

Climate Futures' Past: Law, Insurance and Weather Knowledge in the Indian Ocean World

Debjani Bhattacharyya
University of Zurich
debjani.bhattacharyya@hist.uzh.ch

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Dear Penn Economic History Forum,

Thank you for reading and commenting on this draft chapter. This chapter is part of a larger book project which attempts to ask what sorts of cyclonic and weather knowledge was being produced by the expanding East India Company merchants, sailors and its underwriters. In my attempt to reconstruct what I am provisionally calling merchant science in the expanding nautical marketplace of the Indian Ocean, I return to the period from the mid-18th to mid-19th century, a historical moment that I argue was marked with financial and scientific experiments by the various company-states active in the Indian Ocean sometimes operating in the shadows or outside the metropolitan regulatory regimes. In trying to understand the making of climate as a commodity frontier, the three sections of the book will focus on legal institutions (marine courts), science (new science of cyclonology that emerged from these courts) and finance (insurance and weather risk management). The chapter that I have shared with you is my attempt to document the moments when the risk of weather disturbance – or what one may understand as climatological limits to trade – were commoditized in the service of marine insurance. I would like feedback on two aspects of this chapter:

1. I am not sure section IV belongs here. Rather that could go to the chapter on science.
2. In each chapter I take some aspects of our contemporary debates around climate as a starting provocation to think about the period between 1770-1850 in the Indian Ocean world and return to that in the conclusion. I try not to indulge presentism, therefore would value your feedback on whether the framing has worked.

This chapter is far from complete, as the bulk of the material I discuss come from the National Archives of India (Delhi), West Bengal State Archives (Kolkata) and British Library (London). I have not yet processed all the material I digitized last summer and this winter at the Maharashtra State Archives (Mumbai). I apologize for using both embedded citations and footnotes in this version and for the sometime choppy reading. Thank you again so much for taking the time to read this and I am looking forward to your critique and feedback.

With best wishes,
Debjani

Chap 2: Law, Insurance and Weather Knowledge in the Indian Ocean World, 1770-1870

The English language does not contain a native word to express the *more violent forms of wind*. We have borrowed a great many since we became the great merchants of the East, but hurricane and tornado are Spanish, typhoon, we believe, Chinese, though dictionaries derive it from the Greek, simoom Arabic, and cyclone pure Greek, with a conventional meaning imposed upon it by science." [...] Storm is the only native word of any force, and an Englishman's idea of a storm does not tempt him to sympathize greatly with the sufferers from its violence. Accustomed only to the winds of the north, which bring catarrh and consumption, but leave wooden houses standing for years, which seldom last many hours, and are never destructive except at sea, his power of imagining wind is limited, and he reads a story like that of the catastrophe at Calcutta with a feeling of pity in which there is just a trace of something like contempt. People out there must be very weak or arrangements very bad for a mere wind to work all that destruction, throw 'Lloyds into a panic, and impede the systole diastole of Her Majesty's foreign mails.'

- Anon., *The Spectator* November 12, 1864 [my emphasis].

..that it teaches how to *avoid Storms* - teaches how best to *manage in Storms* when they cannot be avoided - and teaches how to *profit by Storms*!

- Henry Piddington, *Law of Storms* (1848)

Climatic catastrophe is a specter that haunts global financial institutions, sending banks and insurance scrambling to find new monetary tools for risk management. Two years after the Indian Ocean Tsunami in 2004, Lloyd's of London launched the 360 Risk Project to research the effects of climate change on the global insurance industry. In the annual reports, published annually, the 360 Risk project demarcate spaces of future climatic risk. These spaces are overwhelmingly in the Indian Ocean and the Caribbean. In the contemporary moment, climate destabilization has become a financial and political security issue and these reports frame national and global policy discussions. Moreover, mitigation efforts like green capitalism to tackle environmental damage are emerging as

