THIS BOOK

IS RESPECTFULLY DEDICATED

TO

THE CALCUTTA CHAMBER OF COMMERCE

BY

THE AUTHOR

PREFACE

TO THE FIRST EDITION.

A GUIDE TO THE HOOGHLY has been compiled from various *well established* sources of information. Without professing to be original or the result of a single experience, it claims to be useful to the novice as a *general guide book*; to the initiated—as an occasional help to memory. It is not without some small misgiving that the *Guide* is launched on the stormy waves of public criticism, from no lack of confidence as to its utility or correctness, but from the conviction that certain enemies to its success will leave no plan untried to compass its failure. That a first publication of the kind cannot reasonably be expected to be *perfect*, is the consolation of the writer for the obvious defects which must almost necessarily accompany it; but as the object of its publication is rather to inform the ignorant, than to instruct those already versed in the art of piloting on the Hooghly, it is hoped that imperfections, impossible to be avoided in a maiden attempt, will be merged in the fruitful results likely to follow a close study of its carefully collated facts. The writer trusts that no apology is needed for introducing the Native

Compass, and the Appendix of Sea Terms in Hindustani for working a Ship; the want of these two important points of knowledge having been too long felt to need comment. At a time when the Pilot Service of India is being denuded of its most experienced and veteran officers—men who have long sustained the prestige of a Marine Service (once held to be the finest in the world)—leaving their vacant places to be filled by officers of perhaps nearly equal ability, though less experience, the writer feels that such a work as the present may not aptly be introduced to the study of those young men now preparing to pass their examination as Pilots; and who, by comparing the results of the experience they are acquiring with the information this little work can afford them, will find the advantage of combining *practice with theory*, and thus be the better prepared to support creditably the character for efficiency, so justly earned by men about to exchange the scene of their active duties—the trying vicissitudes of a tropical climate, and a wearying life—for, we trust, that snug independence, won through many hair breadth escapes and so many dangers.

THE AUTHOR.

May, 1866.

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PREFACE
TO THE SECOND EDITION.

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The First Edition of this little work proved an undoubted success. It being now out of print, and still greatly in demand, the Author has been induced to publish a Second Edition—revised, corrected and enlarged; with a Pilotage Table, the French Measurement rendered into English, &c.

The desideratum of such a work, for those as are qualifying for Pilots, as well as for Masters of vessels frequenting this Port, is obvious, and fully borne out by the opinions of the press, herewith annexed.

THE AUTHOR.

April, 1870.

OPINIONS OF THE PRESS.

"We have received two very useful little works: one entitled *An Elementary and Practical Grammar of the French Language*, by J. M. Cantopher; and the other *A Guide to the Hooghly*, by W. McKenney Wall The latter contains, besides much useful information, the Marks, Sets of Tides, Bearings and distances of Buoys, Latitudes and Longitudes of places in our treacherous river, compiled, as it appears, from the best official sources. Both these works are neatly got up, and in a small compass to suit the pocket."—*Englishman, 8th June*, 1866.

GUIDE TO THE HOOGHLY.—"A little work under this title has been forwarded to us, which seems very complete in its way It is not what might be termed a popular Guide, because it is almost exclusively technical, and will consequently be more adapted to sea faring people than as a Guide in the ordinary "Handbook" sense. There is really nothing attempted in the way of topography, while the information needful to the Pilot or the navigator seems all that could be desired. The book is interleaved for observations, and changes, and ought to be acceptable to the class for which it is especially designed."—*Indian Daily News, 9th June*, 1866.

We have to acknowledge a neat little work on the Hooghly, compiled by W McKenney Wall, Licensed Mate Pilot. It is called a "GUIDE TO THE HOOGHLY," and will prove a valuable assistant to all whose business takes them on the River.—*Bengal Hurkaru, 9th June*, 1866.

MR. PILOT WALL'S GUIDE TO THE HOOGHLY.—We have been requested to publish the following testimony of the utility of Mr Wall's work.—*Indian Daily News, 5th July*, 1866:—

BENGAL CHAMBER OF COMMERCE,
Calcutta, 18th June, 1866

W. McK. WALL, ESQ.,

SIR,—I am directed by the Committee of the Chamber of Commerce to thank you for your presentation Copy of your "GUIDE TO THE HOOGHLY," which appears to contain information that is likely to be useful to members of the Pilot Service and nautical men generally, and the Committee trust the object you had in view in its publication, will be fully realised

I am, Sir,
Your obedient servant,
(Sd) H. W. I. Wood,
Secretary.

"The Chamber of Commerce have, we observe, thanked Mr. Wall, of the Pilot Service, for his very creditable 'GUIDE TO THE HOOGHLY,' a work which should form part of the library of every Pilot and nautical man frequenting the Port of Calcutta"—*Englishman, 5th July*, 1866.

N.B.—The best recommendation this little work can have, is the fact of the Lieutenant Governor of Bengal ordering the purchase of a number of Copies by the Marine Authorities, for distribution among the members of the Pilot Service, which was accordingly done by Capt. H. Howe, Offg. Master Attendant.

WM McKENNEY WALL,
Licensed Pilot,
Late Indian Navy.

A GUIDE TO THE HOOGHLY.

CALCUTTA REACH

Lies from N. E. b. N. to N. N. E ; is about 300 yards wide, in navigable channel. An extensive sand along the Western bank occupies half the river. The Eastern bank is bold from Hastings' (or Kidderpore) Bridge to abreast the Mint, where a shoal runs out, and the deepest water will be found on the Howrah side. Tides set fair. Strong eddies off Fort Point. Soundings in channel, 6, 7, and 8 fathoms.

GARDEN REACH

Commences at Kidderpore, and ends at Pans para

Course.—W. N. W. to E. S. E., 4 miles.

Soundings.—Six, 8, and 10 fathoms, low water, spring, tides

Tides.—Flood tide sets fair along the Northern bank, from Raj Gunj on to Garden House Point, thence on to Cambabatch's Point ; round, with strong eddies off it, into Kidderpore Bight.

Ebb tide sets round Kidderpore Bight, crosses over from Cambabatch's Point, on to Garden House Point, round, and then fair into Raj Gunj.

Sands.—Sumatra Sand, which commences at Tel Kul Ghât, and extends down to Sumatra (or Kyd's) Point Bishop's College Sand (commonly called "College Sand") extends from Sumatra Point to a little above the Sluice Gate. Half way between Bishop's College and the opposite shore, there is only one fathom on the sand.

Marks—Scotch Kirk and Old (or Mission) Church steeples in one. Keep the lead going *on the sandy side.*

This is the *only* Reach where a ship may work *from bank to bank*; though only from below Garden House Point, to above Hangman's Point on opposite shore.

SANKRAL REACH

Commences at Pansparra, and ends at Moonekolly Point.

Course.—S. S. E. to S. E, 3 miles.

Soundings.—Seven, 9, and even 11 fathoms.

Tides.—Flood tide sets from above Moonekolly (commonly styled "Melancholy") Point, fair round the Bight, up to Sankral Bazaar. Ebb sets strong into Raj Gunj Bight, fair round Sankral Reach, on and off Melancholy Point; with strong eddies off the Point.

Sands.—Sankral Sand begins on the Southern shore above Hangman's Point, or Pansparra;

extends round the Bight, occupying two thirds of the river, and ends a little above Melancholy Point. It is a sand very unsafe to approach, shoaling *very rapidly*.

Marks.—Garden House on with Kyd's Docks, clears the sand off Hangman's Point, nearly down to Raj Gunj. Two *tall* trees at Garden House Point, on with Superintendent of Marines House, clears upper part of Sankral Sand

Proceed down round the Bight, at a distance of 70 or 80 yards off the shore, keeping your lead going *on the sandy side*, and keeping Hangman's Point open with the large trees off the Doctor's House till a little below Raj Gunj.

Budj Budj Trees open off Melancholy Point, clears this Sand.

JAR MAKER'S REACH

Commences at Melancholy Point, and terminates at Coffree Point.

Course.—S. W. b. S, round to West.

Soundings.—From Melancholy Point to Jar Maker's, 9 to 11 fathoms; from Jar Maker's to Peer Serang, 5, 6, 7, shoaling gradually as you approach the sand. Bank bold.

Tides in this Reach are irregular, with eddies off the Point.

Sands.—Melancholy (or Moonekolly) Sand extends from Melancholy Point to Peer Serang; the widest part being a little below the cocoa-nut trees, occupying two-thirds of the river, and opposite Jar Maker's one-third; the channel lies on the South shore, which is steep.

Between Peer Serang and a creek on the North shore are two or three bad patches.

Marks.—Sankral Bazaar open with Melancholy Point, clears the head of Melancholy Sand.

In steering from Melancholy Point do not keep away for the cocoanut trees till you open Jar Maker's

As soon as you see Budj Budj Trees open with the Point you can stand to Jar Maker's House.

COFFREE REACH

Commences at Peer Serang and ends at Budj Budj

Course—W. b. S to S. W, 3½ miles.

Soundings—In channel, 8 to 10 fathoms; abreast Fort Gloster Mills, 5 to 6.

Tides set fair through this Reach.

Sands—Coffree Sand commences at Lunghee Bunglah, or opposite Peer Serang, and ends in a spit off the North Mill Chimney; the broadest part is abreast Dowko Kol Creek (below Peer Serang, on the Northern shore) and is steep after you cross over from Peer Serang.

Marks—Keep Jar Maker's Bight open, till you get the two Mill chimneys in one; you will then be clear of the Sand.

Keep within 100 yards of the bank, *lead going on sandy side*, until abreast the upper chimney; you may then haul into the middle of the river, until abreast Budj Budj House (known as Bracken's House), then gradually edge on to the Northern bank.

A little above Bracken's House, off the big trees, a Flat runs out, and from the Creek below the House there is another Flat. Also above the Oil Mill (*just above the two chimneys,*) a nasty Flat runs out, called "Dingywallah's Flat," on which you shoal rapidly from 7 or 8, into 3 fathoms.

BUDJ BUDJ REACH

Commences at Budj Budj, and ends at Point Jelly, 2½ miles.

Course.—W. b. S. to W. b. N.

Soundings.—Near the House called Bracken's, or Budj Budj House, 6 to 7 fathoms; and between the House and Point Jelly, 9 and 10 fathoms. Off Point Jelly, 4 to 6 fathoms, shoaling rapidly as you approach the sand.

Tides.—Flood sets from Oollabarriah on to Budj Budj Sand, then into Budj Budj Bight. Ebb, into the Bight, on to Point Jelly, then across to Oollabarriah Creek.

Sands.—Budj Budj Sand extends from Fort Gloster Point to a little above Point Jelly (on opposite shore) or about 2 miles above Oollabarriah Creek. It occupies three-fourths of the river a little above Point Jelly.

Marks.—Upper Fort Gloster Chimney, a little open to the Eastward of the Lower one, clears the spit of this sand

In leaving Point Jelly, proceeding down for the opposite bank, keep the Bight open until abreast of the tall cocoanut trees on the N. W.

shore; then keep along the bank, *keeping the lead going on sandy side.*

OOLLABARRIAH

Commences at upper *Oollabarriah Creek*, and terminates at upper Crossing Creek, 3 miles.

Course.—S W. b. W. to S. b. E.

Soundings. In channel, 8, 9, and 10 fathoms.

Tides.—Both flood and ebb set fair.

Sands —Oollabarriah Sand begins at Point Jelly, gradually extends round the Point, and is connected to Moyapore Sand, which is also connected to Royapore Sand, by a Flat called "Moyapore Flat." Sand occupies three fourths of the river from Seesbarriah to a little below Oollabarriah ; and half a little below this.

Marks —In crossing over from Point Jelly for opposite shore, keep Budj Budj Bight open, until you near the Index Piles ; then keep along the bank, until you come to the marks at the Crossings

MOYAPORE REACH

ommences at the upper Crossing Creek, and minates at the lower Crossing Creek.

Course —S E. b S. to S. E. b E

Soundings, in the tracks, vary very considerably, according to the seasons of the year — *See Surveyor's Reports.*

Tides.—Flood and ebb set fair up and down the *Channel.* but right across the tracks, which

No. 1.—From a little above upper Crossing Creek to a little above Moyapore Powder Magazine

No 2.—From a little below upper Crossing Creek to a little below Magazine

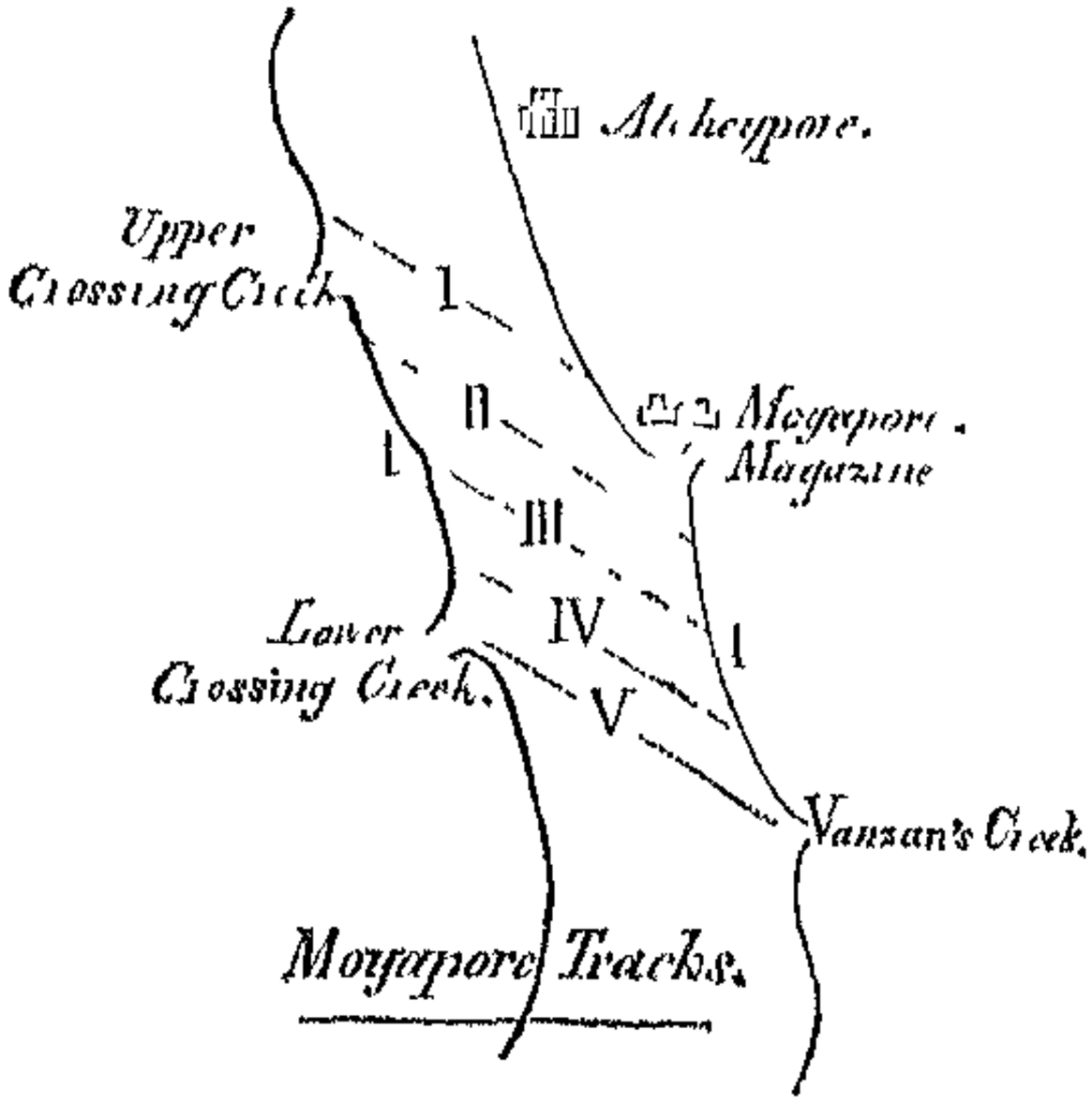
No. 3 —From Mark to Mark.

