

No. 183. Read the following letter from Lieutenant-Colonel W. T. F. FAREWELL, R.E., Inspecting Engineer for Ports and Communications, to Colonel G. W. WALKER, R.E., Secretary to Government, Public Works Department, dated Chempauk, 5th December 1873, No. 401-29:—

I HAVE the honour to report that, as directed, I accompanied Mr. W. Parkes, Member, Institute Civil Engineering, to Kurrachee to inspect the harbour works executed under his direction as Consulting Engineer in that port.

1 Survey of the Kurrachee Harbour, A.
Plans and Sections of Kurrachee Breakwater, and the travelling crane named "Titan," B.
1 Plan of concrete mixing, station and block ground, C.

2. During my stay at Kurrachee, I minutely examined all the surveys, plans, models, etc., etc., that had reference to the harbour works, and every portion of the work actually executed.

3. So much has already been written and printed in reference to the Kurrachee Harbour work generally that it would be useless for me to recapitulate here its history, geographical position, physical aspect, etc., etc., and the various discussions that have arisen regarding the anticipated failure or possible deterioration effect of the works now carried out, owing to the reputed existence of a strong easterly current, etc., etc., etc., I have only to remark that, notwithstanding the predictions to the contrary, the works, as originally designed by that experienced and eminent Harbour Engineer, the late Mr. James Walker, and perseveringly adhered to by the Consulting Engineer Mr. W. Parkes, have fully realized all that was looked for by these gentlemen, as is proved by the present condition of the harbour in comparison with its original state.

4. The Commissioner in Sind, in a report to his Government, dated 15th September 1873, (a copy of which I have been favored with,) requesting that the increased facilities for entering the port of Kurrachee may be made public, notes vessels of the largest class may now enter and leave the port with perfect ease and safety during the fair seasons of the year, and the port sailing directions he furnished for publication show that, at all seasons of the year, vessels not exceeding 21 feet of draught can, without difficulty or delay, enter and leave the port, while during the fair season from October to the middle of May the port is easily accessible to vessels drawing even 24 feet of water.

5. In the first reports on the project the navigable depth on the bar in 1853-54 was mentioned as being at high water about 21 feet and at low water 13 feet; the present average depth of water on the bar, as shown in the port sailing directions at high water of springs, is 28 feet, neap tides 25 to 26 feet; the original channel of entrance was a most tortuous one, while the present is perfectly straight.

6. In order that my report may be river sand (more like tracing of a survey of the Kurrachee Harb. irregular shapes (of a allowed me to copy; this survey shows the end of a carried out, which I will now cursorily describe south-west of the

- I.—The Keamaree Groyne, which 5 feet in height.
- II.—Manora Breakwater, 1,500 feet blocks of which
- III.—Napier's Mole opening, and bridge in the past and ing well of

IV.—New quays near the Native town.

V.—New channel of diversion.

VI.—Closing Chinna Creek.

7. The object of the works being to so confine the ebb tide as to concentrate its force on the bar to shelter the entrance to the harbour from the heavy rollers of the south-west monsoon, and by closing the Chinna Creek and opening the Napier Mole to utilize the large area eastward of the Napier Mole, increasing the capacity of the tidal estuary and the discharge through the harbour, and finally to secure a good navigable channel to the then proposed quay, now built, adjacent to the bridge site.

8. On the eastern entrance to the harbour running out in a south-easterly direction is the Keamaree Groyne, a simple rough-stone groyne nearly two miles in length about 2' 6" above high tides, the slopes about one-and-a-half to one, the stone is large rubble, the average depth of the groyne is from 9 to 10 feet. In the angle formed by it and the shore on the eastern side, there is a slight accumulation of silt and vegetable deposit that may possibly be brought here by eddies from creeks in the neighbourhood; on the harbour side of this groyne a very considerable change, giving additional depth, has taken place, and since the construction of its auxiliary work, the Manora Breakwater, the depth of the entrance of the harbour has much increased; the groyne, I understood, was constructed by tilt wagons, the precaution of a good apron in front of the point of tipping having been taken to prevent cutting by scour.

9. West of the harbour entrance, which is about 2,000 feet wide, with its base on the Manora Point, is the Manora Breakwater, running out in a south and by east direction to a length of 1,500 feet; the work is a noble one and proves by its present condition, after three monsoons, its thorough stability and the value of the excellent principle on which it has been constructed.