new frontiers for capital expansion (Carroll, Fox and Bayon 2008; Gabor 2023). In the age of heightened awareness about living in a climate-changed and hyper-financialized world, the global financial sector defines nature increasingly in terms of a peril index, carbon footprint, carbon taxes, weather risk, and hazards, to mention but a few of the more prevalent terms in the nomenclature. Naming has power – it defines the terrain of expertise and influences the movements of global capital, labor, and goods. Sociologists and STS scholars have developed four typologies of financialization to understand the intersection of climate change and market practices: nature finance, nature work, nature banking, and nature derivatives (Sullivan 2012). Lobo-Guerrero (2011), Bellamy Foster (2022) and Cooper (2008), whose work has focused on explaining and contextualizing the ascendancy of financialization of climate, argue that the world is witnessing the emergence of a new politics pertaining to the atmosphere, where insurance and finance are defining the key terms of the debate. They call this an “insurantal imaginary” which is used to measure and project climate catastrophe through financial calculation alone (Lobo-Guerrero 2011). Such an imaginary, they argue, is a product of the ascendancy of Earth System Science, the mainstreaming of environmental movements, and ecological economics and futurologists from the 1970s onwards, especially since the publication of the 1972 Club of Rome report (Höhler 2015; Moreno and Speich Chassé et al. 2015; Andersson 2012). While such an analysis is extremely critical in bringing financial and climate history into conversation, it remains captive to understanding the contemporary moment as a product of neoliberal politics shorn of historical depth.¹ In this chapter, I attempt to question this short-term framework to understand climate risk management through financial

¹ Indeed, most scholars analyzing the contemporary socioecological crisis have turned either to the concept of spatial fix or furthered that concept to understand processes of green capitalism as ecological fix. I am not yet convinced that ecological fix, as such, can operate as a heuristic to explain the commodification of climatological crisis in the form of trading in weather risk contracts. Indeed, a much more fruitful analysis might be developed by understanding how value extraction occurs in moments of crisis, or as in the case of this chapter, I try to understand how cyclones are incorporated into processes of accumulation.

means. The chapter asks if there might be other historical antecedents to this moment, when weather destabilization – what we today increasingly understand as climate destabilization – became a site of profit making.²

On October 5, 1864 as the monsoon winds were retreating from the littorals of the Bay of Bengal, a devastating cyclone struck, killing 80,000 people, drowning the city of Calcutta and washing away large swathes of coastal villages. The first and the most extensive account of the storm damage comes from Lloyd's records. Of the 195 ships docked at the Calcutta port, 36 were lost and 182 were damaged with an estimated loss of approximately 1 million sterling (Gastrell and Blanford, 1866: 145). While the loss of life, cattle and property were staggering, the coasts of the Bay of Bengal were no stranger to the cyclonic battering.³ Yet by the early decades of the nineteenth century tropical cyclones in the Bay of Bengal emerged as both a problem of knowledge as well as one of risk management in Britain's eastern colonies. These "violent forms of winds" snapped the very sinews of imperial trade, created panic amongst underwriters in the colony and metropole, and as the London-based paper *Spectator* writes, they "impede[d] the systole diastole of Her Majesty's foreign mails." How do we make sense of the fact that Lloyd's was the first to produce the most authoritative account of the cyclone, which later found its way into government reports as well as later meteorological accounts of its ravages? Or for that matter how do we understand the world

² There are multiple ways to distinguish between weather and climate, with weather being understood as regional and climate planetary. However, historians of climate, especially Katherine Anderson, Jan Golinski and Deborah Coen have historicized the distinction in their works. What is important is how this distinction is being mobilized in the present moment in climate litigation, especially using attribution science. The science chapter in the book will delve into that, so I bracket off the discussion here.

³ A perusal of the Bengali chapbooks published through the first half of the nineteenth-century, nearly one fourth of them were on cyclones – both historical and metaphorical – indexing both a heightened interest in them as well as moral meteorological imagination that pervaded popular culture (see chapter 3).

where the anonymous journalist ends his description of the storm by pondering on the state of Lloyds and imperial finance. This chapter will turn primarily to the archives of imperial commerce, insurance records and marine court cases to understand what sort of cyclone knowledge was cobbled together in these spaces, prior to the establishment of the Indian Meteorological Department in 1875.