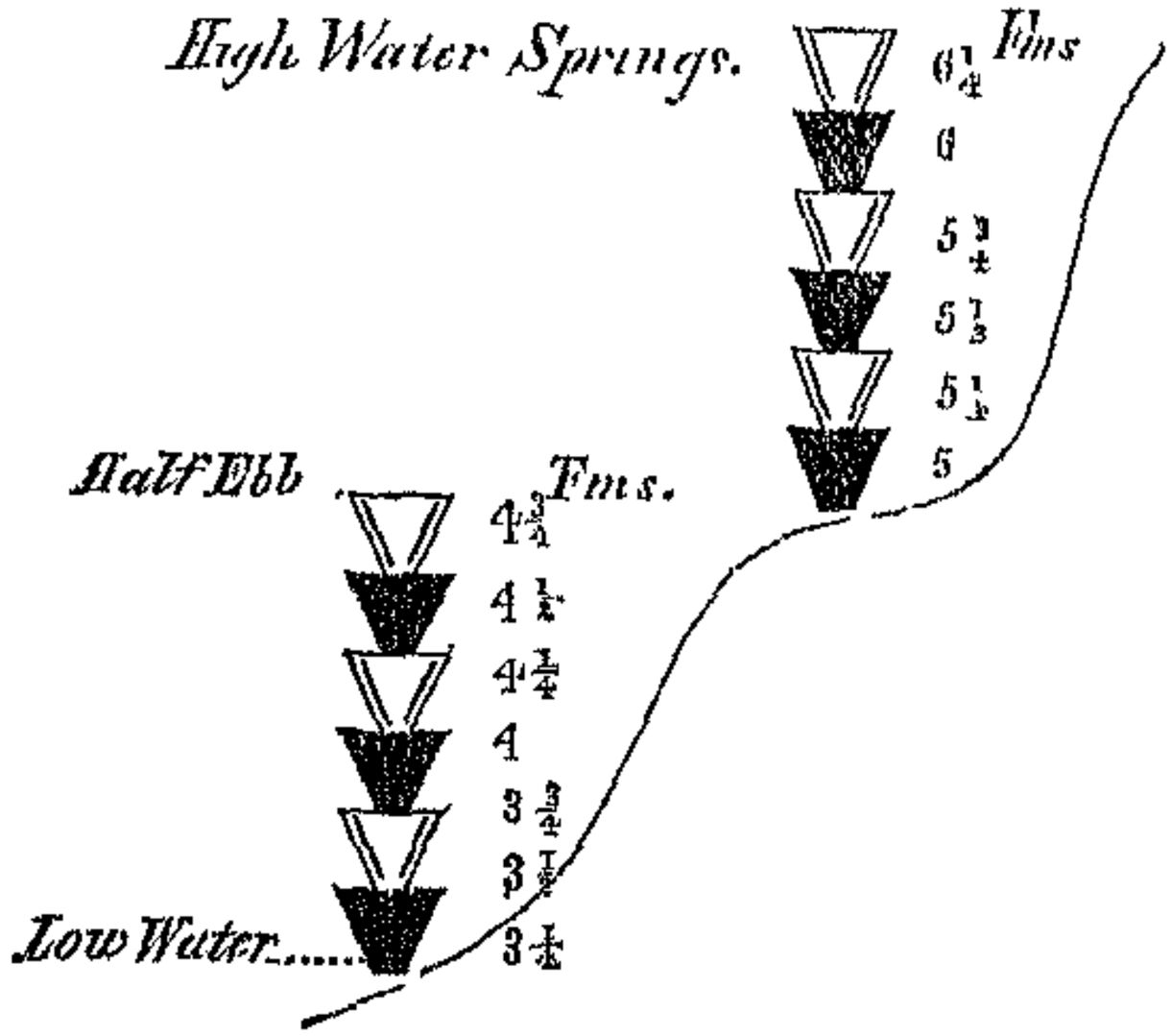
No. 4 —From a little above lower Crossing Creek to a little above Vanzan's Creek

No. 5 —From lower Crossing Creek towards Vanzan's Creek

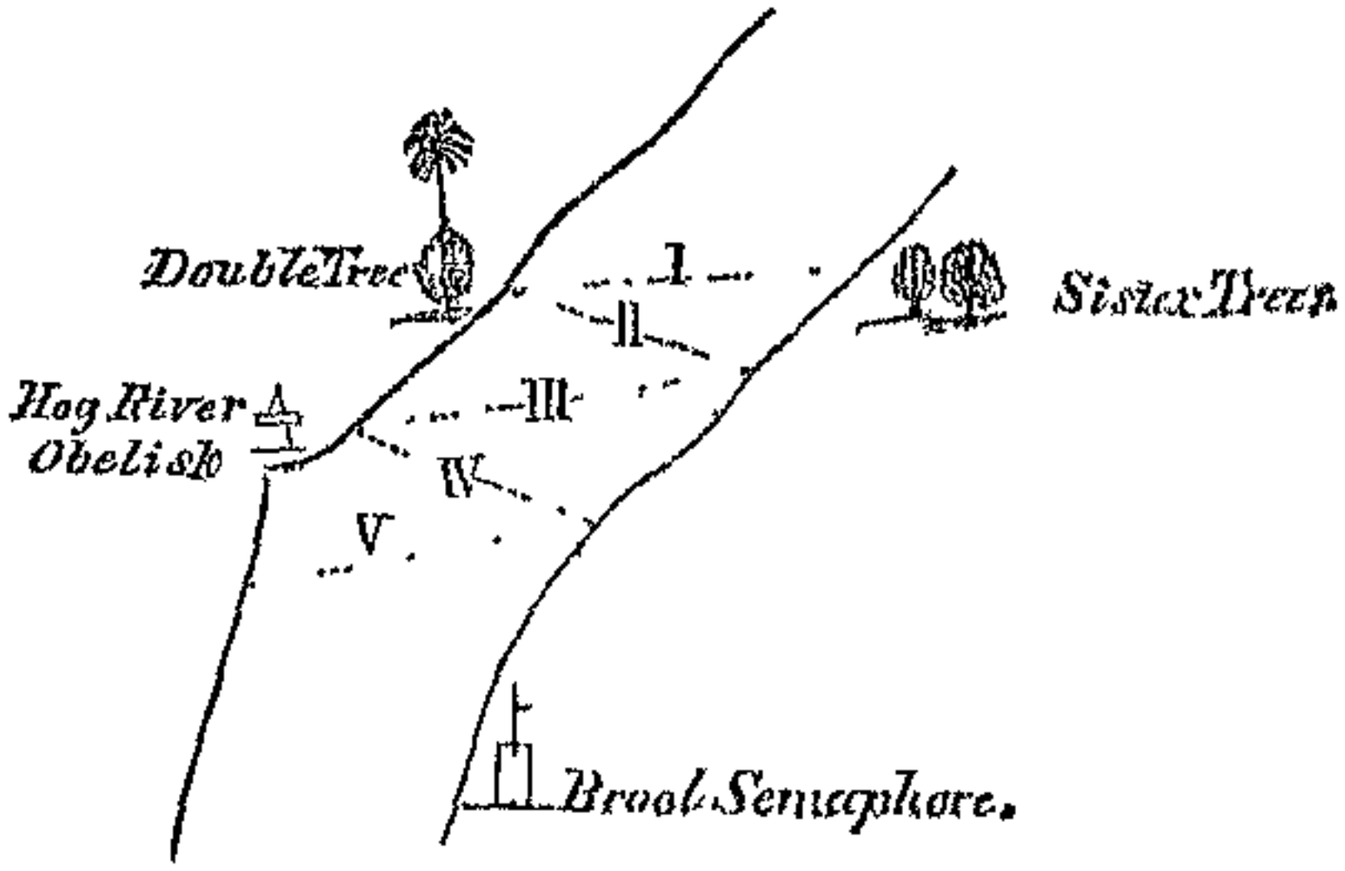
ROYAPORE REACH

Commences at Heeragunj Point, and terminates at Brool Point, 5 miles.





The Index Piles are not the same in all parts of the river, in some the notches are 12 inches, in others 18 inches, in length. *(See River Surveyor's Reports.)* To tell the rise or fall of tide, is to deduct the number of notches appearing *above* water from those *below*.



Royapoor Tracks.

Course—S. b. W. to S. W. b. W.

Soundings.—In mid channel 9, 10, and 11 fathoms; shoaling on to the sand, 5 and 6 fathoms, on the flat, $2\frac{1}{2}$, 3, $3\frac{1}{2}$ fathoms.

Tides—Flood tide sets from the Index Piles fair round the Bight, strong on to Devil's Point; ebb sets fair along the bank up above Devil's Point, strong on to this point, fair down the Bight; from Index Piles, on to the head of Brool Sand, then across towards Hog River.

Sands.—Royapore Sand begins a little below the lower Crossing Creek, and extends down to midway between Sister Trees and Brool Point; and is connected to Brool Sand by a ridge called Royapore Flat, there is a small Flat a little below Devil's Point.

Marks.—The channel runs along the Eastern bank, to a creek a little below the Sister Trees; then crosses over to Hog River. The sand occupies better than half the river; and from abreast Devil's Point, to below Royapore village, it is very narrow.

A Flat runs off Vanzan's Creek; the mark for clearing which is, *not to shut in Vollabamiah Bazaar* with Atcheepore Point At night you can see the lights in this Bazaar, so do not shut them in. The Royapore Tracks, for which notice *Surveyor's Reports*, are as follows—

No. 1.—Sister Trees to Double Tree.

No. 2.—Below Sister Trees to Double Tree.

No 3.—Below Sister Trees to Hog River Obelisk.

No 4—Midway between Sister Trees and Brool Semaphore, to Hog River Obelisk.

No 5.—Midway between Sister Trees and Brool Semaphore, to a little below Hog River Obelisk.

South-west monsoons, Nos 4 and 5, are in general use. North east monsoons, Nos. and 2

HOG RIVER REACH

Commences at Hog River Creek, and ends at Hog River Point, 3 miles.

Course.—S W. b. S to S E.

Soundings.—In channel, 7, 9, and 11 fathoms, shoaling rapidly on to the sand.

Tides.—Both flood and ebb set fair up and down this short reach; the ebb sets on to Hog River Point, and then off it into Fultah Roads.

Sands.—Brool Sand (sometimes styled Hog River Sand), extends from a village between Sister Trees and Brool Point, to a little above Fisherman's Point. After crossing over to Hog River, it occupies two thirds of the river.

Marks.—Fultah House open with Fisherman's Point, clears the edge of Brool Sand. Proceeding up, you can begin to cross over towards Sister Trees when you open Hog River Creek, just below Hog River Obelisk. Proceeding down after crossing over to Hog River, keep along the bank from 60 to 80 yards, *with the lead going on sandy side*, as the sand is very steep, shoaling from 6 into 2 fathoms, and is in many parts dry at low water

FULTAH REACH

Commences below Hog River Point and ends at Fultah Point, 5 miles.

Course—S b. E. to S S. W.

Soundings.—In channel, 6 and 8 fathoms; off Fultah Point, and above it, 9, 10, and 11.

Tides.—The flood tide sets up the back of the sand (where it makes *first*), and on to the point; then fair up the Bight on to Fisherman's Point. Ebb sets on the head of the Sand, then down the Bight on to the Point, and off into Nynan; *it makes down first at the back of the Sand.*

Sands—Fultah Sand commences below Hog River Point, and extends down to a little above Fultah Point: the upper part occupies $\frac{1}{3}$rd of the river; *the lower or that between the North-ern point of the Damoodah, called "Dhaja," and* Fultah Point, $\frac{3}{4}$ths of the river; it is very steep to approach, shoaling rapidly. A small Flat exists below Fisherman's Point, also one above Fultah Creek.

Marks.—Shibgunge Mark just open with Fultah Point, clears the spit of the Sand. Fisherman's Point on with Hog River Obelisk, clears the spit of the Sand off the House.

With Fultah Creek open, you may stand across Fultah Sand *in a light ship.*

Hyma Tree on with Dhaja Semaphore. It is imprudent to venture round Fultah Point in the strong floods before the tide breaks.

The channel runs in a direct line, from Hog River Point to Fisherman's Point; and then along the Eastern bank down to the point.

NYNAN

Commences below Fultah Point and terminates at Lower Nynan Mark. $3\frac{1}{2}$ miles.

Course.—S. S E to S. S. W.

Soundings—Four, 5, and 6 in the best anchorage.

