

## **\* The Kolkata Cyclone/Earthquake of 1737 : Random Scribbles**

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**Abstract:** *This article argues that the natural catastrophe that swept away Calcutta in 1737 was not only the first recorded case study of a natural disaster in an English settlement in India but it could also be argued as the first tsunami, which occurred in the Indian Ocean rim. While it traces the historical relation between natural disaster and human affliction in that region it also explains how the combined effect of both cyclone and earthquake led to the disaster. Finally, it shows how the effect of this natural calamity was not only limited to Calcutta but also devastated thousands of lives in the deltaic region of lower Bengal.*

**Keywords:** *Storm, Cyclone, Earthquake, Tidal Wave, tsunami, Environment, Calcutta / Kolkata, Sundarbans, East India Company.*

### **Introduction**

The present paper is a case study of a natural calamity that swept over the English settlement of Calcutta on October, 11, 1737 with reference to the broader questions relating to climate and settlement. This natural calamity has been interestingly represented in the contemporary sources as well as in recent writings as an 'earthquake' or a 'hurricane' or both. It is the first storm in recorded history reported to have been accompanied by an earthquake. I will argue that, in all probability, it was the first recorded *tsunami* in the Indian Ocean rim. Sugata Bose has argued that 'the first modern tsunami hit the Indian Ocean more than a century ago on August 27, 1883'.<sup>1</sup> The natural calamity ('earthquake'/'hurricane'/'storm') that swept over Calcutta, 20 years before the battle of Plassey was, in all probability,

the first recorded *tsunami* in the Indian Ocean rim. Interestingly, this calamity has gone down as one of the significant 'earthquakes in history' which is supposed to have resulted in 300,000 deaths. If it was in fact a *tsunami*, then, it would push the first occurrence of a *tsunami* in the Indian Ocean back to 146 years and would also pose a challenge to what Sugata Bose considers as the first *tsunami* incident.<sup>2</sup> But this paper is not merely to deal with this historically trivial sequential disagreement, if any. It is about a more significant issue relating to the historical relation between natural disasters and human settlements.

### **The English Settlement of Calcutta/Kolkata : Climate of Disaster**

A group of English merchants formed the East India Company in 1599. On 31 December, 1600 the East India Company was granted a royal charter and the exclusive right to trade in the East by Elizabeth. English explorers had been visiting India since 1591. The East India Company made its first voyage to Indonesia in 1601. In 1608, Captain Hawkins, the representative of the company, was granted the permission by Jahangir to open a factory in Surat. Later, Hawkins was driven out from Agra by the Mughals at the instigation of the Portuguese. No one could have imagined, when the English were driven out from Indonesia by the Dutch and from Agra at the instruction of the Portuguese, that, in little more than two hundred years, the British East India Company would become the master of a domain more than ten times the size of their own motherland. In Bengal, however, the English East India Company was not allowed to trade in Hooghly before 1651. Company's factories were soon opened in Patna, Balasore, Dacca and other places in eastern India. By 1669, the English had developed a genuine political ambition to control India. The political anarchy of the period encouraged them to pursue this objective. Armed conflict between the English and the Mughals broke out in Hooghly and Bombay in 1686. The English were expelled from Hooghly by the local authorities. Job Charnock, the Company's agent in Bengal, had been looking for the necessary permission from either the Emperor of Delhi or his representative, the *Nawab* of Murshidabad, to establish a factory in Calcutta. Success did not favour him till he received in 1690 the much awaited formal permission from

Aurangzeb. Fortified with the formal permission of the Mughal Emperor, Charnock landed, as is told in '*Chutanutty Diary*', at one of the *ghaats* at Sutanati, on the sultry mid-day of August 24, 1690. At that time Charnock and his associates did not have the faintest idea that they were laying the foundation of a settlement destined to emerge as the powerhouse of the British Indian Empire. The volume of Company's import and export from Calcutta increased rapidly. By 1698, The Company had also acquired the *zamindari* of the 3 villages-Sutanati, Kolkata and Govindapur. The English settlement at Calcutta, comprising those three villages, expanded in course of time.<sup>3</sup> In 1700, the English also built a fort around its factory in Calcutta.<sup>4</sup> The fort was named Fort William to honour William III, the then King of Great Britain. A separate Council was created in Calcutta to control the English factories situated in Bengal.