As the nautical marketplace expanded in the Bay of Bengal from the eighteenth century onwards, fire and piracy emerged as risks associated with maritime routes and tropical storms trafficked between calculable risks and uncertainties or what is today increasingly understood as “unknowns.”⁴ Indeed, informational exchange about overseas trade conditions, both through informal networks sustained by ship captains embedded social milieus of the port towns as well as through formal institutionalized publications about weather condition, geographical and political risks, as well as price in almanacs and travelogues were critical in shaping the changing nature of unknowns and risk pricing through the eighteenth century.⁵ Monsoonal weather – predictable winds that governed trade till the coming of steam, as well as seasonal cyclones and sudden onsets of gale and bad weather – was an important actor in the world of finance.

Attempts to manage trade in these cyclonic spaces operated within a terrain of financial management and a network of agency houses and legal infrastructure that began to dot the Indian Ocean littorals. If insurance and forms of underwriting weather risk was one node of this management, the other, as this chapter will show was multiple forms of risk transfer, in the name of

⁴ Frank Knight, *Risk, Uncertainty and Profit*, 1921. Climate unknowns and weather uncertainties historically fetched a very high premium in insurance. See Luis Lobo Guerrero, “Insurance, Climate Change and the Creation of Geographies of Uncertainty in the Indian Ocean Region,” *Journal of the Indian Ocean Region* 6, no. 2 (2010): 239-251, 240-41; about how underwriters assess uncertainty especially in medical cases see C Parson, “Insuring the Unknown,” *Human and Experimental Toxicology* 34, 12 (2015): 1238-1244.

⁵ Erikson, Emily, and Sampsa Samila. “Networks, Institutions, and Uncertainty: Information Exchange in Early-Modern Markets.” *The Journal of Economic History* 78, no. 4 (2018): 1034–67. <https://www.jstor.org/stable/26787146>.

protection that took place in the marine courts. Premium based marine insurance, in the form of a promise of an indemnity in the case of loss originated in fourteenth century Italy and spread through England and northwestern Europe in the fifteenth and sixteenth century. While formalized insurance markets developed in northern Europe and United States rapidly, throughout the eighteenth century the British insurance community continued to rely on private underwriters through companies like Lloyd's.⁶ Forms of private underwriting, risk sharing also existed in India's overland trade, where the threats were primarily interception, rather than weather based.

In his work on security in Mughal trade routes between the 16 to 18th centuries, Nazer Aziz Anjum writes about what constituted insecurity in the inland routes. He classifies two types of insecurities that merchants had to deal with: a. thieves or attacks on trade caravans and b. what traders understood as "illegal" exactions by local landlords along the routes.⁷ These extractions were understood as levies or *rabdari*, exacted by the various Jagirdars or Zamindars under whose jurisdiction the routes fell. These levies were often had to be paid in order to avail of protection from thieves along the routes. Anjum also documents the following kinds of arrangements which merchants availed themselves of to stave off attacks or sometimes leverage these levies for their

⁶ For a recent accounts on Dutch practices see Puttevils, Jeroen, and Marc Deloof. "Marketing and Pricing Risk in Marine Insurance in Sixteenth-Century Antwerp." *The Journal of Economic History* 77, no. 3 (2017): 796–837. <https://www.jstor.org/stable/26787043>. 797-8; for an institutional approach to the history of insurance in the Netherlands see Sabine Go, *Marine Insurance in the Netherlands, 1600-1870: A Comparative Institutional Approach* (Amsterdam 2009); for an account of how private underwriting functioned in England see Guido Rossi, "England 1523-1601: The Beginnings of Marine Insurance, in A. B. Leonard eds. *Marine Insurance: Origins and Institutions, 1300-1850* (Palgrave 2015); while Rossi's account ends with the 1600s, there is still much to be researched with relation to insurance in "eastern waters." For that see A. B. Leonard. "Underwriting British Trade to India and China, *The Historical Journal*. 2012;55(4):983-1006. doi:10.1017/S0018246X12000398, where he argues that in the post 1720 moment following the passage of the Bubble Act, underwriting started thriving in the eastern trade. His argument bears out my archival research with the risk and assurance books of Lloyds so far.