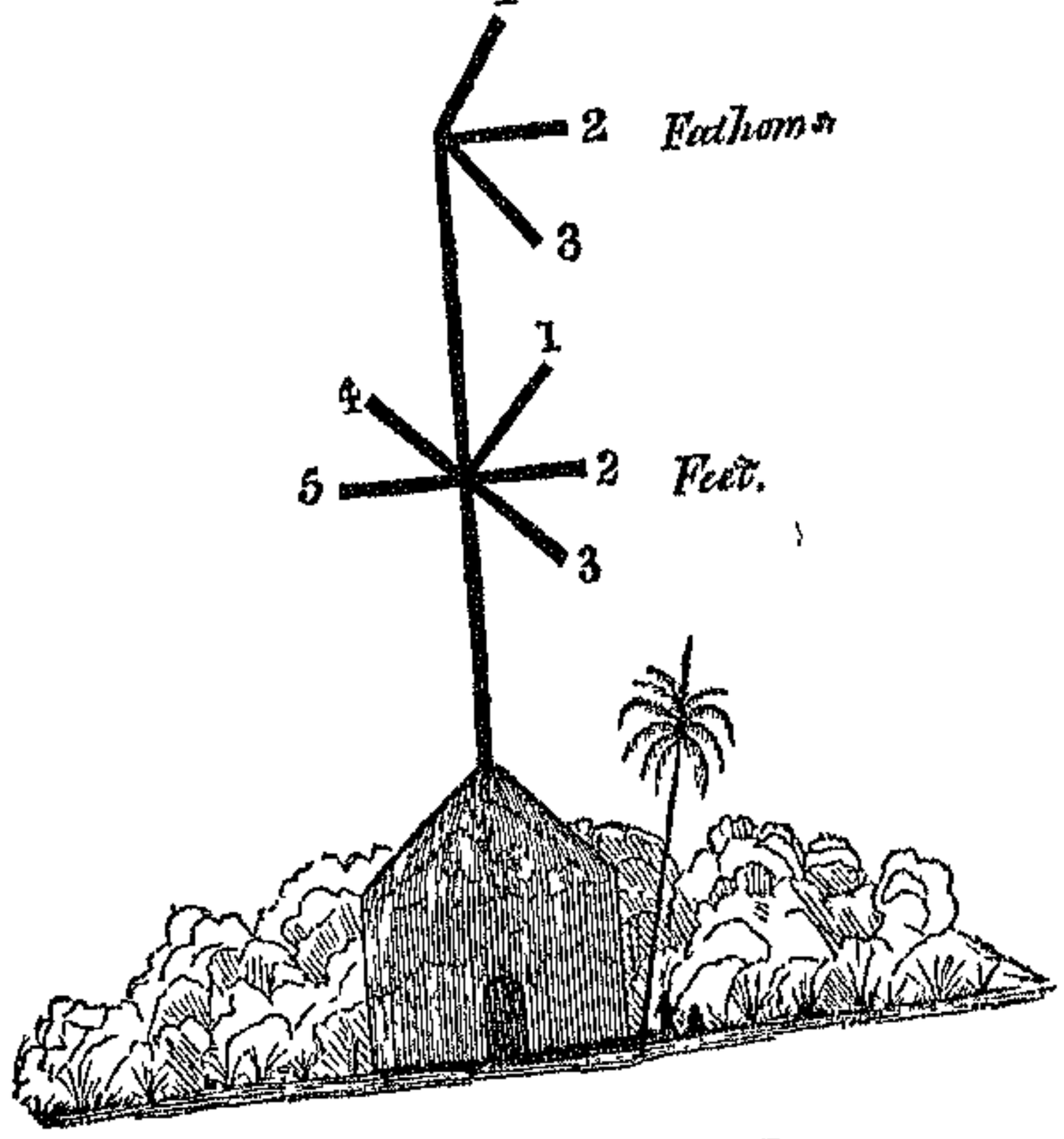
Tides.—Generally irregular; that is, that there is no regular rush, but at times stronger or weaker than at others; with strong eddies, especially below Fultah Point and abreast of it. Flood sets on to Fultah Sand. Ebb sets on to Shibgunge Point, then on to Muckraputty Lumps

Sands.—Nynan Lumps (which are worse at some times of the year than at others), extend generally from below Fultah Point down to the Nynan Marks; but some years disappear. A Flat runs down from Fultah Point, on the Eastern bank of the river, to Noorpoor Point, where it continues, and eventually joins Hooghly Point Sand. It is broadest between Nynan Marks and Fultah Point. It is known by different names in different places.

Shibgunge Sand, on the Western side, begins at the Southern point of the Damoodah River, extends right down, and is at last joined to the Muckraputty Lumps, forming the bar to the Western Gut. It is broadest midway between Shibgunge Mark and Southern point of the Damoodah. Tumlook well open with Shibgunge Point, will keep you clear of the edge of this Sand. It is very unsafe to approach.

Marks—Going down Nynan, keep about the centre of the river until abreast of Nynan Marks; then edge in for the Eastern bank, by keeping Anchoring Creek Obelisk a point on the port bow: or "Marks on." When on the edge of the ridge, then Falah Point is in one with

Dhaja Point. Coming down, after rounding Fultah Point, keep it well open with Fultah House, till you open Nynan Creek (*not Anchoring Creek*), you are then clear of the Lumps.



TIDAL SEMAPHORE.

The lower arms show *feet* only, as ⊣ 5 feet, ⊢ 3 feet,

Th upper arms show *fathoms*, as ⅄ 3 fathoms (or 18 feet), Γ 2 fathoms or 12 feet.

To show any number, above feet, *in feet*, is done thus: ⅂ 15 feet, that is, 2 fathoms (or 12 feet) *above* and 3 feet, *below* = 15 feet.

Anchorage.—Keep nearly in the centre o the river. Fultah House well open with Fultah

Point. Keep the mouth of Anchoring Creek *nearly open*, and anchor in 5 or 6 fathoms. It is not at all advisable to anchor here *(especially in a deep ship)* in the strong floods or freshets; or in the springs at any time of the year, in consequence of having to encounter the whole force of the tide, along with the eddies, which are sometimes very strong. Always anchor at Fisherman's Point, or even above Tultah House, when practicable.

The Anchoring Creek Ridge Tracks are as *follows*:—

No. 1.—A little to Southward of the Lower Nynan Mark.

No. 2.—Midway between the Lower Nynan Mark and the Anchoring Creek.

No. 3.—Abreast of the Anchoring Creek.

No. 4.—A little to the Southward of the Anchoring Creek.

The "Creek to Creek" Tracks are:—

No. 1.—From Lower Noorpoor Mark towards Hope's Obelisk.

No. 2.—From Noorpoor Creek toward Hope's Obelisk.

No. 3.—A little to the Southward of the last line.

It is almost impossible to keep in these tracks as they lead directly across the tide.

JAMES AND MARY'S

Commences below Noorpoor Point and terminates below Hooghly Point.

Course.—Through the two passages known as "Eastern Gut" and "Western Gut," S. W. and N E.

Soundings.—Irregular, according to the different seasons of the year. In the Eastern Gut *(not on the bar)* 3, 4, and 5 fathoms. In the Western Gut *(not on the bar)* 6, 7, 8, and 9 fathoms For water over the bar, see *daily reports*, Master Attendant's Office.

Sands.—Besides the Nynan Lumps, Shibgunge Sand, Anchoring Creek Ridge, &c., is a very extensive lumpy sand known as "Muckraputty Lumps,' commencing from a line drawn from Shibgunge Point to the Anchoring Creek, and terminating a very little above the Muckraputty Buoy. These Lumps are in the centre of the river, with a channel on either side of them On the Eastern and Western bank of each of these channels is a Flat, in some places extending well out, requiring care and attention to the marks; which last are further on.

Tides.—Flood tide sets strong on to the Muckraputty Lumps, across into Western Gut, and up the Roopnaraun River. Ebb sets strong on to the Hooghly Sand, and it makes down in the Roopnaraun before it does in the James and Mary's.

Marks—Eastern Gut Tracks are:—

No 1.—The two Noorpoor Marks in one.

No. 2.—Lower Noorpoor Mark between the Upper Noorpoor Mark and Anchoring Creek Obelisk.

No 3 —Lower Noorpoor Mark on with Anchoring Creek Obelisk.

No. 4.—Anchoring Creek Obelisk just clear to the Westward of the trees at Noorpoor village

Western Gut Tracks are :—

No 1.—Upper Nynan Mark on with two tall cocoanut trees, in the bluff next to the Southward of the Double Tree.

No. 2.—Upper Nynan Mark on with the Double Tree.

No. 3 —Double Tree midway between the two Nyman Marks.

No 4 —Lower Nynan Mark on with the Double Tree.

N. B —Tracks Nos. 2 and 3, in the Eastern Gut, cannot be brought on, *above the Round Tree*, above Hooghly Point. Track No. 4, Eastern Gut, cannot be brought on *above Hooghly Point.*

The Eastern Gut opens out in August and closes in March. The Western Gut closes in July and August, and opens out in February and March. In other words, the Eastern Gut opens in the freshets and closes in the strong floods, and the Western Gut, "*vice versâ*" The freshets and strong floods do not make *(exactly)* at the same time every year, but nearly so.

When the Eastern Gut is bad, the Anchoring Creek and the back of the Hooghly are good. The general mark for running through the Eastern Gut is No. 1 Track; two Noorpoor Marks in one.

Going down Eastern Gut, good anchorage waiting for the tide, is below the Index Piles; Anchoring Creek open, about sixty yards off the shore.

Marks.— After crossing Anchoring Creek Ridge, going down, keep 80 or 90 yards off the bank, till below Anchoring Creek, then 40 to 50 yards off, down to Noorpoor Point, then steer for the Muckraputty Buoy, until you get the Eastern Gut Track Marks on; if the buoy should be washed away, then steer for Tumlook Pagoda, commonly called "Gowankholly Temple."

When you open the North bank of the Roopnarain, you are clear of the head of the Hooghly.

A very useful mark in the freshets, as the ebb tide sets strong on to the head of the Hooghly Sand.

To know when you are out of the Eastern Gut, and clear of the Muckraputty Lumps, is when you open Diamond Harbour with Hooghly Point.

To clear the sand off Noorpoor, keep Noorpoor Point just open with Hooghly Point.

A pilot is not supposed to enter the Eastern Gut till half flood, as then the strength of the tide breaks and disperse the eddies.

Hauling into the Eastern Gut, to clear the flat above Hooghly Point, keep Single Tree clear of Noorpoor Point

Beebee Domingoe's Point and Beebee Domingoe's Tree in one, clears Beebee Domingoe's Lumps.

If you can find sufficient water proceeding up, always use the Western in preference to the Eastern Gut, as you generally meet an ebb tide in the latter, though a strong flood may be running up the former: this rule applies also to hauling into the Eastern Gut on a strong flood tide, to avoid drifting on to the Muckraputty Lumps; especially when without steam, or with a weak steamer.

The lowest anchorage in Beebee Domingoe's Hole, is the lowest Creek open with Hooghly Point Semaphore. Anchoring Creek shut in with Beebee Domingoe's Point (or Noorpoor Point,) clears the head of the Hooghly.

Western Gut Marks —To enter this Gut, coming down, proceed down, edging in for Anchoring Creek, till below Nynan Marks; then get the marks on for the track you mean to use, till you deepen across the bar, which will be between the two Noorpoor Marks.

Shibgunge Point on with Fultah Point, clears the Muckraputty Lumps

Shibgunge Point on with False Point, clears Fort Mornington Flat.

The mark for entering the Western Gut, is Shibgunge and Fultah Points in one.

The general track for running through, is No 3 track; Double Tree midway between the two Nynan Marks.

The limits for working ship are, between the track marks; that is, to get No. 1 mark on standing to the Westward, and No 4 standing to the Eastward. Standing on to the Western

bank, you must not form False Point. Luffing into the Western Gut, Muckraputty Buoy on with the Round Tree above Hooghly Point, clears the Muckraputty Lumps. It is easier hauling into the Eastern Gut, coming up the back of the Hooghly, than from Hooghly Bight

The James and Mary's was once in so bad a state, that a man could walk from Hooghly Point to Shibgunge Point; and has not been so bad since, as it was in 1854, in which year it was very bad.

HOOGHLY BIGHT

Commences at Tumlook, and terminates at Luff Point

Course.—S. E. to E. b. N.

Soundings.—In channel, 10, 12, and even 14 fathoms; shoaling rapidly on to the sand. Bank bold.

Tides set fair in the Bight and at the back of Hooghly Sand On the flood strong eddies off Luff Point and in Puppie's Parlour (a Bight above Luff Point)

Sands—Hooghly Sand commences at Hooghly Point and extends to Puppie's Parlour, but not below it. This sand is steep and dangerous to approach. There is a channel between the North edge of it and the North bank, styled "Back of the Hooghly," where the soundings vary according to the different seasons

Marks—For going up the back of the Hooghly, Buffalo Point open with Luff Point.

For standing on to the Hooghly Sand, in Hooghly Bight, is Diamond Harbour Custom House shut in with Luff Point. Centre part of Hooghly Bight go by your lead

In crossing over from the Eastern Gut, you clear the head of the Hooghly, when you get Muckraputty Lump Buoy on with Hope's Obelisk: this Obelisk is in the Western Gut

Also, Tumlook Point on with a conspicuous tree on the Northern bank of the Roopnarain River

The mark for crossing over from Hooghly Bight to the Eastern Gut is, when you open a large creek (in the Bight) known as "Teetool-baniah Creek;" or when you get Hooghly Point on with Fultah Point.

A good mark for hauling into the Eastern Gut, on a strong flood tide, is to keep the Muckraputty Buoy on with Hope's Obelisk

LUFF POINT TO HOSPITAL POINT.

Course—E. N. E and W S W.

Soundings. In channel, 9, 10, and 11 fathoms.

Tides. Flood and ebb both set on to these points, as well as on to the Diamond Sand below. Strong eddies off both these points.

Sands—Cookrahattee Lumps lie between Luff and Buffaloe Points (Buffaloe Point is the next point below Luff Point, on the same side of the river as the latter.) A Flat extends from below Roychuck Tree to Hospital Point. Go by your lead.

Marks.—Hospital Point on with Diamond Harbour (*Custom*) House, to the Northward. Coming up, by keeping your Luff on the Diamond Sand, till you get to Buffaloe Point, you steer *direct for Luff Point*, keeping your lead going *on the shore side*, you will go up at the back of these Lumps. When Roychuck Tree (a conspicuous *single* Cocoanut Tree on the north bank, above Hospital Point) bears N ½ E. or N. b. E., you are clear of these Lumps.

First Creek below Luff Point, *open*, is also a mark.

DIAMOND HARBOUR.

Course.—E. b. S. to S. b. E.

Soundings.—In channel, 8, 10 and 12 fathoms.

Tides.—Flood and ebb set fair.

Sands.—Diamond Sand begins at Buffaloe Point, and terminates at Diamond Point, occupying two-thirds of the river, and is dry in many parts at low water.

Marks —Standing on to the sand above Diamond Harbour House, is Luff Point on with Tumlook trees. Abreast the House, Luff and Buffaloe Points in one

Standing on to the Diamond, above Diamond Harbour Creek, you shoal *gradually* ; but below, suddenly. North bank very steep, may be approached to within 100 yards.

To clear the small Flat abreast of the Custom House is, *not to shut in* a clump of trees, below Hooghly Point, with Hospital Point, until you are below a single tree abreast the Flat.

CANTERBURY REACH

Commences from Diamond Harbour Creek, and extends to Canterbury Point

Course.—S. E. b. S.

Tides.—Flood sets strong round the Reach. Ebb strong into the Bight, on to Canterbury Point, round, and then fair into Culpee Roads.

Sands.—Diamond Sand,—*very steep.*

Marks.—Standing on to the Sand above Canterbury Point, is the point on with a clump of trees to the South of Culpee Pagoda.

Abreast of Chingree Kol, Canterbury Point on with Culpee Pagoda.

Bank very bold; deep water in mid channel.

CULPEE ROADS.

From Canterbury Point to abreast Culpee Pagoda.

Course.—N. b. E. and S b. W.

Soundings.—Abreast and below Canterbury Point, 7, 8, and 9 fathoms; abreast Jiggorkolly Semaphore, 4, 5, and 6 fathoms.

Tides set fair up and down the Roads.

Sands.—An extensive Sand begins a little above Jiggorkolly Semaphore, to the Westward, encroaching further to the Eastward as it goes to the Southward; it eventually joins the Jellingham Sand.

A Flat runs down on the Eastern bank, from below Canterbury Point down to Deep Water Mark; and between this Flat and the Sand to

the Westward, is the Rangafulla Sand, extending right up to nearly abreast Jiggerkolly Semaphore

Marks In standing to the Westward in Culpee Roads, you shoal gradually, and to the Eastward rapidly. Mark for standing to the Eastward, is Canterbury Point on with Diamond Harbour.