To gain certain additional concessions, John Surman was sent in 1715 to Delhi to negotiate with Farruk Siyar, the then Mughal Emperor. In the year 1717, the merchants of the English East India Company stationed in Calcutta received the much awaited *farman* from the Mughal Emperor Farruk Siyar, which conferred on it the right of trade in Bengal free of customs duties in lieu of a payment of Rs. 3,000 every year. In this manner the seeds of a future contest between the English and the *Nawabs* of Bengal were sown. The English living in the settlement celebrated the *farman* with a grand bonfire. The English settlement of Calcutta, which stood at the centre of the events that led to the battle of Plassey, was located on the north western edge of the tract which later came to be known as the Sundarbans, a unique natural zone,<sup>5</sup> comprising mangrove swamps, where land making has not yet ceased and which is half land and half water.

Not only Southern Bengal, but the political economy of much of the Bengal delta was conditioned by its unique geophysical and climatic features. In many places land formation had not ceased (as in the Sundarbans), it remained as a collection of low swampy shifting land masses or islands where existing lands are continuously eaten up by rivers and new land is being formed. Geographers and geologists would argue that the best example of a charland in South Asia is the Bengal delta, created by the river-borne

silt drawn from the Himalayas. *Chars* are riverine landmasses rising above the water level. Rivers carrying large quantities of silt and flowing slothfully over the plains create these alluvial deposits. Riverine *chars* may be on the river beds, or may appear as attached spits near the banks.<sup>6</sup> The *chars* are extremely susceptible to frequent floods and bank corrosion due to changing river channels. The physical characteristics natural in the ecology of *char* formation make the charland one of the most fragile environments in the world. The vulnerability of the physical environment makes it a hazardous and disaster prone place.<sup>7</sup> Newly formed charlands are more fragile than the older ones as their edges may be eroded at any time by the river currents. Even older charlands may be lost to the unpredictability of a river, with fields and dwellings disappearing in a matter of days. In fact many flourishing towns and cities in Bengal had disappeared in the past due to natural calamities like flood, cyclone or high tide. The current size of Sagar Island is roughly 350 square km and it is presumed that its size has decreased over centuries due to continuous friction resulting from tidal waves.<sup>8</sup> This is a very common feature of the tidal country where old land masses disappear and new landmasses are formed by the silt which is being continuously washed away by waves.

Let us take up the interesting and well documented example of Goalanda.<sup>9</sup> In the nineteenth century during the earliest phase of railroad, the passengers going to Dhaka from Kolkata had to disembark at Goalanda. The journey from there to Narayanganj had to be continued by steamers. Goalanda was located at the junction of the Padma and the Brahmaputra and daily services of steamers connected it to the railway systems at Narayanganj and Chandpur and to steamer services to Madaripur, Barishal, Sylhet and Kachhar. Thus it occupied a very strategic position in the waterways of Bengal. The location of the place shifted on several occasions because of the shifting flow of water in the mighty rivers.<sup>10</sup> Once upon a time Goalanda was situated exactly at the junction of Padma and Brahmaputra. Large sums of money were spent in protecting the site from erosion. But, in 1875 the spot was washed away and since that date the terminus had constantly been on the move. The guide book of Eastern Bengal

State Railway published in 1913 recorded the following: '.....it (Goalanda) is now to be found about seven miles south of its former position.....The crumbling nature of the alluvial soil renders the banks easily adaptable to these makeshift arrangements and an occasional fall of a few tons of earth into the river seems to inconvenience no one.'<sup>11</sup>