10. The work consists of huge blocks of concrete laid closely together without mortar or bond on a bed of rubble stone levelled by divers to receive the blocks, each block measures 12' x 8' x 4½' and weighs 27 tons; there are three double courses of these concrete blocks, making the built portion of the breakwater 24 feet wide and 24 feet in height; the blocks are slightly inclined at an angle of 76°, thus giving the upper two courses firm footings and rendering it a comparatively easy matter to place each block in its correct position; the lower courses are sunk into the rubble foundation, and the whole structure is so constructed as to give it an elastic condition preventing distortion from subsidence of foundations, etc., etc.; the design of this work, I believe, is entirely due to the Consulting Engineer Mr. W. Parkes, it having been originally intended to build the Kurrachee Harbour Works Mr. W. Parkes, gives a plan, section, and elevation of the blocks, etc., etc., are laid; figures of end elevations of the breakwater, 4, 5 of the gigantic travelling crane named of concrete weighing 27 tons each were assistance of the divers deposited where

required; seawards, the foundation of rubble stone outside the blocks is double the width of that inside. For some special sites, necessitated by meeting with boulders, etc., in the foundation, special blocks of various dimensions were made, while all the other blocks are of the same size and weight; the blocks in the first course are sloped so as to lay level on the foundation with the incline before noted, which arrangement forms a good and secure footing.

11. The "titan," a most useful and powerful crane, was specially designed, I believe, by the Consulting Engineer Mr. W. Parkes, and constructed by Messrs. Stothert and Pitt of Bath for the heavy work it had to do; the machine, with the exception of the deck, is entirely of iron; it is provided with an 8-horse power steam engine and a very strong crab and traveller which will move a weight vertically or transversely; the engine is also so arranged as to move the machine to the position required; it runs on rails laid on the work and is provided with an iron tank to contain sufficient water to act as a counterpoise while it is at work, when it is well blocked up in front and in addition cramped to the block lewis; the machine is in excellent order and shows hardly any signs of wear and tear, except in the wheels for moving it, which appear to be not quite strong enough for the machine; it was tested with 40 tons in England.

12. I will now describe the mode in which the concrete blocks were made, their composition, mixing, moulding disposition on block ground, etc., etc.; the block ground is at some distance from the breakwater, with which it is connected by a railway which communicates all over the works to the wharves, workshops, quarries, concrete mixing machines, etc., etc., etc.

13. The moulds for each block are laid on each side of a portion of the railway on a slight incline so arranged as to allow of the blocks being raised and lowered in the exact position they are eventually to take in the work; the moulds are made of strong planks cramped and keyed together with iron ties; each block has two lewis holes which are provided for during moulding, and the edges of each block are chamfered to prevent the otherwise sharp square edges being chipped off.

14. Over the railway in the block ground are several travelling cranes, running on an outer line of rails, each having its own particular duty to perform, one more powerful than the rest called "the Goliath" fitted with a steam engine and hydraulic ram lifts the blocks when ready for removal on to the trucks, which, when loaded, are taken to the breakwater by a locomotive engine; this machine also appeared to me to be in perfect order; the enclosure (marked C) gives plans, sections, and elevations of the Goliath and smaller travelling cranes used, with plan of block ground, railway, and mixing mills, etc., etc.

15. Each block is composed of pebbles, coarse river sand (more like gravel), portland cement, water, and quarry boulders of irregular shapes (of a size easily handled) in the proportions noted from the extreme end of 1

- | | | |
|--------------------|----------------------|--------------------------------|
| 1. Pebbles | ... | side on to the south-west |
| 2. Sand | ... | on of waves 15 feet in height |
| 3. Portland cement | 3,816 lbs. or nearly | ds of concrete blocks of which |
| 4. Water | ... | ve been dislodged in the past |
| 5. Boulders | ... | ds for auguring well of |

*Proceedings of the Madras Government, Public Works Department.
14th January 1874.*

of a similar superstructure at Madras, cushioned upon a deeper and more uniform rubble bed, and exposed to waves of which no recorded measurements are known to equal those of waves at Kurrachee.