Above Culpee the sands are subject to various periodical changes, which depend on the tides. When the flood tides are strongest (or from March to June) the heads, or upper parts, of the sands extend further up, and are generally steep When the ebb tides are strongest (or from July to October) the heads of the sands wash away, and the tails, or lower parts, extend further down, and are likewise steep

The only parts above Culpee where the channels are materially affected by the above changes, are the James and Mary's, and Moyapore and Royapore Flats.

During the period when the floods are strongest, the Western Gut is open and the Eastern Gut is closed; and the best places for crossing Moyapore and Royapore are in the upper tracks.

When the ebb tides are strongest the Eastern Gut is open and the Western Gut is closed; and the best places for crossing Moyapore and Royapore are in the lower tracks.

These are the usual changes, and their progress is gradual, but they are invariable, particularly at the James and Mary's.

The two Cuts in the James and Mary's have been known to keep open throughout the year; but both are seldom closed or open *together*.

Moyapore and Royapore can least be depended upon when in their transition state, or in the months of February and July.

RANGAFULLA CHANNELS.

These channels are subject to great, rapid, and uncertain changes; depend chiefly on the *River Surveyor's Reports*, and the charts published by him, at the Master Attendant's Office.

At present the marks for the Inner Rangafulla Channel are these. Proceeding down, gradually edge into the Eastward, till you get a small *Nun* buoy on with Canterbury Point; with this mark you can go right down to midway between Culpee Pagoda and Deep Water Mark. The Rangafulla Island Mark, on with a large round bushy tree to the South of Rangafulla Obelisk, is also a mark. From a little below Rangafulla Obelisk, the mark is, not to shut in Middle Point with Silver Tree Point.

In the outer channel go by the buoys, the *River Surveyor's Reports*, and the charts published by him, at the Master Attendant's Office.

MUD POINT CHANNEL.

Course.—N. N. E. and S. S. W.

Soundings.—2, 2½ to 4, and 4½ fathoms, low water springs.

Sands.—Jellingham Sand to the Westward, and Mizen Sand to the Eastward.

Marks—*See River Surveyor's Reports and Charts* Standing *in*, below Mud Point, is Mud Point mark on with Silver Tree Obelisk.

Best anchorage is U E. M P. Buoy, bearing S W. by S, in from 4 to 4½ fathoms, low water springs.

SAUGOR ROADS

Course—South to S S E.

Tides—Flood and ebb set towards Saugor Flat and the Long Sand

Soundings—Five to 6 fathoms to the Westward, on the edge of the Long Sand, and 8 to 9 to the Eastward, on the edge of Saugor Flat

Sands—The Long Sand; which extends from below Cowcolly down to the Anchoring Buoy, and from thence to the Reef Head, is steep and unsafe to approach; lies on the Western side of the channel, the Eastern edge of which is marked by red buoys, and Saugor Flat, on the Eastern side of the channel, the Western edge of which is marked by black buoys.

Marks.—Below L. S. S Buoy, get it to bear N b W. before going about, and about S b. E above it.

Never stand into less than 9 fathoms abreast Saugor Lighthouse, nor into less than 7 fathoms standing on to the Long Sand; and into 7½ or 8 fathoms off Lower Lloyd's Buoy. The general anchorage, well down the Roads, is Saugor Lighthouse, N. b. E. ½ E, or near Saugor Anchoring Buoy, in 5 or 6 fathoms; centre part of the Roads, Saugor Lighthouse N E ½ E in 9 or 10 fathoms,

or near Long Sand Spit Buoy; and upper part of the Roads, to the Northward of Centre Saugor Flat Buoy, Saugor Lighthouse bearing about S. E in 6 or 7 fathoms. *A ship in a sinking condition will find a favorable place for beaching N. E. of the Centre Saugor Flat Buoy.*

From Upper Gaspar Light, proceeding up at night for good anchorage, the course is N. W. b. N, and when Saugor Light bears N. b. E. ½ E then steer N. b. W. ½ W. till it bears about East Should Saugor Light be out, a good mark is to keep the Lower Gaspar Light about a ship's length open to Eastward of the Upper Gaspar Light, till in 6 fathoms.

When Lower Saugor Flat Buoy bears S. E, Saugor Lighthouse should bear the same, or nearly so. Abreast of Saugor Lighthouse got Saugor Flat Buoy to bear N ½ E.; above the buoy get it to bear S. ¼ W.; 3 miles above it get it to bear S. ½ E.

EASTERN CHANNEL.

Generally go by your lead; 9, 8, and 7 fathoms, standing on to Saugor Sand; 6, 5, and 4, standing on to the Eastern Reef; or get the Lower Gaspar Light to bear N. W. b. N. standing to the Eastward, and N. ½ E standing to the Westward Eastern Channel Light S., standing to the Eastward, and S. E. standing to the Westward. The North Star directly over the Lower Gaspar Light, is a mark for tacking from the Westward to the Eastward.

Between the Middle Ground and Saugor Sand there are 5 fathoms water; between

the Middle Ground and Eastern Reef only 4 fathoms.

With strong Easterly winds, a current or set runs off the tails of the Sands to the Westward, from 2 to 4 knots, according to the strength of the wind ; and with strong Westerly winds, the currents or sets run from 1 to 2 knots to the Eastward.

The current or set breaks considerably in the Northern part of the channel, and is scarcely felt above the Lower Gaspar Light. The flood tide sets on to Saugor Point, and from the Long Sand on to the Mizen Sand.

The best mark for crossing the upper bar of Thornhill's Channel, is Saugor Anchoring Buoy on with Saugor Lighthouse ; or N. b. E. from Upper Western Buoy of Thornhill's Channel.

The position of Saugor Anchoring Buoy should be as follows :—

Saugor Lighthouse	.. ..	N b E. ½ E
„ Bluff .	... ...	N. E. ½ E.
Lower Gaspar Light	. ..	S. E. b. S.

Position of the Upper Gaspar Light.—

Saugor Light	.. ..	... N ¾ W.
U W G Buoy	... ...	West.
C E. G ,	... ...	E b S ½ S.
U. E G. ,	. ...	North.
Saugor Anchoring Buoy	.. ..	N. W. ½ N.

Position of Lower Gaspar Light.—

L E C Buoy (*on with Saugor Bluff*)	N. ¾ W.
U Saugor Sand Buoy	E. S. E.
L W. G. Buoy . .	N. W. b. W ½ W.
Upper Gaspar Light . .	N W ½ N.

To weigh on a spring flood tide from Saugor Roads, in a deep ship, with the wind from the

south westward, cast on the port tack, weigh about ¾ flood, as the tide sets on to Saugor Point, to the N. E, or weigh on starboad tack, fill, stand down, and when you have sufficient way, tack.

When you get Saugor Point to bear N E. b. E., you may steer up Saugor Roads, as you are then clear of the Flat.

When the full moon rises, the flood is in at Kedgeree; water enough to cross the Gaspar.

Coming in at night, get Saugor Light to bear N. E. b N, and anchor in 6 fathoms.

Position of Saugor Anchoring Buoy, in 4½ fathoms low water springs, is as follows —

Saugor Lighthouse and Middleton Point	..	.	N	b E	½ E
Saugor Bluff	..	.	N.	E	⅛ E.
„ Point	..	.	„ E	b. N	½ N
Sidney Point	.	..	.. E.		¼ N.
Spit Buoy Long Sand	...		N. N	W.	¼ W.
Lower Gaspar Light	..	...	S.	E b	S

Working up Saugor Roads, Spit Buoy of Long Sand to bear North and South Upper Eastern Thornhill's Buoy, S b. E, abreast of the Anchoring Buoy, Upper and Centre Western Thornhill's Buoys in one. Standing to the Eastward, Saugor Point N b W.

SIGNIFICATION OF LETTERS.

P R.	..	Pilots' Ridge	Buoy.
S C	..	South Channel	„
L. S. S.		Lower Saugor Sand	„
C S S.	.	Centre „	„
U S. S.	...	Upper „	„
L. R	.	Lower Reef	„
U. R.	...	Upper „	„

SIGNIFICATION OF LETTERS —*(Continued)*

S	..	Spit Buoy.
E. C. L	...	Eastern Channel Light.
L G L	.	Lower Gaspar „
F T.	.	Fairway Buoy of Thermal Ils.
U M G.	...	Upper Middle Ground Buoy.
L M G	.	Lower „ „
L W G.	..	„ Western Gaspar „
L E G	...	„ Eastern „ „
C W G.	..	Centre Western „ „
C E G	...	„ Eastern „ „
U W G.	.	Upper Western „ „
U E G.	...	„ Eastern „ „
U G L.	..	„ Gaspar Light
S Anchg.	...	Sangor Anchoring Buoy.
L S S		Long Sand Spit „
L L.	..	Lower Lloyd's „
C L	..	Centre Lloyd's „
L S F	...	Lower Sangor Flat „
C. S F	.	Centre „ „ „
U S F.	...	Upper „ „ „
A B	.	Apex Buoy.

GASPAR CHANNEL.

U. G	Light from	L G	Light	N W ½ N	Nly.	3 miles.
Sangor	„ „	U G	„	N b W	nearly	11 „
„	„ „	L G	„	N b W.	W.	12 „
„	Anchoring Buoy from	U G	Light	N W ½ N		
U. E.	Gaspar „	„	„	„	N a little Wly.	
U W.	„ „	„	„	„	W ½ S.	
C E	„ „	„	„	„	E b S	
C W	„ „	„	„	„	S E b S ½ S.	
L E	„ „	„	„	„	S E b S ½ E.	
C W	„ „	„	L G	„	N W ¼ W	
C E	„ „	„	„	„	N W. b N Nly	
L E	„ „	„	„	„	N b W Wly	
L W	„ „	„	„	„	N W b W ¼ W.	
U S S	„ „	„	„	„	S E b E ½ E	
U M G	Buoy	„			S ½ E	
C W	Gaspar „	„	L W	Gaspar Buoy	N W ¼ N.	
U W	„ „	„	C W	„	N W ¼ N	
L W	„ „	„	L E	„	S W b S S	
L E	„ „	„	C W.	„	E ¼ N	
C. E.	„ „	„	L E.	„	N W ¼ W W y.	
U. E	„ „	„	C L	„	N N W W y	

GASPAR CHANNEL —*(Continued)*

Saugor Light from „ Saugor Anchoring Buoy		N b. E ½ E
„ Bell „	.	N E E Ly.
„ „ U G Light „	..	N ¾ E
„ „ L Gr „	..	N b W Wly

Least water in the Channel is 17 feet reduced, Low water spring tides. A Westerly track (*i. e*, close to the Western Buoys) will be found the best.

Going down to work over the Gaspar, you will weigh from Saugor Anchoring Buoy the last of the flood (in a deep ship), so as to be there at High water.

Coming in at night you will find good anchorage in Saugor Roads, with the Lighthouse bearing about N E. by N. in 6 fathoms

In a 21-foot ship, you will leave Town the first day of springs, get to Culpee the first day, Mud Point the second, and have good tides to work out from Saugor. In the months of March, April, and May, without steam, you will leave Town the day after full and change, so as to have good strong tides to get down the narrow reaches.

In the Freshets, you will leave Town, without steam, on Quarter-Day, will not have such strong tides in the narrow reaches, and have good tides to go out from Saugor. The least water across Saugor Sand at the following places is—

Pilot Light Buoy	..	6 fms
Between U Reef and L Reef Buoy	.	3½ „
„ U Saugor and C Saugor	3 to 1	„
Spit Buoy	.	3½
Lower Middle Ground Buoy		15 feet

The least water across the Eastern Roofs at the following places is :—

E C Light Buoy	... 6 fms.
Between U Roof and L. Roof Buoy	.. 4 ,,
Spit Buoy	. 17 feet.
Abreast F T Buoy	. 7 ,,

Anchorage in Hooghly Bight, a little above Puppie's Parlour. To weigh from there, with a strong flood, drop close into the Bight, and with a S. W. wind brace up after yards on the *starboard tack*, and keep your head yards square.

Towing down the James and Mary's on a flood-tide, with the steamer lashed alongside, have her on the starboard side; on an ebb tide on the port side; as, in taking a sheer, the steamer alongside will always better *force* the ship round *against* the tide, than she will *pull* her round against it

In crossing James and Mary's with the steamer ahead, on an ebb-tide, you part your *starboard* hawser, you cut the other, and let go both anchors; if on a flood tide, you can go on; and *vice versâ*.

Coming down in tow of steam, rounding Fultah Point, you meet a ship coming up, also by steam, port your helm, and go towards the sand, rather than trust to the *chance* of escaping a collision, which is almost inevitable, both ships meeting in an eddy.

POINTS IN THE RIVER.

Fort	Point	East
Sumatra	,,	. West.
Cambridge's	,,	. East
Garden House	,,	.. West.

POINTS IN THE RIVER.—*(Continued)*

Hangman's	Point	.	East
Monckolly	,,	..	West.
Jai Mistri's	,,	..	East.
Coffree	,,	.	,,
Port Glosters	,,	...	West
Bud Budj	,,	.	East.
Pointjely	,,	...	,,
Atalcepore	,,	...	,,
Heeagung	,,	..	West
Davis	,,	..	East
Royapore	,,	...	,,
Hog River	,,	...	West.
Fisherman's	,,	...	East.
Tultah	,,	...	,,
Dhaja, or Old Tultah	,,	...	West.
Shibgunge	,,	...	,,
Port Morrington	,,	...	,,
Noorpoor	,,	...	East.
Hooghly	,,	...	,,
Tumlook	,,	...	West.
Luft	,,	...	,,
Hospital	,,	...	East.
Buffaloe	,,	...	West.
Diamond	,,	..	,,
Canterbury	,,	..	East.
Middle	,	...	,,
Silver Tree	,	...	,,
Mud Point	,,	...	,,
Kedgeree	,,		West.
Black	,,	.	East.
Middleton	,,	..	,,
Pitts	,,		,,
Saugor	,,	..	,,

These Points are not *strictly East* and *West*, but *right* and *left*, coming up the river.

RISE OF TIDE

AT THE FOLLOWING PLACES —

Roof Buoy	..	.	18 foot
Upper Floating Light	.. 24 miles	.	13 ,,
Middleton Point	18 ,,	.	14 ,,

RISE OF TIDE *(Continued)*

Kedgeree	.	14½ miles	16 feet.
Mud Point	...	8 „	. 20
Culpee	.	12½ „	. 20 „
James and Mary's		11½ „	.. 9 „
Fultah		6½ „	17 „
Hog River		5 „	14 „
Myapore	..	8½ „	... 15 „
Bud Bud		6 „	. 17 „
Jar Maker's		4 „	.. 17 „
Cooly Bazaar	.	13 „	... 18 „
Bankshall	..	3 „	... 16 „

From 3 days after full and change to 3 days before full and change, the river is generally 5 feet above the lowest level.

When the moon is in Apogee the tides are variable, and not so strong as when in Perigee.