The perpetual variability of the topography in Bengal not only poses a challenge to the historian engaged in reconstructing local history but it also made the job somewhat thorny for the cartographers and revenue administrators throughout history. As the maps of James Rennell, drawn between 1764 and 1772, were updated, it became clear to the administration that huge amounts of new terrain had been formed on the beds of the rivers or on the banks of rivers. Like the forest and wasteland the *chars* were deliberately kept out of the purview of the Permanent Settlement (1793). Estimating the extent of *chars* would anyway be tricky since the rivers of the delta kept forming lands on an unpredictable scale and pattern. To cite one example, between 1793 and 1827 eighty two *chars* were formed in the district of Comilla alone.<sup>12</sup> The Bengal delta is not only flood prone but it is also one of the most cyclone prone zones of the world. The Bay of Bengal is one of the major tropical cyclone basins where an annual average of five tropical cyclones forms 6% of the global total. In coastal Bengal there are two cyclone seasons, one before and the other after the Asian summer monsoon months, June-September. These storms originate usually in the south-east of the bay and they move towards the north. In the post monsoon months of October and November the majority of these storms later move north and eventually some change to a northeastern movement and hit the coastal areas to the north of the bay. These re-curving cyclones have a much longer sea travel than those that continue to move northwestwards and cross the coast west of the bay. All the major cyclones of this area resulted from such re-curved storms.<sup>13</sup>

As one major slum in San Juan, Puerto Rico, continues living on that place despite the fact that it is frequently inundated by high tide; as the poor of Rio de Janeiro continue living on the dangerous slopes of Sugarloaf Mountain despite the fact that it is subject to landslides; the slum dwellers

of Guatemala kept living on the steeper slopes even after it was affected by earthquakes, as the Japanese still live in the seismic zone of the world; as the Americans never move away from the tornado prone areas of the American continent, the city of Kolkata too, despite the fact that it was located in one of the most vulnerable physical environments, continued to flourish and the settlement continued to grow which display the remarkable spirit of resilience of the humans upon this earth. The city and its vicinity kept on witnessing a steady migration of foreigners from different parts of the world.

### **The Cyclone or Earthquake of 1737**

The catalogue of historically devastating earthquakes published in 1992 includes an earthquake in Calcutta in 1737 that is held responsible for the loss of 300,000 lives.<sup>14</sup> It also features in Oldham's catalogue of Indian earthquake.<sup>15</sup> The destruction of 1737 was the single largest event since the establishment of the English settlement in Kolkata and its effects are apparent in east India Company records for several years. Purnendu Patri, a noted scholar and an artist, did not forget to mention this natural disaster of 1737 in *Ki Kare Kolkata Holo* (a historical account of Kolkata written in Bengali primarily for children):

*Hathat saterosho saitirish saler ek bhishan jhar ese landa bhanda kare die gelo sajano shaharta. Nadite dublo jahaj pattar. Matir bari lutolo matite, engrejder paka badio kadaye kat* (A violent storm suddenly devastated the beautiful city in 1737. Ships sank in the river and both mud and pukka houses broke down)<sup>16</sup>

Thomas Joshua Moore, the company's *zamindar* (collector of duties and rents) stated in his report that the ravages of the storm had rendered the inhabitants of the black town destitute and that 'hardly twenty thatched houses were standing the next days'.<sup>17</sup> Two days later, on October 13, he reported:

Out of 32 company buildings, 24 are listed as being beyond repair. Of 2 gates in the town walls 14 are "broke to pieces" and the door of greatly damaged *puckka* gate "is quite blown out from the wall".<sup>18</sup> Several bridges

large and small for draining the towns were destroyed and the river banks near the market place eroded so much that there was no space to construct temporary warehouses to import relief supplies of grain.<sup>19</sup> There are vivid descriptions of the catastrophe in *Gentleman's Magazine* and *London Magazine* too:

"We had the following particulars (among others of the dreadful Hurricane that happen'd in India, mentioned in our last, p.257. In the night between 11th and 12th Oct. last, there happened a furious Hurricane at the mouth of Ganges, which reached 60 leagues up the river. There was at the same time a violent shock of an earthquake, which threw down a great many houses along the river side; in Galgota (Kolkata) alone, a port belonging to the English, 200 houses were thrown down and the high and magnificent Steeple of the English Church sunk into the ground without breaking. It is computed that 20,000 Ships, Barks, Sloops, Boats, Canoes & c. have been cast away. ....300, 000 souls are said to have perished. The water rose forty Feet higher than usual in the Ganges."<sup>20</sup>