3. The information concerning the manufacture of concrete blocks, and the machinery employed in making and placing them, will, with the two sheets of illustrations, be recorded for future use. Lieutenant-Colonel Farewell has made good use of his opportunities of observation, and His Excellency the Governor in Council has reason to be satisfied with the result of his deputation to Kurrachee, which will doubtless bear fruit if to the benefit of Madras, to that of Cochin, Vizagapatam, and other minor ports of the Presidency.

(True Extract.)

Colonel, R.E.,
Secretary to Government.

To the Inspecting Engineer for Ports and Communications.
„ Marine Department.
„ Master Attendant, Administrative Department.
„ District Engineer, Presidency.
„ „ Malabar.
„ „ Vizagapatam.

Exd. E. C. S.
Spare Copies

of theited and
f concr site
assistanc

a k
durin
t in



No.

Inspecting Engineer's Office for
Ports & Communications
Chepank. Madras.
5th December 1873.

From

Lieut. Colonel W. J. F. Farewell
Inspecting Engineer for
Ports. & &

To

Colonel G. W. Walker R.E.,
Chief Engineer and
Secretary to Government.
Public Works Department

Enclosures 3.

Sir,

1. Survey of the
Kurrachee
Harbour - A.
2. Plans & Sections
of Kurrachee
Breakwater,
and the travelling
road across
"Bitter" - B.
3. Plan of concrete
erecting station
& block ground - C.

I have the honor to report
that as directed I accompanied
Mr. W. Parkes M. Inst. C. E., to
Kurrachee to inspect the harbour
works executed under his direction
as Consulting Engineer in that port.
2. During my stay at Kurrachee,
I minutely examined all the survey
plans, models &c &c that had
reference to the harbour works and
every

every portion of the work actually executed.

3. So much has already been written and printed in reference to the Hurachee harbour work generally, that it would be useless for me to recapitulate here its history, geographical position, ~~the physical aspect of the harbour~~ and the various discussions that have arisen regarding the anticipated failure or possible deterioratory effect of the works now carried out, owing - to the reputed existence of a strong easterly current &c. &c. &c. I have only to remark that notwithstanding the predictions to the contrary, the works as originally designed by that experienced and eminent Harbour Engineer, the late Mr. James Walker and perseveringly adhered to by the Consulting Engineer Mr. W. Parkes, have fully realised all

all that was looked for by these gentlemen, as is proved by the present condition of the harbour in comparison with its original state.

4. The Commissioner in Sind, in a report to his Government, dated 15th September 1873 (a copy of which I have been favored with) requesting that the increased facilities for entering the port of Hurachee may be made public, notes vessels of the largest class may now enter and leave the port with perfect ease and safety during the fair seasons of the year, and the port sailing directions he furnished for publication, show that at all seasons of the year, vessels not exceeding 28 feet of draught can, without difficulty or delay, enter and leave the port, while during the fair season from October to the middle of May, the port is easily

easily accessible to vessels drawing even 24 feet of water.

5. In the first reports on the project, the navigable depth on the bar in 1853/54 was mentioned as being at high water about 28 feet and at low water 13 feet; the present average depth of water on the bar as shown in the port sailing directions at high water at springs is 20 feet, neap tides 25 to 26 feet; the original channel of entrance was a most tortuous one, while the present one is perfectly straight.

6. In order that my report may be understood I append (marked A) a tracing of a survey of the Kurrachee Harbour, which Mr. Parkes has kindly allowed me to copy; this survey shows the positions of the works designed and carried out which I will now cursorily describe.

They

2/



They consist of -

- I. The Mamarce groynes which is close upon two miles in length.
 - II. Manora Breakwater 1,500 feet in length.
 - III. Napier's Mole, opening, and bridging it.
 - IV. New Quays near the native town.
 - V. New Channel of diversion.
 - VI. Closing Chinnia Creek.
7. The object of the works being to so confine the ebb tide as to concentrate its force on the bar, ~~to sheltering~~ the entrance to the harbour from the heavy rollers of the south west monsoon, and by closing the Chinnia Creek, & opening the Napier Mole, to utilise the large area eastward of the Napier mole increasing the capacity of the tidal estuary and the discharge through the harbour, and finally

finally ^{to} securing a good navigable channel to the then proposed quays, now built, adjacent to the bridge site.