In the month of March, when the tide begins to fall, the average is 1 *foot in* 12 *minutes.*

Anchorages in the Freshets and weatherly positions in the South-West Monsoon. Gene rally at the back of the tails of the Sands; under the lea of Fisherman's Point; from abreast of Fultah House to a large round tree in the village; a little above Devil's Point; and below Vanzan's Creek, in about 5½ fathoms, not too far in, to avoid the flat, you ride an easy tide. Off Pointjelly is passable; Coffree Reach is bad for eddies and burying anchors At the tail of Melancholy Sand; weigh last of ebb, as the flood sets right across the Sand; not off Puppie's Parlour, during the Freshets, nor off Nyman to the Westward.

MISCELLANEOUS.

The tides in the channels leading into the Hooghly, uninfluenced by wind, apparently set

round the Compass 1st quarter flood W. N. W round by North, last quarter E N. E.; 1st quarter ebb E S. E. round by South; last quarter W S W. The great body or strength of the tide running in the direction of the channels, about N N. W. and S S E. at the rate of from 2 to 3½ knots per hour, on the springs (often more), and on the neaps, or weak tides, from 1 to 2½ knots per hour; the greatest rise and fall being 12 or 13 feet at the Lower Gaspar Light, and 9 feet at the Eastern Channel Light, where it is High water, on full and change day, at about 9 hours.

It should never be attempted to go in from sea with the wind East or West, after or during the Freshets, when the sets are strong. A careful Pilot will not leave Saugor with the wind East or West in the S. W. Monsoons.

With Easterly winds there is always a set of current to the Westward, stronger in neap tides than in springs, and generally felt more during the Freshets.

There is more set with Easterly winds than with Westerly, on account of the Sands to the Eastward inclining that way

When you can hear the breakers on Saugor Beach, a true sign of Easterly winds; particularly if the weather is clear and the Barometer high.

To know if you are shoaling on to the Middle Ground or the Eastern Reef (coming in after bad weather, with neither lights nor buoys for a guide), if on the Reef, from the mast-head can be seen the Reef Head Breakers N. N. W.; if on the Middle Ground, they are not visible.

Coming in after bad weather from sea always take daylight for going into Saugor, as the lights and buoys are almost sure to be out of position, if not entirely gone. To tell whether you are in the Eastern or Western Channel, in the absence of lights and buoys, stand to the Eastward, and you will deepen, to the Westward, and you will shoal, if in the Eastern Channel; but very gradually if in the Western.

Steering E. N. E. from False Point (distant 10 or 15 miles), the soundings will gradually increase to 23 fathoms on the Eastern edge of the Ridge. The soundings to *seaward* of the Ridge are generally a greenish or olive-colored mud, with occasionally a few bits of broken shells, while those *on* the Ridge are of a shelly sand or small gravel, chiefly of a reddish or rusty brown colour.

North end of Pilots' Ridge, sand, red specks and shells, 20 to 23 fathoms. Centre of Ridge, sand with black and reddish specks and shells, 17 to 20 fathoms. Southern end of Ridge, coarse amber-colored sand and broken shells, 15 to 18 fathoms. Rise and fall of tide, 8 or 9 feet.

In the months of November and December there is a strong set from N E. of from 1½ to 2 knots, round Point Palmyras and False Point; and in making the latter, from the Ridge Light, in those months, endeavour to make the Northward of Dowdeswell's Island, as, if you make the Southward, it will be difficult and tedious getting to the Northward again.

In the months of May, June, and July, when strong South-Westerly winds prevail, there is generally a strong set to the Eastward in the Eastern Channel; and in August, September, and October, with Easterly winds prevailing, there is generally a strong North-Westerly set towards the Pilots' Ridge.

The distance from the Ridge Light to False Point is from 60 to 63 miles.

In the month of March, the current is reverse to what it is in November, and it is as hard to *make* False Point, as in November it is to get away from it, and get to the Eastern Channel.

Being caught in a gale of wind from the Eastward, on the Ridge, or indeed anywhere to the Westward, the best place for beaching a ship is False Bay (*i. e*, between False and Palmyras Points), as you have then some 15 miles of beach to do so on, and can run the vessel almost on to the land, at high water.

This would be done oftener, had people a better knowledge of the Western Coast than they have.

In Balasore Bay you cannot go more than 3 or 4 miles from the beach, when you are in 3 or 4 fathoms.

Abreast of False Point you will get 17 fathoms, Ridge Soundings, and will have False Point Lighthouse well in sight.

To know whether you are approaching False Point or Point Palmyras, if the former, you shoal very gradually; if the latter, you shoal

on to Palmyras Reef, very suddenly, going from 13 into 9, 6, and 4 fathoms. Approaching it from the S. E, you go from 15 into 12, 9, 7, and 6 fathoms.

The S W. Monsoon is supposed to commence about the middle of March, and to end about the middle of September, in the vicinity of the Sand-Heads, (directions for sailing in the Bay of Bengal will be found in Captain Heckford's work for the Bay), but it by no means follows that the bad weather is at an end, for October is considered, by many, one of the dirtiest months in the year, and seldom ends without a gale at the Sand-Heads, or cyclone in the Bay of Bengal. The cyclone of 1864 occurred on the 5th of October, and that of 1867 on the 1st of November In another place will be found a small sketch of the weather that usually occurs throughout the year, also the season that the sets generally occur at the Sand Heads and along the Western Coast. The following remarks will suffice to give a clear description how to approach the Sand Heads during the S. W. and N. E. Monsoons, to enable young commanders, and strangers, to pick their way from False Point to the Pilot Brig stationed on the Pilots' Ridge.

Vessels bound to the Sand Heads, during the S. W. Monsoon, generally endeavour to make the land either at the Black Pagoda or False Point; from thence they direct their course to the Pilots' Ridge, or Eastern Channel. The Pilots' Ridge Station is the proper station for ships to pick up the cruising Brig; but

it is not an unfrequent occurrence for ships to pass by, and not take any notice of the Brig stationed there. On standing in to the coast for the Black Pagoda or False Point, the land is very low, therefore not easily discerned, (during this season of the year the atmosphere is frequently very hazy) Commanders of vessels should not stand into less than from 14 to 13 fathoms of water, in this water the soundings will be found to be composed of soft mud, and off False Point, with small bits of broken shells The soundings from seaward to False Point will decrease rapidly, so that great attention should be paid to the lead, and the lesser the soundings, the oftener it should be hove, in small water, say, every half-hour. There is a Lighthouse erected on False Point, and its light is visible at a distance of from 15 to 16 miles, but during dirty weather this cannot be relied on; commanders ought therefore to pay strict attention to the lead, which will be found to be the best guide to the Pilots' Ridge after sounding into 13 or 14 fathoms (soft mud) at False Point, should no light be visible, the commander may safely alter his course to N. E. by E. (Magnetic), when the soundings will be found to increase gradually to 16 and 17 fathoms; Pilots' Ridge soundings will then be found, which will consist of coarse, amber-coloured sand and broken shells. But should olive-coloured mud be found, and the soundings increasing, then the vessel has gone to the eastward of her course, and it should be altered accordingly more to the northward, for the Pilots' Ridge is composed solely of sand and

shells, with black, white, and reddish specks; whilst a little to seaward of the Pilots' Ridge, nothing but olive coloured mud will be found, and the soundings increase rapidly. From False Point to the westward of the Pilots' Ridge, the soundings will decrease from 13 to 10 fathoms gradually, on a N. E. by North course, and no Pilots' Ridge soundings will be found, so that great care should be taken not to stand into less than 13 fathoms, or the vessel will be standing into danger.

After striking Ridge soundings in 16 or 17 fathoms, by continuing to steer N. E. by E. the soundings will be found gradually to increase, until on the northern end of the Ridge 22 and 23 fathoms will be found, but the glare or reflection of the blue light from the Light Vessel stationed on the Ridge, should be seen in about from 19 to 20 fathoms Ridge soundings. This vessel is stationed on the northern end of the Ridge, and a little to the eastward of the middle of the Ridge, in 22 and-a-half fathoms of water, a buoy is placed to mark her station, with P. R. marked on it; this buoy is placed to enable the Light Vessel to regain her station should she be blown off, and also, when at an anchor, to know she is on her station by the bearings of the buoy. The soundings at the Ridge Station are composed of sand with black, white, and reddish specks A Pilot Brig will be found cruising off this station during the S. W. Monsoon, showing a maroon every half-hour, and a bright standing light at her main-royal-mast-head during the night. Her cruising station is with the Ridge Light Vessel bearing

from North to W. N. W. During the day, when an inward bound vessel is sighted, a red flag is hoisted at her main royal mast-head, which signifies "I will give you a Pilot."

The commander of an inward-bound vessel on arriving at the Ridge Station, and finding no Brig there, should steer for the Eastern Channel Light Vessel, where another Pilot Brig will be found, cruising to take the Pilots from outward bound vessels as they arrive at the Sand-Heads; this vessel has a white flag hoisted at her fore-royal-mast-head, to indicate that she is the Buoy vessel; on sighting the inward-bound vessel (if the cruiser is not near) she will hoist the red flag, and supply the vessel with a Pilot. Inward bound vessels should always steer for the Brig with the red flag flying.

When no Pilot Brig is on the Ridge Station, and the commander of an inward bound vessel is bound to the Eastern Channel Light Station, he should get the Ridge Light Vessel to bear W S. W., then steer E. N E, when the soundings will be found to increase, and olive-coloured mud found on the lead · the soundings will increase to about 30 fathoms, after which they will gradually decrease again. A buoy is laid to mark the entrance to the South, or Western Channel, marked S. C.; it is laid in 12 fathoms reduced, and is distant about 10 miles W S. W. from the Eastern Channel Light Vessel; the distance from this buoy to the Ridge Light Vessel is 22 miles, making the distance from Light Vessel to Light Vessel

32 miles. Care should be taken not to be carried out too far on an ebb-tide, or the Eastern Channel Light Vessel will be missed, and the vessel run too far to the eastward. It is therefore desirable to use the log, (or if a patent log is on board, to use it,) so as to enable the commander to estimate the distance run. Should a vessel have run her distance, and find nothing in sight, and the soundings be more than 17 fathoms it will be advisable to steer up North, until the Brig or Light Vessel is sighted, but by no means should the commander of a vessel stand into less than 12 fathoms of water at the Sand-Heads. By paying attention to the lead and log, it is almost impossible to miss the Eastern Channel Light Vessel, after the soundings decrease, keep in from 15 to 17 fathoms of water. If the vessel should get into less water, haul her up more to the eastward, and if she increases her soundings, in like manner keep her more to the northward.

The cruising ground of the Pilot Brig stationed at the Eastern Channel is with the Light Vessel bearing from N. W. to N. N. W, or N. W. On an ebb tide the Brig is generally found with the Light Vessel bearing N E, and on the flood tide standing to the southward; the vessel, during the night, also burns a maroon every half hour, and carries a bright light at her main royal mast head. There is also another Brig at the Sand Heads, during the S. W. Monsoon, whose duty it is to carry the Pilots from the Eastern Channel to the Ridge Station, so as to keep the cruiser stationed there supplied; this vessel during the

not drift out of sight of the Light Vessel. If the vessel should drift out too far, run back again towards the Light Vessel. On the flood, fill the main-topsail and stand to the southward under easy sail; when the light bears about N. W., which will be about the last of the flood, wear round, and stand back again to the vessel's former position Care should be taken not to approach the Light Vessel nearer than from 6 to 7 miles; the blue-light will be an excellent guide for judging her distance; when the body, or blue light itself can be seen, then she is hull up, and is about 6 miles distant. On standing to the southward it is not necessary to be so near, only keep the glare or reflection of the blue light in sight: this manœuvre will answer with the wind from South to W S. W., as it will be the weather side of the Light Vessel the ship will be on; but with the wind anywhere from the eastward of South, it will be the lee side, therefore the vessel will have to be to the eastward of the Light Vessel to be to windward of her.

Now, with the wind from the eastward of South, there is nearly always a set to the westward, so that it is almost impossible to lay down any rule to keep on the station, for the B igs invariably have to anchor to keep on it themselves; but as it is not advisable for ships to anchor during the S. W. Monsoon at the Sand Heads, unless compelled to do so, commanders of vessels should stand to sea on the flood, and come back on the ebb: by those means a vessel can be kept on the station, provided the set is not too strong

Should bad weather be apprehended, a vessel can easily get to sea, until the gale be broken; it has never been known to blow so as to hinder a vessel from obtaining an offing. A S. E. gale would be the worst wind to get an offing with. *No Pilot Brig has ever been known to be lost at the Sand Heads through stress of weather.*

Should it at any time be necessary to anchor at the Sand Heads, the commander of a vessel should avoid anchoring on the Reef, (which he will find by the Chart extends to the southward of the Eastern Channel Light Vessel) as there is always a much heavier swell there than anywhere else. The best place to anchor in the event of a vessel not being able to keep on the station, is to the eastward of the Light Vessel, in about 10 fathoms of water, and about 4 miles distant, Light Vessel bearing from West to W. N. W. Anchoring should be avoided in the S. W. Monsoon, unless in cases of calms, or too strong a set to keep on the station, when it cannot be avoided On the tails of the Reefs, sand, with bright specks, having the appearance of steel filings, will be found.

NORTH-EAST MONSOON.

On a vessel arriving at the Sand Heads during the N. E Monsoon, and the commander finding that he has drifted past the Eastern Channel Light Station, through light winds, sets, or other causes, he will find it difficult and tedious to get back again, unless he has some knowledge of the sets of the tides at the Sand Heads, and how to work them, so as to favour

his returning to the station. To those who are not well acquainted, the following hints will serve as a guide.

The tides at the Sand Heads set round the Compass ;—the first of the flood tide setting to the westward for about an hour, after which it sets fair up-channel, or about N N. W. to North ; gradual y, as the tide slackens, it runs more to the eastward ; and finally, for the last hour, sets about N. E. and E. N. E The tide flows for five hours, and ebbs seven. The first of the ebb-tide sets from E. S. E. to S. E. for about an hour, after which it sets fair down channel, or from S. S. E. to South, running to the westward as the tide slackens, until about the last hour, when it sets about S. W and finishes at W S. W. It must be borne in mind, that when there is a set it entirely alters the tides.

A vessel bound in with a North East wind, missing the station and getting to the westward, will find it almost impossible to get to windward again, until a shift of wind occurs, unless the commander has a knowledge of working tide-works , for the plan of keeping under weigh the whole of the time causes a vessel to lose on the one tide what she has gained on the other ; therefore ship masters ought, as a rule, during the N E Monsoon, before arriving at the Sand-Heads, to bend a stream anchor to one of their bower cables, and get it ready for use , it will be found heavy enough for all requisite purposes at the Sand Heads, and much more convenient to handle than a bower anchor.

We will suppose a vessel has missed the Light Vessel at the Sand-Heads and got to the westward, wind from the North-eastward, and the first of the flood tide; by studying the tides, it will be seen that the vessel will lose ground if she is kept under weigh without anchoring; therefore, if the vessel is in anchorage, and she is on the losing tack, it would be advisable to anchor until half-flood, then weigh and stand to the southward until high water; tack on the ebb, stand back again until half ebb, and anchor, when the vessel so manœuvred will hold all she has gained. By repeating these manœuvres vessels will arrive much quicker at the Sand-Heads than by keeping under weigh the whole of the time; for, by anchoring, the vessel does not lose any of the ground she has gained, whereas, on the other hand, by keeping underweigh, she loses the whole, and sometimes more than she gains.