⁷ Nazer Aziz Anjum, "Security on the Routes in Mughal India," *Proceedings of the Indian History Congress*, Vol. 66 (2005-2006): 446-455 and see also his "Indian shipping and security on the seas in the days of the Mughal empire" *Studies in People's History*, 2, 2 (2015): 155–168, for the various types of credit available and the limitations of sources during this time see Najaf Haider, "English Merchants and the Credit Market of India in the 17th Century," *Proceedings of the Indian History Congress*, Vol. 48 (1987): 294-301.

protection. Sometimes the traders, including European traders traveling inland from ports, would take armed guards. At other times they travelled in large caravans, or *Kafilas*, and paid protection costs along the routes for safe passage. Irfan Habib and Girija Shanker among others have documented the private practice of *bima* (best translation would be insurance) by western Indian merchants, primarily Marwari merchants. They document two basic types of *bima* based on the account books of Western Indian merchants. One type of *bima* covered the risk of loss on the way and in the other type there were professional carters who took the risks on the routes and paid the dues to ensure safe conveyance of the goods. The merchants had branch offices all over India and their *bima* were like indemnity letters, but unlike mutual protection these *bimas* charged either a fee based on a percentage or on the weight of the insured goods, operating rather similarly to premium-based insurance. Lakshmi Subramanyam, more recent work on coastal trade shows how political authority along the Konkani coast in western India during the same period was often reliant upon their coastal chiefdoms' ability to offer protection and regulate salvage.⁸

Within a rapidly transforming financial landscape, where Indian and Company agents, local insurers and merchants vied for power with ship captains, insurance *vakeels* (lawyers) and the marine court to adjudicate over damage on cargo.⁹ Storms thus emerged as problems of administering justice and estimating risks. The Bay of Bengal, faced with the exigencies of global trade in the

⁸ Lakshmi Subrahmaniam, *The Sovereign and the Pirate: Ordering Maritime Subjects in India*. Oxford University Press, 2016.

⁹ So far there are no comprehensive work on the changing world of credit, finance and insurance during the period under investigation. Either studies focus on the Mughal period, or primarily they begin in the nineteenth century. Eighteenth century continues to be a vibrant field of debate caught between the poles of dynamism and decline. It is still not understood well. The classic study explaining this period through great firm theory is by Karen Leonard, "The 'Great Firm' Theory of the Decline of the Mughal Empire." *Comparative Studies in Society and History* 21, no. 2 (1979): 151–67. <http://www.jstor.org/stable/178414>. Currently works focusing on regional dynamics and specific financial aspects that touch upon insurance are emerging. See for example Sundara Sreenivasa Rao Vadlamudi, "Merchants in Transition: Maritime Trade and Society of Tamil Muslims in the Indian Ocean World, c. 1780-1840," Unpublished dissertation, UT Austin, 2016; Timothy Davies, "British Private Trade Networks in the Arabian Seas, c. 1680-c-1760," Unpublished Dissertation, University of Warwick, 2012.

eighteenth-century, thus became the space of both legal and financial experimentation and subsequently a laboratory for nineteenth-century weather science. In the midst of this trial and error, storms managed to become sources of profit.

From the latter decades of the seventeenth century, the East India Company (EIC) began consolidating itself through fortification from Surat to Chittagong, buttressed by the armed schooners and canons along the littorals of the western Indian Ocean and the Bay of Bengal.¹⁰