8. On the eastern entrance to the harbour running out in a south easterly direction is the Kiamaree groynes, a simple rough stone groyne nearly two miles in length about 2' 6" above high tides, the slopes about one and a half to one, the stone is large rubble, the average depth of the groyne is from 9 to 10 feet. In the angle formed by it and the shore on the eastern side, there is a slight accumulation of silt and vegetable deposit that may possibly be brought here by eddies from creeks in the neighbourhood. On the harbour side of this groyne a very considerable change, giving additional depth, has taken

74
taken place, and since the construction of its auxiliary work, the Manora Breakwater, the depth of the entrance of the harbour has much increased; the groyne, I understood, was constructed by tilt waggons, the precaution of a good apron in front of the point of tipping having been taken to prevent cutting by scour.

9. West of the harbour entrance which is about 2000 feet wide, with its base on the Manora Point, is the Manora Breakwater, running out in a south and by east direction to a length of 1500 feet; the work is a noble one, and proves, by its present condition, after three monsoons, its thorough stability and the value of the excellent principle on which it has been constructed. The

10 The work consists of huge blocks of concrete laid closely together without mortar or bond on a bed of rubble stone levelled by divers to receive the blocks. each block measures $12' \times 8' \times 4\frac{1}{2}'$ and weighs 24 tons; there are three double courses of these concrete blocks, making the built portion of the Breakwater 24 feet wide and 24 feet in height; the blocks are slightly inclined at an angle of 46° , thus giving the upper two courses firm footings and rendering it a comparatively easy matter to place each block in its correct position; the lower courses are sunk into the rubble foundation, and the whole structure is so constructed as to give it an elastic condition preventing distortion from subsidence

3
subsidence of foundations &c &c; the design of this work, I believe is entirely due to the Consulting Engineer Mr. W. Parkes, it having been originally intended to build the breakwater of stone; the accompanying plan marked B obligingly furnished to me by the able Superintendent of the Murrumbidgee Harbour works. Mr. W. Price M. Inst. C. E., gives a plan, section and elevation of the Breakwater and the mode in which the blocks &c &c are laid; figures 1, 2 & 3 are the upper plan, side and ^{and} elevations of the Breakwater, 4, 5 & 6 plan, side and ^{and} elevations of the gigantic travelling crane named "the Titan" by which the blocks of concrete weighing 24 tons each were lifted from the waggons and with the assistance of the divers deposited where required

required; seawards the foundation of rubble stone outside the blocks is double the width of that inside. For some special sites, necessitated by meeting with boulders &c. in the foundation, special blocks of various dimensions were made, while all the other blocks are of the same size and weight; the blocks in the first course are sloped so as to lay level on the foundation with the incline before noted which arrangement forms a good and secure footing.

11. The "Titan", a most useful and powerful crane was specially designed, I believe, by the Consulting Engineer Mr W. Parkes and constructed by Messrs. Itothert and Pitt of Bath, for the heavy work it had to do; the machine with the exception of the deck is entirely of iron, it is provided

9 provided with an S. H. P. steam Engine and a very strong crab and traveller which will move a weight vertically or transversely the Engine is also so arranged as to move the machine to the position required, it runs on rails laid on the work and is provided with an iron tank to contain sufficient water to act as a counterpoise while it is at work, when it is well blocked up in front and in addition cramped to the block lewis; the machine is in excellent order and shows hardly any signs of wear and tear, except in the wheels for moving it which appear to be not quite strong enough for the machine, it was tested with 40 tons in England.

12. I will now describe the mode in which the concrete blocks were made, their com-
- position

-position, mixing, moulding
disposition on block ground &c &c
the block ground is at some
distance from the Breakwater
with which it is connected
by a railway which com-
-municates all over the works
to the wharves, workshops,
quarries, concrete mixing
machines &c &c &c.

13. The moulds for each
block are laid on each side
of a portion of the railway
on a slight incline so
arranged as to allow of the
blocks being raised and
lowered in the exact position
they are eventually to take in
the work; the moulds are made
of strong planks cramped
and keyed together with iron
ties each block has two
lewis holes which are pro-
vided for during moulding
and

4/ and the edges of each block
are chamfered to prevent the
otherwise sharp square edges
being chipped off.