Commanders of vessels ought not to stand into less than from 9 to 10 fathoms of water for anchorage; in this water good anchorage will be found anywhere at the Sand Heads.

Vessels to the eastward of the Light Vessel with a North-West wind, if late in the North-East Monsoon, will find it quite as difficult to get to windward as those to the westward with a North East wind; therefore it will be advisable to work tide-works to enable a vessel to get to windward. Suppose a vessel at anchor, in from 9 to 10 fathoms of water, with the wind from the North-westward, it will be advisable

to weigh at the last quarter ebb, stand to the southward until first quarter flood, then tack and stand back again into soundings, before the last quarter flood, and anchor; or it might be done just as well by working short tacks, and keeping in soundings Care should be taken not to get out of anchorage on the ebb-tide, for unless the vessel is anchored on the last of the flood, she is sure to lose all she has gained during the tide's work Ships have frequently been known to get jammed, either to the eastward or westward, according to the wind, for days, and not able to get to windward during the N. E. Monsoon. By following out the foregoing, commanders of vessels placed in such a position will be enabled to work to windward much sooner than they could otherwise.

LIGHT VESSELS, AND HOW TO DISTINGUISH THEM.

From the Pilots' Ridge to Saugor there are four Light Vessels stationed during the S. W. Monsoon, and three during the N E. From the 15th of March to the 15th of September there is a Light Vessel stationed on the Pilots' Ridge, after which it is removed to town, or sent on other duty elsewhere. The Light Vessels do not fire any guns, as represented in Horsburgh,—unless vessels come too close to them and are likely to cause a collision,—but the Pilot Brigs occasionally have to do so, to attract the attention of vessels running away from the Cruiser, or coming into dangerous proximity to them when at anchor. The whole of these

Light Vessels are painted a light yellow colour, and have three masts At times one of the Pilot Brigs has to do Light Ship duty at the Pilots' Ridge, when no Light Vessel is ready in time to take that station . and during the N E. Monsoon one of the Brigs generally relieves the Eastern Channel Light Vessel, so as to allow her to return to town to refit for the S W. Monsoon. The fore mast has a yard for hoisting the maroon on ; the main or lantern mast is one spar ; the mizen-mast the same ; the flag, to show that the vessel is on her station, is hoisted at the main or lantern mast head · it is a white flag with a red cross These vessels, during the night, show blue-lights and maroons or torches, and are easily distinguished from each other by the time elapsing between each blue light As an example, the Light Vessel stationed on the Pilots' Ridge exhibits a blue-light every hour, and a maroon every half hour; whilst the one stationed at the Eastern Channel exhibits a blue light every half hour, and a maroon every quarter, during the S. W. Monsoon, or from the 15th of March to the 15th of September ; the Eastern Channel light does not show the same light throughout the year ; in the N. E. Monsoon she burns a blue light every hour, and a maroon every half-hour ; she burns a bright standing light at her lantern-mast head throughout the year The Lower Gaspar Light Vessel exhibits a blue light at a different time from the others, *her blue light being shown at every intermediate half hour, and the maroon at the hour.* For example, let it be supposed that she has shown a blue-light

at half past seven, she will not show another until half past eight, &c, so that an hour really elapses between each blue-light; the maroon is shown at the hour By this arrangement it will be seen how easily one light can be distinguished from another. The Upper Gasper Light exhibits two plain lights, one at each yard arm, besides one at the peak *when a vessel is passing her.*

Should the commander of a vessel at any time be in doubt, whether he has sighted the Pilots' Ridge or Eastern Channel Light Ship in the day, he has only to bring her to bear East or West, from 3 to 4 miles distant, and drop his lead over the side, when, if it is the Pilots' Ridge, he will have from 22 to 24 fathoms, but if it is the Eastern Channel Light Vessel, he will have from 8 to 10 fathoms of water. Commanders mistake the Eastern Channel Light Vessel for the Pilots' Ridge sometimes.

The Mutlah Light Vessels are painted red, and are rigged the same as those stationed in the Eastern Channel; there are two: one at the entrance of the Mutlah anchored in 12 or 14 fathoms of water, the other at the Ring Buoy When a vessel is sighted, the one stationed at the entrance of the Mutlah hoists a red flag at the main or lantern-mast-head; and during the night, exhibits a bright light at her lantern mast head, and fires off rockets, one at 8 P M, midnight, and 4 A.M The soundings at the Mutlah, from seaward, standing in, are steep, and the mud very soft, and of a slushy nature.

ON THE WEATHER AT THE SAND-HEADS.

The weather which may be expected, as near as possible, commencing from the breaking up of the S. W Monsoon (which is supposed to take place in the month of September,) is as follows —

September is a month which may be noted for its light variable winds and calms, showers of rain, with occasional puffs of wind from the south and eastward, it being about the breaking up of the rains Easterly will be found to be the prevailing wind this month; and a set to the westward will be experienced at the Sand Heads, varying in strength, according to the force and length of time the easterly wind has been prevailing. This set will be experienced along the Western Coast setting to the S W The Pilot Brigs have considerable difficulty in keeping on their station on account of the set and light winds prevailing. The atmosphere is generally very clear, and the reflection of a good blue-light can be seen from 20 to 25 miles off. Frequently, at this season, the reflection of the Lower Gaspar blue light can be seen from the Eastern Channel Light Vessel. Vessels bound to Calcutta, from the middle of this month, if not before, should endeavour to make the Sand Heads to the eastward of the Eastern Channel Light Vessel, on account of the set they will experience carrying them to the westward On the 15th of this month the Light Vessel is removed from the Pilots' Ridge.

OCTOBER.

October is generally noted for being a stormy, dirty month, a gale is almost always expected, after which fine weather may be looked for, but it is not to be depended upon. Strong sets may be expected, as in last month; ships should come in from the eastward, as the Ridge Light is now removed. Easterly winds predominate; a N. E or E N. E. wind is the precursor of a cyclone or gale Calms, with hot sultry weather, angry sun sets, and high Barometer is generally what we experience before a gale. Ships coming in to the westward of the Eastern Channel Light Vessel will experience much difficulty in getting to the eastward again. The freshets in the river end during this month, but a very strong set will be found along the coast setting to the S. W. Commanders of vessels coming in from the eastward should keep in about 12 fathoms of water, so as not to miss the Eastern Channel Light Vesse, but on no account should they stand into less than 10 fathoms.

NOVEMBER.

In the month of November the N. E Monsoon has fairly set in; so we may add December and January in the same list, as the weather in these three months is somewhat similar, fine weather, with cool mornings and evenings, although the middle of the day is very warm, unless there is a strong northerly wind blowing, when it keeps decently cool Fresh northerly winds generally blow in the morning, gradually dying away towards the middle of the day,

freshening again in the evening; but, taking it on the whole, there are more calms than wind during this period. During these months there is a cessation of the strong tides experienced in the Hooghly,—a sort of temporary calm, as if the giant tide were resting previous to its labours recommencing; Nor'westers sometimes visit the Sand-Heads towards the end of December The Pilot Brigs always anchor at night during these months, but are generally under-weigh during the day. Towards the end of January fogs may be expected in the morning, in the river, although they rarely extend to the Sand-Heads. Ships may anchor anywhere during these months at the Sand Heads with safety; in fact, it is necessary that they should do so, on an ebb tide, to keep from drifting out to sea again.

The Brig for supplying ships is always anchored near the Light Vessel at night, and about a mile to the westward of her; she, (*i. e.*, the Brig) shows a maroon every half-hour, and exhibits a bright light at her starboard fore-yard arm.

In February, generally, light variable winds prevail, and a great deal of calm weather; sometimes a spurt of wind from the northward, but it does not last. At night there is generally a light southerly breeze, with a fog in the morning. The fogs are very heavy this month, frequently not clearing up until past eight o'clock in the morning, sometimes even ten o'clock. It sometimes happens that we have strong southerly winds in the middle or latter part of this month, the weather having

the appearance of the S. W. Monsoon, which lasts for three or four days, after which calms or light winds may be expected. The strong floods commence to be felt in the river towards the latter part of this month; on the whole, the weather is fine. Nor'westers sometimes make their appearance (after a southerly breeze,) but they are not so strong as in March and April; the weather begins to get warm also.

MARCH.

From the latter part of the month of March, to May, is considered the best period for strong, steady S. W. winds; at the beginning and middle of it the wind is not settled, light winds often prevail; but towards the latter part the S. W. Monsoon may be considered to have set in, after which strong winds from S. to S. W. are the prevailing ones, sometimes hauling round to the West The weather is very often hazy at the Sand-Heads, in fact, so hazy at times as to be almost a fog; heavy, damp-looking clouds, with white heads, rise from the S. W. Nor'westers are in their full glory during this and next month, hoary-headed follows make their appearance, beautifully arched underneath, with torrents of rain and, at times, hailstones. Thunder and lightning accompany these storms; generally, they do not give much warning, so that commanders of vessels should always be prepared in case of an emergency, for it is impossible to tell what amount of wind is in them. They sometimes threaten rude, and end in nothing, and *vice versâ*. The N. W. wind generally comes on immediately on the southerly wind

ceasing, when a cool, pleasant breeze is felt. The flood-tides are strong in the river during this and next month, bores also make their appearance. On the 15th of March the Ridge Light Vessel takes her station on the Pilots' Ridge; the Pilot Brigs are under weigh night and day, cruising off their respective stations:—one at the Pilots' Ridge, as cruiser, to supply all inward bound vessels, another, as intermediate, to carry Pilots from the Eastern Channel to the Ridge Station, to keep the cruiser there supplied with Pilots; and last the Buoy Brig, stationed at the Eastern Channel to receive Pilots from outward bound vessels, as they come out from Saugor. The Brig stationed at the Pilots' Ridge, commences to cruise off her station on the 15th of March, and one of the Brigs, by turn, continues to cruise there until the 15th of September. When there are only two Brigs outside, they generally remain at the Eastern Channel, but when one does cruise off the Ridge, on getting short of Pilots, she has to run to the Eastern Channel Station for a fresh supply. The Brig stationed on the Buoy Station never leaves it.

The average range of the Barometer, during settled weather, in this Monsoon, is from 29-68 to 29-70 Thermometer 86.

JUNE.

In the month of June the strong S. W. wind commences to lull, and the weather is more unsettled than during the past three months; towards the middle of the month the *chhota bursat*, (or small rain,) commences, which usually lasts a

fortnight, after which the weather clears up again ; the wind generally inclines more to the westward, and sometimes we have a westerly gale ; the Nor'westers begin also to lose their strength, and generally end more in rain than in wind. Thunder storms are usually heavy this month ; but, on the whole, the weather is passable, though intolerably hot.

JULY.

Towards the middle of July the heavy rains set in (sometimes a little earlier), but it is generally towards the middle of the month before they set in for good Squally weather may be expected after the rains have set in ; but generally there is more rain than wind in the squalls ; a N E. or E. N. E. wind, accompanied with rain squalls, is often the forerunner of a westerly gale. Westerly gales generally last for several days, and are always accompanied with much rain ; vessels have been known to be detained at sea for a week or ten days owing to them, for with a westerly wind it is impossible to get into Saugor, vessels cannot lay through the Gaspar Channel. The first ots make their appearance in the river early in this month, and towards the end of the month they are very strong ; easterly and westerly sets will be felt at the Sand-Heads in consequence. After a westerly gale the set runs to eastward from the westward , in like manner, after an easterly wind or gale, the set runs to the westward from the eastward ; but the easterly set lasts much longer than the westerly, and is much stronger. S. W to S E winds generally pre-

vail, but when the weather is unsettled, W. and W. S. W. The nights are generally fine, but very oppressive on account of the great heat. Before a gale the sea rises very quick ; a heavy swell comes rolling in from the southward ; after the gale, it goes down nearly as fast ; and there is more swell in the Eastern Channel at this season than at any other.

AUGUST.

The month of August is similar to July in regard to weather :—rain squalls, westerly gales, &c.

The set at the Sand-Heads, from the eastward, is sometimes very great ; a vessel at an anchor will not swing more than from E. S. E. to S. E. on a flood tide ; the Pilot Brigs at times get set into the South Channel, off their station, when they have to beat back again to the Eastern Channel. The atmosphere is generally very clear, objects and lights can be seen at a great distance. Heavy squalls of rain are experienced during this month, and the wind anywhere from E. N. E. to N. E., is the forerunner of a westerly gale, as in July ; the wind during the day is generally well from the westward, gradually hauling to the south-ward towards the evening.

TIDES.

The time of high and low-water at the Sand-Heads is as near correct as can be given. Take the N. E. Monsoon for it, as being the least likely to be affected by the wind, and

other local causes. Appended are the remarks made by the River Surveyor as to season, &c., affecting the tides; but it is to be presumed they will not have so much effect at the Sand Heads as in the River

TIDE-TABLE FOR THE SAND-HEADS.

	H W.	L W.
	H M	H M
Full or Change	9 20	4 10
On the Quarter.	3 0	9 50

NOTE BY SURVEYOR—"In the calculation of the above Table the time of High and Low water have been corrected for the moon's parallax, as also for the seasons, in which is included the influence due to the sun's position, and the two Monsoons. Much reliance cannot be placed on what may be called the seasonal corrections, as they depend on the comparative force and duration of the two Monsoons, but it is anticipated that any errors produced by variation in the elements will be constant for a considerable portion of a lunation and the Table will still serve as a Guide.

NOTE.—By adding 18 minutes to the above time given for High or Low Water to each day will give an approximate time of High or Low-water as required for the Sand-Heads daily. Or by multiplying the number of days elapsed from Full or Change by 4, and dividing by 5, the product so found added to the time given on the Full or Change or on Quarter, will give a very near approximation to the time required.

Example: suppose the time required to be 5 days after the moon:

$$5 \times 4 - 20 - 5 = 4$$

4 hours is added to 9 — 13 hours, time required, 1 hour afternoon

The difference between the time of High-water at the Pilots' Ridge and Eastern Channel, is half an hour, and 40 minutes for Low water (earlier), so that a calculation is easily made for any time of the tide required; subtracting the difference of Time at the Eastern Channel from the Pilots' Ridge, will give the time required.

In like manner, the difference from the time of High water at the Mutlah Light and Eastern Channel, is one hour; so that by adding the given difference, the time for High or Low-water for that place may be easily ascertained.

FLAG-SIGNALS OF PILOTS BRIGS.

The Brig doing Floating Light duty in the Eastern Channel, Service Pendant at the main.

The Brig doing Floating Light duty at the Pilots' Ridge, St. George's Cross at the main.

Brig on Buoy Station, (Eastern Channel,) white flag at the fore.

Brig on Buoy Station, (South Channel,) white flag at the main.

"I will give you a Pilot"—red flag at the main.

FLAG-SIGNALS FOR INWARD-BOUND SHIPS GOING UP THE RIVER.

In a salt ship, for a Custom House Officer, National Ensign at the main, at Saugor.

In a ship from Akyab, Easton or Sco ports in the Bay, National Ensign at jibboom, at Diamond Harbour.

A ship in ballast, white flag at the main.

In want of a Harbour Master, Blue Peter at the main.

Troops on board, Union Jack at the mizzen, at Saugor.

