consideration, work done in the Falklands should not cost more than from 50% to

60%

60% more than similar work at home.

But by the adoption of labour saving plant, and the employment of the most suitable labour and materials work out here can be done cheaper than that.

Of course if there is much brickwork in a building it increases the cost, as English bricks are very expensive here, and a house built altogether with brick walls would cost about twice what a simily house would at home.

A safe average estimate in General Engineering works is to add ^{80 %.} 50% to the cost of similar work at home.

Building Contractors.

There are no Building Contractors in the Falklands, so that all works have to be carried out by Departmental labour, although British Contractors from Buenos Aires would no doubt be willing to take work here, if the work was of sufficient extent to make it pay them for coming here.

The Falkland Islands Company carry out repairs to disabled shipping which come in here from time to time but the shop which they have fitted up for the purpose is small, and only the roughest sorts of repairs can be dealt with.

House accom-
odation in
Stanley.

There are no spare houses in Stanley, and married workmen find difficulty in getting accomodation, the usual price for a workman's house is £24 per year.

Before such men as Storehousemen, etc. are sent from England, it would be advisable to have accomodation

engaged/

Engaged for them before they arrive in the Colony.

The following information would be required:-
Whether the man is married, how many in family and approximate size of house required.

Single workmen and others would have no difficulty in getting lodgings.

Cost of.
articles of
consumption.
in Colony

The following prices of the main articles of consumption in this Colony are taken from the Colonial Report for 1900.

Wheaton flour	per bag of 100 lbs	22/6. 18/-
Wheaton bread	per lb.	^{-3½.} 2½d
Fresh milk	per quart	8d to 1/- (supply scarce)
Fresh butter	per lb.	^{2/9} 2/3 to ^{3/-} 2/6
Beef	per lb.	5d
Mutton	per lb.	^{-3.} 2d

All other articles from 50% to 100% over English prices.

Cable com-
munication
with the
Falklands.

There is no cable communication between the Falklands and the rest of the world. Messages can be sent by wire from England to Valparaiso or Monte Video and forwarded by letter by the next Pacific Co's steam ship from these places to Stanley.

It saves considerable time if the time-table of The Pacific Steam Navigation Co. be consulted before sending cable-grams from England. It can then be seen which of the fore going two places in South America it would be best to wire through to Stanley.

(Signed) G. P. Hayes

Civil Engineer.

Alterations show work. October 1923.

R. Basely,
Asst. Engineer.
16/10/23.