There is a similar description of the event in *The Gentlemen's Magazine*: "On October 11, last happened a furious Hurricane in the Bay of Bengal, attended with a very heavy Rain which raised 15 Inches of water in 6 Hours, and a violent Earthquake, which threw down [an] abundance of Houses; and as the storm reached 60 leagues [=300km] up the River Ganges, it is computed that 20,000 ships, Barks, Sloops, Canoes, & c have been cast away. A prodigious quantity of cattle of all sorts, a great many Tygers, and several Rhinoceroses were drowned; even a great many Caymans [crocodiles] were stifled by the furious agitation of the waters, and an innumerable quantity of Birds was beat down into the River by the Storm".<sup>21</sup>

Another account of the storm is available in the writing of Sir Francis Russell, a great grandson of Oliver Cromwell, who happened to be present in the city of Calcutta on that fateful night :

"Such a scene of horror as that night was I never saw or heard of. Such Terrible guest of wind like the loudest thunder, and torrents of rain, that I expected every moment the house I live in, which I believe the strongest in the town, wou'd have fallen on my head. The noise was so violent above stairs, that myself and family was obliged to go down and stay below till

morning with poor Mrs. Wastell and her children, who fled to our house for shelter, the doors and windows of her's being burst from the walls . But good God, what a sight was the town and the river in the morning".<sup>22</sup>

There are various other references to the event of 1737. An inscription which has been discovered in Saibana, a village near Kolkata, mentions the storm of 1737. This inscription provides evidence, in Bengali script, about the capture of Calcutta by *Nawab* Siraj udaula in June 1756. The stone contains eight lines of inscription, in verse, known as *payar*. It talks about one Chudamani Dutta, who fled to Calcutta to escape the persecution of Nawab Murshid Quli Khan and returned to his village the year Siraj captured Calcutta. The inscription also refers to the great storm of 1737 and the *bargi* (Maratha) invasion in 1741, the two catastrophes that ravaged eighteenth century Bengal. Chudamani's psyche was shattered by the storm and also by the pillaging of the countryside by the Maratha cavalry. The inscription also records the construction of a dwelling house at Pakudiya after clearing of the *jungle* in the *Saka* year 1677 corresponding to 1756 A.D. by Chudamani Datta, son of Abhiram and grandson of Raghunath Datta. Though the inscription is apparently a record to commemorate the construction of the building, it refers to contemporary socio-political conditions of Bengal between 1726 and 1756. This inscription happens to be the only epigraphic evidence in Bengali script of the mid eighteenth century, casting a glimpse into the miseries of the common people caused by political and environmental turbulence.<sup>23</sup>

Among the later authors of the colonial era who had discussed the event mention may be made of H. F. Blanford, Henry Piddington and I. R. Tanehill. Blanford, a metrologist working in India in the 1870s, all along had a hunch that the casualty figure was inflated. He wrote, '..... but judging from the character of Indian statistical estimates, even at the present day, we may perhaps justifiably entertain a suspicion that these figures are somewhat excessive'.<sup>24</sup> Blanford quoted Henry Piddington's *Hornbook* as his source of information. For some unknown reason Piddington considered this storm worthy of mention only because of the supposed simultaneous occurrence of earthquake. He has not made any remark about the casualty figure.<sup>25</sup> In

1945 Tanehill wrote : "Perhaps the greatest catastrophe of this nature was that which occurred on October 7, 1737, at the mouth of Hooghly river, on the Bay of Bengal. A furious cyclone destroyed twenty thousand crafts of all descriptions and the storm wave rose 40 ft. It is recorded that ***three hundred thousand people perished in lower Bengal or in the Bay***" (bold Italics mine).<sup>26</sup> Tanehill noted the casualty figure of 300,000 - '300,000 people perished in the whole of lower Bengal or in the Bay' and thereby made it clear that the disaster did not hit the city of Calcutta alone. A.K. Sensarma writing about the event in 1994 in *Weather* expressed serious doubts about the casualty figure on the ground that the 'storm' affected an area a large part of which was under populated.<sup>27</sup> He did not note the historical possibility of the fact that the Sundarbans was not under populated in the beginning of the eighteenth century as it is today. The figure 300,000 is a colossal one anywhere anytime despite the fact that cyclone disasters in Bangladesh in recent times have brought the number within the realms of possibility. We shall return to comment on this issue in some detail later.