14. Over the railway in the
block ground, are several
travelling cranes, running on
an outer line of rails, each
having its own particular
duty to perform, one
more powerful than the rest
called "the Goliath" fitted with
a steam engine and hydraulic
ram, lifts the blocks
when ready for removal,
on to the trucks, which
when loaded are taken
to the Breakwater by a
locomotive engine, this
machine also appeared
to me to be in perfect
order, the enclosure (marked
c) gives plans, sections and
elevations

elevations of the Goliath and smaller travelling cranes used, with plan of block ground, railway, and mixing mills &c. &c.

15. Each block is composed of pebbles, coarse river sand (more like gravel) Portland Cement, water, and quarry boulders of irregular shapes (of a size easily handled) in the proportions noted below.

- | | |
|----------------------|------------|
| 1. Pebbles | 240 c. ft. |
| 2 Sand | 100 - " |
| 3 Portland cement | |
| 3,816 lbs. or nearly | 40 - " |
| 4 Water | 42 - " |
| 5 Boulders | 144 - " |

The first four materials are mixed by steam machinery as follows: Close to block ground (vide plan C) are the mixing machines ("Messent's Patent") of which there are four

four driven by an S. M. P. Engine, the plan, section and elevation of the machine is shown on the plan. No 1 of figure 1 is the mixing platform, 2 the hopper, 3 the rotating mixer, 4 charge of water. In each hopper is placed $7\frac{1}{2}$ cubic feet of pebbles, 5 c. ft. of sand, and 106 lbs. of Portland Cement; the ascertained correct charge, which is swung by a davit over and discharged into the open indescribably shaped cast iron mixing box, into which the charge of water is discharged, the top door is then closed and box set to rotate by steam power; 9 turns is found to be sufficient to thoroughly mix the materials; the belt is then turned off, a

a bottom door opened in the mixer and the contents discharged into skips laid on trolleys to receive them below from whence they are taken to the small travellers, which lift the skips and deposit their contents into the block moulds. Each block takes 36 charges of mixture plus 4 cubic feet of boulders to each charge to complete it. The boulders are carefully hand-laid and the concrete thoroughly grouted in round them, the mould is well filled, but is neither rammed nor pressed down. The time the blocks are allowed to remain on the block ground to set is from one to two months; the blocks would possibly be improved in

in quality if they could be submerged much earlier, but they cannot bear the strain of removal until they have set for some time; all the blocks now in the Break-water, allowed to remain two months on the block ground, show no signs of ground, show no signs of a mark even on them after the hammering of three masons, their edges are as sharp and well defined as when they first left the moulds, and altogether their durability and hardness are remarkable. — Those only left on the block ground for a month, showed signs of having been crushed on their upper surfaces at the points where, I was informed, the weight of the

the Titan when working about them impinged; on discussing the question of the time concrete blocks should remain in the block ground with Mr. Parkes, he mentioned that he thought it would be at all events advisable that the blocks for the upper courses should not be used for two months, but deemed one month ample for the lower courses.

16 The portion of the Breakwater, constructed in the first two seasons, nearer the shore end, laid on unequal foundations, has opened a little here and there in the centre, but to this no consequence is attached, in the remaining portion, completing the work, the blocks have marvellously closed

15 closed up, the hammering they have had from the sea tending simply to bring the whole mass of blocks closer together, far closer, I believe, than it is possible under the circumstances to place them. In the work done during the first two seasons, some damage occurred, but this was repaired without difficulty, and after the completion of the work to its designed length during the last monsoon (described as a heavy one) but four individual blocks, which Mr. Parkes informed ^{me} had been similarly treated last season, have been unseated and thrown inwards; these I saw being

being replaced by concrete blocks formed in situ, which I believe, will never be removed again.

17. The whole structure has sunk a little as might be expected, but its power of breaking the seas remains the same. During observations made last monsoon, a wave stated to have been noted as fifteen feet in height when it broke on the Breakwater. It was at the point marked on the survey as "Buoy" on the western side of the channel of entrance into the harbour actually measured at the time to be reduced to two feet, the distance from the Breakwater to the buoy

buoy being about 800 feet. 14
18. Having, I trust, clearly though briefly described the construction and effects of the breakwater, I will now ~~give~~ give a general sketch of the other works.
19. The Kapur mole was removed to a width of 1200 feet, and the opening spanned by a magnificent iron girder bridge of 40 feet in width erected on cast iron screw piles with masonry abutments. The 3 most eastern bays were deepened, and a channel dug to divert the whole of the water entering and discharging from the tidal estuary, (formerly in communication with the Chinnak Creek) through it into the harbour. The Chinnak Creek has been closed, and now

now the whole of the estuary south of the Tapiet mole is connected with that north of it and already a fine deep, navigable channel flows under the bridge past the Grand quays which have been built along side of which I saw numerous large sea-going native vessels laying thickly together, taking in and discharging cargo.