For steam, Ensign at starboard fore-yard-arm, when flags are unavailable.

FLAG-SIGNALS FOR SHIPS GOING DOWN THE RIVER.

With a Custom House Officer on board, the National Ensign at the fore.

Without a Custom House Officer on board, the National Ensign at the main

Signal to be taken out, by Buoy Station Brig, No 8 Marryatt's at the main.

NIGHT-SIGNALS.

Under weigh, sailing up the river, a light at foretop gallant mast-head.

Under weigh, in tow of a steamer, a light at each fore yard-arm

At anchor, a light at the starboard fore-yard arm

To be taken out by Buoy Station Brig, a light at jibboom end, and one at the peak.

When a Floating Light is out of her position, she does not hoist her distinguishing flag at the main by day, or show any light at night.

THE MOON.

To find its age at any time, divide the year by 19, and multiply the remainder by 11. The product will be the Epact, if it does not exceed 29. If it does, divide the product by 30, the remainder will be the Epact.

Thus :—

```
19) 1866 (08
    171
    ---
     156
     152
     ---
       4
      11
      --
30 ) 44 ( 1
     30
     --
     14  Epact.
```

If the day of the month and the number of the month, added together *with the Epact*, exceeds 30, then add the day of the month and the number of the month together, *and deduct the Epact. If the three added together* does not exceed 30, the remainder is the moon's age.

Thus for May 16th, 1866 :—

Number of the month	...	2	
Day	„ „	...	16
			18
Deduct the Epact of the year	..	14	

The Moon is 4 days old

Common Year	January	February	March	April
	0	1	0	1
May	June	July	August	
2	3	4	5	
September	October	November	December.	
7	7	0	0	

Leap Year	January	February	March	April
	0	2	1	2
	May	June	July	August
	3	4	5	6
	September	October	November	December
	8	8	10	10

Days of Moon's age	Springs	Neaps.	
10 & 25	0	7	
11 & 26	0	8	Last day of neaps
12 & 27	1	0	First day of springs
13 & 28	2	0	
14 & 29	3	0	
15 & New Moon,	4	Full and Change, height of the springs.	

BENGALI COMPASS

Guy	N
,, weejow choke	N b E
,, ,, teer	N N E
,, ,, akrope dow choke	N E b N
,, ,,	N E
,, ,, ,, weejow choke	N E b E
Mutlee dow teer	E N E
,, ,, choke	E b N.
Mutlee	E.
,, weejow choke	E b S
,, ,, teer	E S E
Soolee dow akrope dow choke	S E b E.
,, ,, ,,	S. E
,, ,, ,, weejow choke	S E. b S.
,, ,, teer	S. S E.
,, ,, choke	S. b E
Soolee	S.
,, weejow choke	S b W
,, ,, teer	S S W
,, ,, akrope dow choke	S W b S
,, ,, akrope	S. W
,, ,, ,, weejow choke	S W. b W.
Cabli dow teer	W S. W.
,, choke	W b. S
Cabli	W
,, weejow choke	W b N
,, ,, teer	W N. W.

BENGALI COMPASS —*(Continued)*

Guy dow akiope dow choke	.	N W b W.
" " "		N. W
" " " weejow choke	.	N. W. b N.
" " teer	.	N. N W.
" " choke	..	N b W
Guy		N

The Bengali Compass is much more easily understood by the young beginner than is generally imagined, as is shown by the following explanation :—

The four Cardinal points are, "Guy," North; "Soolee," South; "Mutlee," East; "Cabli," West.

The points *directly between these* are called Akropes, and are each distinguished by *prefixing* the words "weejow" (right) and "dow" (left), thus denoting their respective positions, right or left, of North or South. For example, face North, then N. E. lies on your right hand, and N. W. on your left, so that N. E. is "Guy *weejow* Akrope," *i.e.*, North's right hand, Akrope; and N. W. is "Guy *dow* Akrope," *i.e.*, North's left hand Akrope: but they are only designated right and left of North and South, *not of East and West.*

The minor points are distinguished by the words "choke" and "teer" (or, rendered in English, "one" and "two"), with the prefix of "weejow" (right) and "dow" (left), as before. For example, face North; now N. b. E is *one point to the right of North*, therefore it is styled "Guy weejow *choke*," literally "*North, right, one*;" N N. E. is *two points to the right of North*, therefore it is styled "Guy weejow *teer*," literally "*North, right, two.*" Again, face

South, now S. b W is *one point to the left of South*, and is therefore styled "Soolee dow *choke*," literally "*South, left, one.*" S. S. W. is *two points to the left of South*, and is therefore styled "Soolee dow *teer*," literally "*South, left, two.*" This applies *only to the four Cardinal points*, North, South, East, and West; as you will find, on reference to the "Bengali Compass," that the Akropes (or N. E., S. E. S W, and N. W) have only *one* point to the left of them; for example, face S. W ;— S W. b S is *one point to the right of S. W.*; now S W *by itself* is the Akrope *to the left of South*, so that S. W b S. is styled "Soolee *dow* Akrope, *weejow choke*," literally "South, *left* Akrope, *right, one*" Again face N. W.;— N W. b. W. is *one* point to the *left* of N.W.; now N. W. *by itself* is the Akrope to the *left* of North, so that N. W b. W. is styled "Guy *dow* Akrope, *dow choke*," literally North, *left* Akrope, *left, one.*" It will thus be seen that there are *two* points (in the Bengali Compass), named right or left, of N. S. E. & W, and only *one* point named right or left of N. E., S. E, S W., N. W. Half-points are styled "Kagitch," quarter points "Mukhee," which are *added* to the other points with "weejow" (right) or "dow" (left), named *before* them; as "Guy dow choke, dow Kagitch," N. b. W. ½ W.

WORKING SHIP

Tyar jaga jaga	..	... Ready about.
Bhurra rack ...	..	... Keep her full.
Bordoo rack ..	...	... Down helm.
Gusse bordoo	...	. Hard a lee.

WORKING SHIP—*(Continued)*

Stringee mora daman	Raise tacks and sheets.
Feerao burra sail ..	Mainsail haul
Beech mat	Helm 'midships.
Feerao augail	Let go and haul.
Feerao jib savoy daman ..	Shift over the head sheets.
Feerao burra gaveo	Maintopsail haul
Bhurr burra gaveo	Fill the maintopsail.
Boxee burra gavee . .	Shiver the maintopsail
Baree nai .. .	Nothing to leeward.
Bopper nai	No higher
Goso	Luff.
Mat bujjow	Don t shake her.
Mil trinket	Drop the foresail
Daman	Keep her away.
Ootow sekun	Put the helm up.
Yam burra perwan	Square the mainyard.
Stringee goosee morah ...	Haul up the driver tack.
Yam augail	Square in forward.
Lag jumna burra brass .	Haul in the starboard main brace.
Lag jumna trinket brass ...	Haul in the starboard fore brace.
Lag bopper burra brass ...	Haul in the weather main brace.
Lag bopper trinket brass ...	Haul in the weather fore brace
Stringee tubber ...	Clew up the royals
Stringee subber	Clew up the to gallant sails
Stringee gavee ...	Clew up the topsails.
Stringee burra sair	Clew up the mainsail.
Stringee trinket	Clew up the foresail.
Tan neechee jib savoy ..	Haul down the head sails.
Hath mai lunger ka bowsa .	Stand by the anchor.
Kubburdar hamar	Stand clear the cable.
Chorday lunger	Let go the anchor.
Maroon oothow	Show the maroon.
Proom ka line lumber kurro	Stretch the deep sea lead line along.
Aunnee koysa?	How s her head?
Hallee lo agail .. .	Flatten in the head sheets
Khoob dek debuc ka wastai	Keep a good look out for the blue-light

LENGTH, BREADTH, AND DEPTH OF REEFS AND BRACES.

Western Brace	35	mls.	long,	3	mls.	broad,	2	to	8	fms.
Eastern „	20	„	„	6	„	„	1½	„	4½	„
Western Reef	28	„	„	4¼	„	„	2	„	7½	„
Eastern „	30	„		4	„	„	1	„	8	„
Saugor Sand	27	„	„	3	„	„	3	„	6	„
Pilots' Ridge	42	„	„	9	„	„	15	„	23	„

MOST WATER ACROSS EASTERN REEF AND SAUGOR SAND, IN THE FOLLOWING POSITIONS

Across Eastern Reef, abreast F. T Buoy,	7	feet.	
„ „ „ , Spit „	17	„	
„ „ between the 2 Reef Buoys,	4	fms	
„ , abreast E. C Light,	6	„	
„ Saugor Sand abreast U M G. Buoy,	9	feet.	
„ „ , L. M. G „	15	,	
„ „ between the 2 Reef Buoys,	3¼	fms.	
, , abreast E C. Light,	6½	,	

FLOOD TIDE SETS.

On to Saugor Point.
From the Long Sand to the Mizen.
Up Mud Point Channel.
„ Silver Tree
Across Rangafulla.
Up Culpee Roads.
On to Canterbury Point, it always flows inside the Point, below the Point.
Up Diamond Harbour.
On to Hospital Point
„ Luff Point.
Up back of the Hooghly.
„ Roopnarain River.
On to Shibgunge Point.
1st part round Fultah Point, latter at the back of Fultah Sand.

FLOOD TIDE SETS.—*(Continued)*

1st part back of Hog River Sand, latter round Hog River Point.
On to Fisherman's Point.
Across Hog River Reach.
On to Hog River Point.
„ Devil's Point.
Across Moyapore Reach.
Into Oollabarriah Bight.
„ Pointjelly Reach.
Across Melancholy Sand.
Into Rajgunj Bight.
Across Garden Reach.
On to Garden House Point.

SOUNDINGS.

Balasore Bay, West	1	Sand, mud with specks	4½ to 5	fms
Palmyras Reef, „	1	„ „ „ light specks	9, 13, 16	„
N W. of Balasore Roads	2	„ „ „ „ „	4 to 6	„
Centre of „ „	2	„ dark „ „ „ „	12 „ 13	„
N W of Swatch	2	„ „ „ „ „	15 „ 16	„
S E of Ridge	2	„ olive „ „ „ „	23 „ 24	„
N. of Balasore Roads	3	Mud, shells, sea eggs	6½ „ 7	„
W of Western Brace, 15 miles	4	„ olive pebbles, shells *(broken)*	10½ „ 11½	„
W b S of Swatch, 13 miles	4	„ hard clay, pebbles, shells (small and broken)	19 „ 21	„
Northern edge of Pilots' Ridge	4	Mud, dark sand, pebbles, shells	19 „ 21	„
Eastern of Ridge Buoy, 10 miles	4	Sand, amber shells, specks, pebbles, coral	24 „ 26	„
Abreast Biddypoor, Balasore Roads	5	Mud (greenish)	3½ „ 6½	„
Close to Westward of Swatch	6	Clay (yellow) and stones	17 „ 19	„
W b N of Ridge Buoy	7	Sand (grey) and shells	14 „ 17	„
N N E of Palmyras Reef	8	„ mud, black specks, shells, small stones	14 „ 16	„
10 miles Westward of Reef Buoy	8	„ „ „ „ „ „ „		
N of Pilots' Ridge, Kunaka Buoy, West	8	„ „ „ „ broken shells, small stones	13 „ 16	„
N. E edge of Ridge	9	Mud (olive), sand (coarse), shells	19 „ 23	„
S extremity of Ridge	9	Sand (coarse), amber shells (broken)	16 „ 17	„
Ridge Buoy	10	„ red specks, shells	21 „ 22½	„
S W of Ridge Buoy	10	„ „ „ „	20 „ 22	„
Between Palmyras Reef and Ridge Buoy	11	„ black, white, red specks	17 „ 19	„
Eastern centre of Ridge	10	„ sand (fine), black specks, and shells	18 „ 25	„
7 miles S of Ridge Buoy	12	Mud, sand, shells	23½ „ 25	„
E. and N E. edge of Ridge	12	„ „	24 „ 25	„
S. of Ridge	12	„ olive, shells (broken)	12 „ 14	„
West centre of Ridge	13	Sand (dark) mud, shells, black specks	19 „ 19½	„
Abreast Palmyras Reef	13	„ mud (brown), black specks, and broken shells	9 „ 17	„

BEARINGS OF BUOYS

S C Buoy from E C Light			W S W	11 miles	12 fms.
L S. S	„	„ „	N N L	5½ „	6 „
C. S S	„	„ „	N ¼ W	11 „	5 „
U S S	„	„ „	N b W	21 „	4½
L R	„	„ „	N W b W ½ W	4½ „	5½ „
U R.	„	„ „	N W	10 „	4 „
Spit	„	„ „	N W b N	15 „	3½ „
L C Light from		„	N b. W ½ W	24 „	4 „
L S S Buoy from L C		„	S E b S ¼ S	20 „	6 „
C S S	„	„ „	S E b S	11 „	5¾ „
U S S	„	„ „	E b S ¼ S.	1 „	4½ „
L R	„	„ „	S ½ E	22 „	4½ „
U. R	„	„ „	S „	11 „	4½ „
Spit	„	„ „	S ¼ W	10½ „	3½ „
L T	„	„ „	S W. ¾ S	4½ „	5 „
U M G	„	„ „	S.	„	3½ „
L M. G	„	„ „	S. b E ¾ E.	6 „	5 „

N. B —*As the Buoys, in the channels leading into the River, are always overhauled, and relaid in the N E. Monsoon, thereby causing some slight alterations, their bearings and distances as noted herein are sufficiently correct for commanders of vessels to go by Members of the Pilot Service can always obtain the corrections from the River Surveyor's Reports at the Master Attendant's Office.*

BEARINGS AND DISTANCES OF TAILS OF REEFS AND SANDS.

				Miles.
Western Reef from Eastern Reef			W b N	16
Saugor Sand	„	„ ...	N E	11
Lighthouse Sand	„	Saugor Sand ...	N b W	
Western Brace	„	Western Reef . .	N. W b W	18
„ Reef	„	Head of Pilots' Ridge .	N E	8
Eastern Reef	„	Palmyras Reef .	E b N	60
Lower Gaspar Light from E C Light...			N b W ½ W	24
Saugor Point from Lower Gaspar Light			N ¼ W	9
E C Light from Pilots Ridge Light .			E N E.	33
Pilots Ridge Light from False Point ..			N E	60
Western Brace from Pilots Ridge ...			N. ½ W.	20
Eastern „	„	„ ..	N	38
„ Reef	„	„ ...	N E b N ½ N	23
„ Brace	„	Eastern Reef	N W. b. W.	38

BEARINGS AND DISTANCES OF TAILS OF REEFS AND SANDS. *(Continued)*

Point Palmyras Reef from Ridge Buoy	W b S.	29 miles,	10 to 21 fms.	
Tail of Ridge from False Point ..	E N E	26 „	4 „ 16 „	
Tail of Western Brace from Ridge Buoy	N ½ W	17 miles,	9 „ 21 „	
Tail of Eastern Brace from Ridge Buoy	N.	30	4 „ 21 „	
Swatch from Ridge Buoy	N	12 ,	16 „ 21 ,	
Tail of Western Reef from Ridge Buoy ...	N E.	15 „	8 „ 23 ,	
Eastern Brace from Western Brace ..	N ½ E.	10 „	4½ „ 9½ „	
Western Reef from Western Brace ..	E S. E	17 „	8½ „ 9½ „	
Due East of Western Brace, 2½ miles, you will carry			4½, 7½, & 3½ „	
Tail of Eastern Reef from Ridge Buoy . ..	E N E.	26 miles,	24 to 10 „	

LATITUDES AND LONGITUDES.