#### **Was it a *Tsunami*?**

What was it? Was it an earthquake driven *tsunami* or a super cyclone or both? We have reviewed the contemporary accounts of the event and noticed the contradictions in them. All accounts in Europe from merchant ships leaving Indian ports mention earthquake violence, but no mention of an earthquake appears in any of the East India Company reports. The East India Company papers describe the catastrophe as a 'hurricane'.<sup>28</sup> The possibility that an earthquake- induced *tsunami* caused the flood damage cannot be ruled out, but the evidence for very heavy rain (38cm in 6 hours) suggests a cyclonic weather condition typical of a late monsoon low pressure. The damages to straw houses and the drowning of people and animals would support the theory of an earthquake driven *tsunami* along with a cyclone. As to the argument in favour of a deadly super cyclone or 'hurricane' as mentioned in contemporary English accounts, it may be said that the English settlement of Calcutta, which stood at the centre of the events that led to the battle of Plassey, was located on the north western edge of the tract which came to be known as the Sundarbans. In medieval texts the lower Bengal has been repeatedly described as *Bati* or *Bhati*. In the oral traditions and

folk songs too the entire land mass spreading over from the eastern shores of Bhagirathi in the west to Chittagong in the east was referred to as *Bangala* or *Bhati*. Abul Fajal in *Akbarnamah* calls this coast line of the Bay of Bengal '*Bhati*' which means 'low land overflowed with the tide'. The tides reach as far as hundreds of kilometers inland and every day thousands of acres of forest disappear underwater only to re-emerge several hours later.<sup>29</sup> There is no disagreement on the point that this area was, and still is, very cyclone prone. The monsoon in this part of Bengal consists of a series of cyclonic depression, which follows each other in more or less close succession up the Bay of Bengal. October cyclones are examples of the most intense tropical storms. Such storms often result in the flooding of the tide country and large scale destruction of human and wildlife.<sup>30</sup> Interestingly all the major cyclones had hit the region in October.<sup>31</sup> The very wide continental shelf along the northern coastline of the bay amplifies the sea effects even from a cyclone of low intensity to immense proportions. Often these oceanic effects are transmitted deep inland through estuaries and waterways that run across the bay.<sup>32</sup>

It is necessary to note however, that the nature of damages and destruction in 1737, as it appears in the contemporary sources, are remarkably different from the cyclones of which we have greater details than the one under review. The cyclone of 1864 for example which hit Calcutta and the Sundarbans on October 5 did mention storm waves washing out villages, but they confirm that most of the damages to the houses and ships were due to the wind which was accompanied by the splashes of water.<sup>33</sup> But, no where in these accounts do we find mention of such occurrences like the Ganges water rising 'forty feet higher than usual' or 'the English church sinking into the ground without breaking'. From all these contemporary accounts it can be confirmed that it was not an ordinary storm or cyclonic depression. The unusual calamity, in all probability, resulted from a rare combination of a cyclonic depression and earthquake induced *tsunami*.

There is some evidence to suggest that the rise of sea water which flooded Calcutta or the Sundarbans may have actually did so, and then only the

discrepancy or the mystery relating to the number of casualties can be resolved. The mention of 300,000 deaths is intriguing. The population of Calcutta was not more than 20,000 in 1737. The graphic descriptions of a large number of tigers, crocodiles or rhinos being washed away, may suggest that the entire lower Bengal including present day Bangladesh was affected. Exact population of India in the middle of the eighteenth century may be difficult to ascertain. We may roughly hold that it was 250 million in the middle of the century and that the population of lower Bengal was, roughly speaking, 20/25 million. If the figure 300,000 is for the entire coastal lower Bengal, it may appear to be somewhat convincing.