20. Gradually in time there can be no doubt, as is proved from the careful and numerous sections now being taken of the harbour, that the harbour itself will be considerably deepened and afford accommodation for more shipping, and as soon as the Indus Valley Railway is open, the
general

12
general impression already existing is that Kurrachee will be, if not the principal, one of the richest ports of the country. I visited the dredges and timed their working and found that with ease they dredged in sand, at an average depth of 24 feet, a ton in a little over 2 minutes; these dredges are furnished with engines of 25 H. P. with one ladder and are said to work fairly and cheaply, and have done their work well.

21. In concluding this report, I beg to note that both Mr. Parkes the Consulting Engineer and Mr. Price the Superintendent of the Kurrachee Harbour works were untrusting in their endeavours to afford me every assistance and information in their power, they

15
they accompanied me over
every work in the harbour,
and I have to thank them
for much of the information
I have been able to give.

I have the honor to be
Sir

Your most Obedt Servt.

Wm. R. Lientt. Col.

Inspecting Engineer for
Ports

1893
 16

No 93
 A. for the Gr. Lakes and
 with interest the prospecting
 Report on the
 Harbor Works,
 that
 especially
 comprised in
 relating to
 of construction
 the details
 of the Port of Montreal, running
 Point;
 model of
 which its design
 to con-
 harbor
 500 yards
 end of
 "Drie-
 Point" or nearly
 the South
 West measure, to the ac-
 15 ft. high
 by natural
 of the thousand
 of which
 feet are only

1893
 16

To Mr. Chief Engineer
 & Secretary to Port.
 P. M. Dept.
 Dated 3rd Oct 1893.
 Report of the
 Harbor Works
 Reports on the
 Harbor Works

constructed, should have
 been dislodged in the
 past with a piece
 of iron. Moreover, affords
 presumptive grounds for
 assuming well of the sta-
 bility of a similar su-
 perstructure, cushioned
 upon a deeper & more
 uniform rubble bed,
 and exposed to waves
 of which no recorded
 measurements are known
 to equal those of waves
 at Hornum.

The information concern-
 ing the manufacture of
 Shot Concrete Blocks, &
 the machinery employed
 in making & placing
 them, with the two
 sheets of illustrations he
 received for future use.
 Lt. Col. Jewell has made
 good use of his opportuni-
 ties of observation, and
 H.S. The G. I. has been
 to be satisfied with the
 result of his deputation
 to Hornum, which will
 doubtless bear fruit of

to the benefit of Madras,
 to that of Cochin, Vizagapa-
 tam, and other minor
 ports of the Presidency -

C.M.W.
 9.12.73

the metal will
 be used for
 the purpose of
 the work
 as shown in
 the plan
 and the
 work will be
 done in the
 same way as
 the work at
 Hornum.

Copies of two plans sent to the
 Hon. Secy. Vizag. & Madras 30/1/74.
 - for despatch to the Hon. Secy. Madras
 & Vizagapatam 2/2/74.

The Hon. Secy. for Port & Harb.
 Marine Dept.
 Madras (Circular)
 Dy. Secy. (Circular) Vizagapatam
 Dy. Secy. (Circular) Madras
 Dy. Secy. (Circular) Madras
 Dy. Secy. (Circular) Madras

100
 Despatched 24/1/74

Letter to K. F. Miller
1/10/1900
Miller

These papers will
I presume be
sent to Alcutt
as well as Home.
We cannot of course
ask for the loan
till we have our
financial estimates
etc. but we may
commence preparing
a favorable impression
by showing how helpful
the work becomes as we
go on requiring & so

Ac. 17. 10. 17

Ms 6646 A

Govt. of 1874 Madras.
PUBLIC WORKS.

*1. The Improving Works
for Ports & Communication*

Dated

Recd.

Encl.

G. O. 14th Dec^r 1874 No 93.

Nov 1874

Murrahee Harbour Works.

*Paying orders on letter
from the Messrs for
Ports & Communication
reporting on the Mur-
rahee Harbour Works.*