	N Lat	E Long
Calcutta, Fort William ...	22° 34 28′	88° 21′ 12′
Mud Point ...	21° 56′ 00′	88° 7′ 00′
Diamond Harbour	22° 11′ 15′	88° 12′ 18′
Silver Tree Obelisk	21° 58 00′	88° 10 00′
Kedgeree Flagstaff ...	21° 52′ 30′	87° 59′ 00′
Cowcolly Lighthouse .	21° 37′ 00′	88° 03′ 00′
Saugor Lighthouse ...	21° 38′ 43′	88° 01 00″
Saugor Anchoring Buoy	21° 34 50	88° 02′ 45′
Saugor Point .	21° 34′ 00′	88° 09 00′
Lower Gaspar Light ...	21° 26′ 53′	88° 06 00′
Saugor Sand (South end) ..	21° 02′ 00′	88° 26′ 00′
Eastern Channel Light .	21° 04′ 00′	88° 11 00′
Lower Reef Buoy ..	21° 09′ 00′	88° 13′ 00″
Eastern Reef (South end)	20° 59′ 00′	88° 15′ 00′
Western Reef (South end)	21° 00′ 00′	87° 57′ 00′
Western Brace (South end)	21° 09′ 00′	87° 40′ 00′
Point Palmyras ..	20° 41′ 00′	87° 11′ 00′

LATITUDES AND LONGITUDES —*(Continued)*

	N Lat.	E Long.
False Point	20° 19′ 38′	86° 59′ 00′
Black Pagoda	19° 52′ 15′	86° 08′ 00′
Juggernauth Pagoda ..	19° 48 21″	85° 45′ 00′
Kedgeree Post Office	21° 50 18′	87° 59′ 46
Outer Floating Light Buoy	21° 4′ 0′	88° 14′ 0′
False Point Lighthouse .	20° 19 25″	86° 48 88″
Pilots' Ridge Buoy	20° 49 30′	87° 42 0
Mutlah Floating Light .	21° 6′ 0	88° 46′ 0′

TIDE TABLE

PLACES	Spring Tides								Neap Tides												Spring Tides							
	Days of the Moon's age																											
	0		1		2		3		4		5		6		7		8		9		10		11		12		13		14	
	H	M	H	M	H	M	H	M	H	M	H	M	H	M	H	M	H	M	H	M	H	M	H	M	H	M	H	M	H	M
Calcutta	3	0	3	48	4	36	5	24	6	12	7	0	7	48	8	36	9	24	10	12	11	0	11	48	12	30	1	24	2	12
Moyapore	2	15	3	3	3	51	4	39	5	27	6	15	7	3	7	51	8	39	9	27	10	15	11	3	11	51	12	39	1	27
Fultah	1	15	2	3	2	51	3	39	4	27	5	15	6	3	6	51	7	39	8	27	9	15	10	3	10	51	11	39	12	27
Diamond Harbour	1	0	1	48	2	36	3	24	4	12	5	0	5	48	6	36	7	24	8	12	9	0	9	46	10	36	11	24	12	12
Kulpee	12	45	1	33	2	21	3	9	3	57	4	45	5	33	6	21	7	9	7	57	8	45	9	33	10	21	11	9	11	57
Channel Creek	12	30	1	18	2	6	2	54	3	42	4	30	5	18	6	6	6	54	7	42	8	30	9	18	10	6	10	54	11	42
Kedgeree	11	30	12	18	1	6	1	54	2	42	3	30	4	18	5	6	5	54	6	42	7	30	8	18	9	6	9	54	10	42
Saugor	11	0	11	48	12	36	1	24	2	12	3	0	3	48	4	36	5	24	6	12	7	0	7	48	8	36	9	24	10	12
Reef Buoy	9	45	10	33	11	21	12	9	12	57	1	45	2	33	3	21	4	9	4	57	5	45	6	33	7	21	8	9	8	57
Western Reef	9	36	10	24	11	12	12	0	12	48	1	36	2	24	3	12	4	0	4	48	5	36	6	24	7	12	8	0	8	48
Balasore Roads	9	0	9	48	10	36	11	24	12	12	1	0	1	48	2	36	3	24	4	12	5	0	5	48	6	36	7	24	8	12
Kunnaka Buoy	8	55	9	13	10	11	10	49	11	37	12	25	1	13	2	1	2	49	3	37	4	25	5	13	6	1	6	49	7	37
Point Palmyras	8	30	9	18	10	6	10	54	11	42	12	30	1	15	2	6	2	51	3	42	4	30	5	18	6	6	6	54	7	42
False Point	8	0	8	48	9	36	10	24	12	57	12	0	12	48	1	36	2	24	3	12	4	0	4	48	5	36	6	24	7	12

Distances of places in the River Hooghly from Fort William, in Geographical Miles, with the corrections for High and Low-Water at those places.

	Miles	Correction for H. W H	M	Correction for L W H	M.
Kidderpore Docks	1 0				
Garden House	2 0	0	6	0	8
Rajgunj	5 5	0	13	0	19
Mopeekolly Point	7 6	0	19	0	28
Jar Makors	9 1	0	21	0	35
Fort Gloster	12 5	0	31	0	49
Ooloobaitah	16 5	0	46	1	6
Atcheepore Telegraph Station	17 6	0	49	1	11
Moyapore Magazine	18 6	0	52	1	15
Sister Trees Royapoor	22 0	1	2	1	30
Hog River Obelisk	23 3	1	6	1	36
Pookooriah, or Hog River Point	25 8	1	13	1	46
Fultah House	28 6	1	21	1	58
Fultah Point	30 5	1	27	2	6
Anchoring Creek	32 5	1	33	2	14
Hooghly Point Telegraph Station	34 7	1	39	2	24
Liff Point	37 0	1	49	2	39
Diamond Harbour Telegraph Station	43 0	2	4	3	0
Canterbury Point	46 1	2	13	3	13
Kupee Pagoda	49 0	2	23	3	28
Rangafulla Obelisk	53 1	2	31	3	44
Middle Point	55 8	2	41	3	45
Silver Tree Obelisk	58 3	2	49	4	5
Mud Point Telegraph Station	61 5	2	58	4	19
Kedgeree Light-vessel	69 1	3	20	4	51
Cowcolly Lighthouse	72 1	3	29	5	5
Sugor Lighthouse by Bedford's	82 1	4	0	5	50
Sugor Anchoring Buoy	86 2	4	9	6	2
Upper Gaspar Light Vessel	90 6	4	15	6	11
Lower Gaspar Light Vessel, by Bedford's	95 5	4	2	6	21
Spit Buoy, W S W	103 4	4	37	6	43
Reef Buoy W S W.	112 4	4	51	7	60
Eastern Channel Light Vessel	119 0	5	3	7	23
South Channel Buoy by Western Channel	123 8	5	14	7	34
Pilot's Ridge Buoy	139 0	5	30	8	0
False Point Lighthouse	200 0	2	55	8	33

Pilotage Tables; showing the amount of Pilotage ships pay to Government, by which may be found the amount Government pays to the Pilots.

Draft of Vessel	Total Inward Pilotage	Deduction of one twelfth for Steam.	Deduction of 12 twelfths, or Steam from Sea	Total Outward Pilotage	Deduction of one twelfth for Steam	Deduction of 12 twelfths, or Steam to Sea.
	Rs As	Rs As P	Rs As	Rs As	Rs As P	Rs As
Under 8	62 8	1 4 10	15 10	62 8	1 4 10	15 10
8 to 9	100 0	2 1 4	25 0	100 0	2 1 4	25 0
9 to 10	137 8	2 13 10	34 6	150 0	3 2 0	37 8
10 to 11	162 8	3 6 2	40 10	175 0	3 10 4	43 12
11 to 12	187 8	3 14 6	46 14	200 0	4 2 8	50 0
12 to 13	212 8	1 6 10	53 2	225 0	4 11 0	56 4
13 to 14	250 0	5 3 4	62 8	262 8	5 7 6	65 10
14 to 15	287 8	5 15 10	71 14	300 0	6 4 0	75 0
15 to 16	337 8	7 0 6	84 6	362 8	7 8 10	90 10
16 to 17	400 0	8 5 4	100 0	450 0	9 6 0	112 8
17 to 18	462 8	9 10 2	115 10	525 0	10 15 0	131 4
18 to 19	525 0	10 13 0	131 4	587 8	12 3 10	146 14
19 to 20	600 0	12 8 0	150 0	675 0	14 1 0	168 12
20 to 21	675 0	11 1 0	168 12	750 0	15 10 0	187 8
21 to 22	737 8	15 5 0	148 6	812 8	16 11 10	203 2
22 to 23	800 0	16 10 8	200 0	875 0	18 3 8	218 12
23 to 24	875 0	18 3 8	218 12	962 8	20 0 10	240 10

PILOTAGE OUTWARD.

FROM WITHIN THE PORT OF CALCUTTA

To below Fort Gloster ..	1/12th
To below Hog River Obelisk	2/12ths.
To below the Anchoring Creek ..	3/12ths
To below Diamond Harbour Telegraph Station	4/12ths
To below Rangafulla Obelisk (S E)	5/12ths.
To below Mud Point Telegraph Station (E S E) .	6/12ths.
To below the Fair way Buoy of Bedford's in that channel, or the lower most Buoy of the Auckland, if in that channel ...	7/12ths.
To below the Apex Buoy of Bedford's, or the A Buoy of the Western Channel according to the channel used .	8/12ths
To below a line East or West of Saugor Anchoring Buoy or of the H Buoy for the Western Channel	9/12ths
To below a line E N E or W S W of the Lower Gaspar Light Vessel, or W S W. of the Lower Eastern Reef Head Passage Buoy for the South Channel . .	10/12ths.
To below a line E N E of the Spit Buoy for the Eastern Channel, or W S W of the South Channel Reef Buoy for the South Channel .	11/12ths
To below a line drawn East and West of the Lower Reef Buoy of the Eastern Channel	12/12ths

or full pilotage

EXAMPLE.

A ship has steam from Calcutta to *Culpee* and no further; that is, to below Diamond Harbour Telegraph Station, and *above* Rangatulla which is 4/12ths, the rest of the distance (8/12ths) without steam Say the ship draws 16 feet —

1/12th for 16 feet *with steam* (*see* Table)			7 8 10
4/12ths multiply by			4
			30 3 4
		Rs	As P
Total pilotage for 16 feet *without steam* (*see* Table)		362	8 0
Deduct for 4/12ths steam		30	3 4
Fifty per cent (or half) of		2)332	4 8
Pilot's share	..	166	2 4

PILOTAGE INWARD.

To within the Port of Calcutta

From below a line drawn East and West of the Tower Reef Buoy of the Eastern Channel .. .	12/12ths *or full pilotage.*
From below a line E N. E of the Spit Buoy for the Eastern Channel or W S. W. of the South Channel Reef Buoy for the South Channel . . .	11/12ths
From below a line E N E or W. S W of the Lower Gaspar Light Vessel for the Eastern Channel, or W S W of the Lower Eastern Reef Head Passage Buoy for the South Channel	10/12ths.
From below a line East or West of Sugor Anchoring Buoy, or, of the H Buoy for the Western Channel ...	9/12ths.
From below the Apex Buoy of Bedford's in that Channel or the A Buoy of the Western Channel, according to the channel used	8/12ths.
From below the Fair-way Buoy of Bedford's in that Channel or the lower most Buoy of the Auckland in that channel .. .	7/12ths.
From below Mud Point Telegraph Station (E S E)	6/12ths.
From below Rangafulla Obelisk (S E) ...	5/12ths
From below Diamond Harbour Telegraph Station,	4/12ths
From below the Anchoring Creek	3/12ths.
From below Hog River Obelisk .	2/12ths.
From below Fort Gloster	1/12th

EXAMPLE.

A ship has steam from abreast the Upper Eastern Gaspar Buoy, that is, from above the Lower Gaspar Light and below Saugor Anchoring Buoy, which is 9/12ths Say the ship draws 21 feet.

1/12th for 21 feet *with steam* (*see* Table)	14	1	0
9/12ths multiply by			9
	126	9	0

	Rs	As.	P.
Full pilotage for 21 feet *without steam* (*see* Table)	675	0	0
Deduct for 9/12ths steam	126	9	0
Fifty per cent. (or half) of	2)518	7	0
Pilot's share ...	274	3	6

FRENCH AND ENGLISH MEASUREMENT

m' stands for Metre and "c" for Centimetre.

French.		English	French		English
1 m'	equals	3 ft 3⅜ in	5 'm"	equals	16 ft 5 in.
2 „	=	6 „ 6¾ „	5 „ 10 'c	—	16 „ 9 „
3 „	—	9 „ 9⅞ „	5 „ 20 „	—	17 „ 1 „
3 „ 5 "c		9 „ 11⅛ „	5 „ 30 „		17 „ 5 „
3 „ 10 „	=	10 „ 1⅜ „	5 „ 40 „	=	17 „ 9 „
3 „ 15 „	=	10 „ 3⅝ „	5 „ 50 „		18 „ 1 „
3 „ 20 „	=	10 „ 5⅞ „	5 „ 60 „	=	18 „ 5 „
3 „ 30 „	=	10 „ 9⅜ „	5 „ 70 „	—	18 „ 9 „
3 „ 40 „	=	11 „ 1⅝ „	5 „ 80 „	—	19 „ 1 „
3 „ 50 „	=	11 „ 5⅞ „	5 „ 90 „	=	19 „ 5 „
3 „ 60 „		11 „ 9⅛ „	6 „ 0 „	=	19 „ 9 „
3 „ 70 „	=	12 „ 1⅜ „	6 „ 10 „		20 „ 1 „
3 „ 80 „		12 „ 5⅝ „	6 „ 20 „		20 „ 5 „
3 „ 90 „	—	12 „ 9⅞ „	6 „ 30 „		20 „ 9 „
4 „ 0	=	13 „ 1⅜ „	6 „ 40 „		21 „ 1 „
4 „ 10 „		13 „ 5⅛ „	6 „ 50 „	=	21 „ 5 „
4 „ 20 „	=	13 „ 9⅜ „	6 „ 60 „		21 „ 9 „
4 „ 30 „		14 „ 1 „	6 „ 70 „	=	22 „ 1 „
4 „ 40 „	—	14 „ 5 „	6 „ 80 „		22 „ 5 „
4 „ 50 „	—	14 „ 9 „	6 „ 90 „	—	22 „ 9 „
4 „ 60 „	—	15 „ 1 „	7 „ 0	—	23 „ 1 „
4 „ 70 „		15 „ 5 „	7 „ 10 „	—	23 „ 5 „
4 „ 80 „		15 „ 9 „	7 „ 20 „		23 „ 9 „
4 „ 90 „	=	16 „ 1 „	7 „ 30 „	—	21 „ 1 „