At some point in the late seventeenth or eighteenth centuries many areas of the lower tract of the 24 Parganas facing the sea were abandoned and overrun with forest and jungle owing to some disorder, not clearly known to historians. The disorder may be political or it may be environmental in nature. The flood of 1584 dislocated thousands of villages in this area and further misfortune was inflicted on these settlements by the Portuguese and Magh incursions. In the Rennell's Map (1761) the whole tract to the south of Bakharganj has been described as 'country depopulated by the Maghs'. The depopulation of this tract may be due to the incursion of pirates, Portuguese and natives, devastations from cyclones and storm-waves. The decline of human settlements in the Sunderbans may be also due to certain changes in the natural environment like shifts in the course of rivers and the lack of flow of enough fresh water and corresponding increase of salt water not suitable for cultivation.

I will argue however, that this depopulation was due to the natural calamity in 1737 which was both a deadly cyclone and a *tsunami*. The probability of the simultaneous occurrence of a cyclone and an earthquake when one or both of the two events have long durations as is the case with super cyclones. The high casualty figure in a cyclone might have been possible only if the houses were not strongly built. But again the traditionally constructed soft houses of Bengal, which could be blown away in a very severe cyclone, would generally not collapse in an earthquake. Thus besides the super cyclone something special must have happened in 1737. A *tsunami*

could be that something special. One of the possibilities could be a mass of earth constituting the deltaic region of Bengal could have slipped into the Bay of Bengal causing thereby an earthquake as well as the generation of *tsunamis*. That an earthquake could have occurred at the time of the cyclone gains in credibility when one considers the casualty figure. In the form of tablet, unearthed in Barasat on the outskirts of Calcutta, the Indian National Museum in Calcutta has records of an earthquake on the night of 11-12 October. There are also geological evidences of many trees in standing conditions underground near Calcutta. The above point to the possibility of simultaneous events of a supercyclone and an earthquake, associated with a massive landslip creating high sea wave in Bengal. The cyclone or the *tsunami* of 1737 left such a deep dent that it recurred again and again in the official papers of the East India Company. There is evidence of the signature of a *tsunami* or a natural calamity greater than a cyclone in a letter written two years later which records : " A sad effect of the Hurricane was a famine that raged all round the country best part of the year, were obliged to forbid the exportation of rice the the 5th June.....".<sup>34</sup> The most common result of an earthquake driven *tsunami* is the loss of soil fertility due to saline incursion. The same was the result of the Lisbon earthquake that shook Europe in 1755.<sup>35</sup> This is not to suggest that storm surges were uncommon in Bengal, but, tidal waves during cyclones rarely traveled so deep into the hinterland. However, the argument in favour of the occurrence of a *tsunami* in 1737 calls for a far greater amount of empirical research. But if there was *tsunami* in 1737 then it also pushes back the occurrence of a *tsunami* in the Indian Ocean world to 146 years.

#### Notes & References :

- \* A somewhat different version of the present article is forthcoming as a book chapter in a collection essays.
- 1. Sugata Bose, *A Hundred Horizons: The Indian Ocean in the Age of Global Empire*, Harvard University Press : Cambridge, 2006, p. 2.
- 2. *Tsunami* is a series of waves created when a body of water, such as an ocean, is rapidly displaced. Earthquakes, mass movements above or below water, volcanic eruptions and other underwater explosions, landslides, under water earthquakes, large asteroid impacts or testing

of nuclear weapons at sea have the potential to generate a *tsunami*. The term *tsunami* comes from the Japanese meaning harbor (*tsu*) and wave (*nami*) meaning 'harbour waves'. *Tsunamis* are very common throughout Japanese history. *Tsunamis* are often referred to popularly as tidal waves. In fact *tsunamis* have nothing to do with tides. *Tsunamis* and tides both produce waves of water that move inland, but in the case of *tsunamis* the inland movement of water is much greater giving the impression of an incredibly high tide. In reality *tsunami* is neither tidal wave nor waves in harbor. The only other language that has a word meaning similar things is Tamil language and the word is *Aazhi Peralai*. The earliest datable *tsunami* in history occurred in 479 BC in the sea shore town of Potidaea, Greece. Thucydides, the Greek historian, was probably the earliest human in history, to relate under water earthquake and wave in a cause-effect relationship. The Maliakos Gulf *tsunami* that took place in the summer of 426 BC was one of a series of earthquakes which affected the course of the Peloponnesian War by forcing the advancing Spartans to abort their planned invasion of Attica. The ancient geographer Strabo reported that everywhere in Greece parts of islands were submerged, rivers permanently displaced and towns devastated. There is a graphic description of the event in the History of Peloponnesian War. Thucydides who saw the calamity with his own eyes concluded: "The cause in my opinion, of this phenomenon must be sought in the earthquake. At the point where its shock suddenly recoiling with redoubled force, causes the inundation. Without earthquake I do not see how such an accident could happen" - see Thucydides, *History of the Peloponnesian War*, Harmondsworth, 1972, Book III.

3. This discussion is based on R.Chakrabarti, *Random Notes on Modern Indian History*, Readers : Kolkata,2006, pp.22-25.
4. The city of Calcutta gave up its British name with effect from January 2001 and is now known by its original name Kolkata; Cf. *The Telegraph*, Kolkata,2nd June,2001.
5. The nearest equivalent of the Sundarbans,in more ways than one,is the Everglades National Park in Florida (USA); Cf.M.Grunwald,*The Swamp:The Everglades,Florida and the Politics of Paradise*, Simon and Schuster:New York,2007.

6. Kuntala Lahiri-Dutt, Gopa Samanta, Like the Drifting Grains of Sand : Vulnerability, Security and Adjustment by Communities in the Charlands of the Damodar River, India, *South Asia: Journal of South Asian Studies*, Vol xxx, No 2, August ; the largest *char* in the world , Majuli, is an island formed by the Brahmaputra in central Assam. The silt-laden Himalayan rivers descending onto Gangetic plains leave behind tracts of such land, commonly known as *diara* in north Bihar and eastern U.P.
7. Ibid
8. The entry on Sagar Island.
9. Also spelled as Goalundo.
10. *From the Hooghly to the Himalayas Being an Illustrated Handbook to the Chief Places of Interest Reached by the Eastern Bengal State Railway*, Bombay, 1913, pp.15-17.
11. Ibid, p.16.
12. Iftexhar Iqbal, *The Bengal Delta : Ecology, State and Social Change 1840-1943*, London, 2010, p.21.
13. A.K.Sensarma, The Great Bengal Cyclone of 1737 - An Enquiry into the Legend, *Weather*, Vol 49, 1994, Appendix B.
14. P.K.Dunbar et al, *Catalogue of Significant Earthquakes 2150 BC - 1991 AD*, US Department of Commerce : Washington DC, 1992; the earthquake also features in *Encyclopedia Britannica*, 1974, *Micropedia*, Vol.9, p.58.
15. T.Oldham, *Catalogue of Indian Earthquakes, Memoirs*, Geological Survey of India: Kolkata, Vol.19,Pt.III, p.170, 1883.
16. Purnendu Patri, *Ki Kare Kolkata Holo*, Ananda:Kolkata, 1972.
17. *Bengal Public Consultations*, Fort William, 1704 - 1740, Range 11, No 1-14, India Office Library, London.
18. *Bengal Public Consultations*, pp. 332-334, 1737.
19. Ibid.
20. *London Magazine*, June 1738, p. 311.
21. *The Gentleman's Magazine, Historical Chronicle*, June 1738, Volume VIII, p. 321.
22. Cited in Roger Bilham, Calcutta Earthquake and Cyclone Evaluated, *Bulletin of the Seismological Society of America*, October 1994, Vol 84, No 5, pp.1650-57.

23. Shyamalkanti Chakravarti, *Saibana Stone Inscription of Saka year 1677 Recording Plunder of Calcutta by Siraj-ud Daulla*, Bulletin of the Indian Museum, vol-19.
24. H.F. Blanford, *Indian Meteorologists*, Calcutta, 1876.
25. Henry Piddington, *Sailor's Hornbook for the Law of Storms*, London, 1848.
26. I.R. Tanehill, *Hurricanes*, Princeton, 1945.
27. A.K. Sensarma, *The Great Bengal Cyclone of 1737 - An Enquiry into the Legend*, Weather, Vol 49, 1994, pp. 90-93.
28. The word 'cyclone' or 'tropical cyclone' however, never features in the contemporary English accounts, it was a later creation of colonial meteorological knowledge and it was intimately bound up with the notion of tropics. In the contemporary accounts or correspondences relating to the disaster of 1737 or of all storms in sea or land till the early 1850s the word used is 'hurricane'. The cyclone of the Atlantic was known as 'hurricane', the name 'typhoon' was peculiar to the storms of the China sea and adjacent parts as a speciality. The word 'cyclone' owes its origin to a book titled *The Sailor's Horn-book for the Law of Storms* (1848) authored by Henry Piddington. Piddington used the word for whirling storms. Piddington was one of the earliest meteorologists who specialized in the study of tropical storms. He arrived in Calcutta in 1830 from the Caribbean with enough knowledge of Caribbean storm. He was much influenced by William Reid's *Law of Storm* (1838). Piddington began to collect massive data relating to hurricanes, gales and violent windstorms. Early colonial meteorology immensely benefited from his writings. In 1844, Piddington published a book titled *The Horn-book for the Law of Storms for the Indian and China Seas*. Shipping practitioners throughout the world acclaimed this work. Piddington was appointed the President of the Marine Court of Enquiry. It was Piddington who described the storm as a 'cyclone', a name derived from the Greek word '*kuklos*' meaning going around, or encircling, like the coil of a snake. It was Piddington, who predicted that the new port on the Matla (Port Canning) would not be able to withstand the fury of a tropical cyclone if hit by one. He was correct. Port Canning was destroyed by a severe cyclone in 1867 and finally abandoned in 1871. Today we have the technology to monitor tropical cyclones through

satellites and we know that it means such storms with counterclockwise rotation in the Northern Hemisphere and clockwise rotation in the Southern Hemisphere. Much of this knowledge was first gathered by Henry Piddington, see [http://banglapedia.search.combd/HT/P\\_0168.htm](http://banglapedia.search.combd/HT/P_0168.htm), also Frederick Hirth, *The Word Typhoon, Its History and Origin*, *Journal of the Royal Geographical Society of London*, vol 50, 1880, pp. 260-267.

29. Ranjan Chakrabarti, *Local People and Global Tiger: An Environmental History of the Sundarbans*, *Global Environment*, No 3, 2009.
30. Annual Report on the Progress of Forest Administration, Calcutta, 1864-68.
31. J.Downing, *The Cyclone of 1864, Bengal Past and Present*, July-October, 1907, pp.112-122. One of the earliest descriptions of this cyclonic storm in the Sundarbans can be found in the writings of Francois Bernier, the French traveler who visited the area in 1665: 'A storm arose so violent, that , although we were, as we thought, in excellent shelter under trees, and our boat carefully fastened, yet our cable was broken and we should have been driven to the main channel, there inevitably to perish, if I and my two Portuguese had not , by a sudden and spontaneous movement, entwined our arms round the branches of trees...the rain fell as if poured into the boat from buckets, and the lightening and thunder were so vivid and loud, and so near our head, that we despaired of surviving this horrible night", see Francois Bernier, *Travels in the Mogul Empire*, Oxford University Press : Oxford, 1914.
32. A.K.Sensarma, *The Great Bengal Cyclone of 1737 - An Enquiry into the Legend*, *Weather*, Vol 49, 1994, Appendix B.
33. J.Downing, op.cit.
34. Bengal Public Consultations, Letter dated 29th January, 1739, Fort William.
35. Edward Bryant, *Natural Hazards*, Cambridge University Press : Cambridge, 2006, chapter-1.