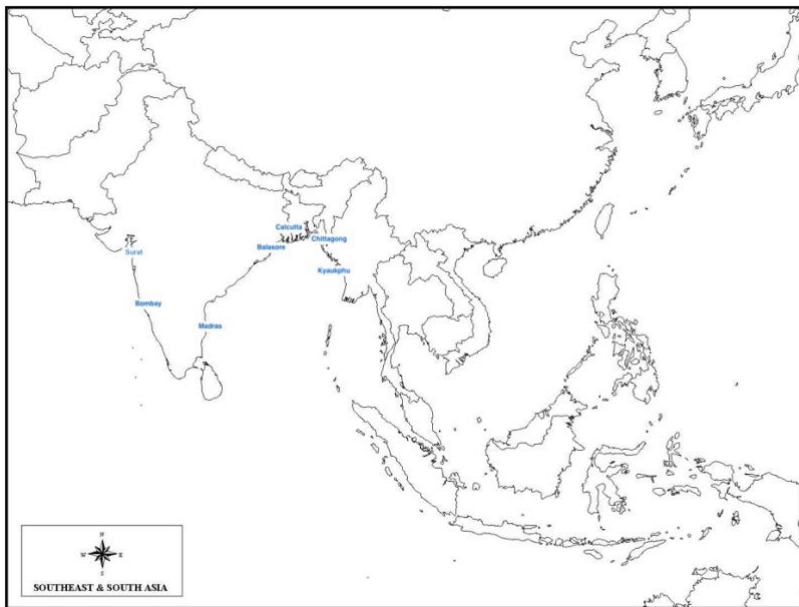


Fig. 1: The blue centers mark spaces mentioned in this paper

The EIC's territorial strength was sustained by the legal pluralism of the Indian Ocean, at a time when the seas were being turned into a juridical space of European competition from the seventeenth century onwards.¹¹ If, as existing scholarship documents, the justification of piracy and

¹⁰ There is a large literature on the transformation of the Indian Ocean World with the arrival of the Europeans. For a history of fortification and emerging regime of “contained violence” see Sanjay Subrahmanyam, *The Political Economy of Commerce: Southern India, 1500–1650* (Cambridge: Cambridge University Press, 1990); see also Lakshmi Subrahmanian on how these new regimes produced some groups as outlaws and how they negotiated this new terrain of protection, *The Sovereign and the Pirate: Ordering Maritime Subjects in India*. Oxford University Press, 2016.

¹¹ Renisa Mawani, *Across Oceans of Law: The Komgata Maru and Jurisdiction in the Time of Empire* (Raleigh, NC: Duke University Press, 2018), see esp. Chap. 1 and 2.

capture animated the legal and juridical debates about European commercial expansion in the Atlantic and Indian Oceans, then this paper argues that the freshes, waterspouts, gales and the monsoon also played critical role in this growing littoral commercium. The dizzying profits and dangers of the Bay of Bengal meant that the merchants and financiers figured out a way to translate environmental anomalies into colonial bureaucracy as the administration of human error.

This chapter turns to the wrecked ship as it emerges in the legal records and the archives of cyclone science to ask how the materiality of the tides and winds intersected with imperial trade, the regulation of the maritime world and the marketplace that grew around it. In her recent book *Across Oceans of Law* (2018), Renisa Mawani urges us to think about “oceans as methods.” She uses the moving ship, crisscrossing multiple bodies of water and jurisdictions, to analyze the asymmetries of power, authority and racialization to recover what she calls a “counter-nomos of the Earth.”¹² How might an attention to this materiality of the oceans help us situate the juridification of the free seas as part of the history of cloaking vast swathes of the ocean and the earth’s surface with isolines representing pressure, temperature and depth?¹³ Lauren Benton’s *Search for Sovereignty* attends to the “fluid discourse about geography [which] urged associations between physical properties and qualities of law and sovereignty.”¹⁴ What exact material practices of law emerged when natural features interrupted imperial trade? How can we use “oceans as method” to productively narrate the legal management of storms and wrecks as entangled with the scientific discovery of the sea as its laboratory? Let us turn to the Indian coasts, which, like the Caribbean, were known to be treacherous, unruly and unmanageable to the European merchants to see how the new taxonomies

¹² Mawani, *Across Oceans of Law*, 60-61.

¹³ Deborah Coen, *Climate in Motion: Science, Empire and Problem of Scale* (Chicago: Chicago University Press, 2018).

¹⁴ Lauren Benton, *Search for Sovereignty: Law and Geography in European Empires 1400-1900*, (Cambridge: CUP, 2009), 7.

of weather and climate emerged as a theory of future value and function of imperial trade, exchange and circulation of capital.¹⁵

The turbulence of the Bay of Bengal concerned Henry Piddington (1797 - 1858), made famous through his book *Law of Storms* (1848), for more than one reason. He is well known for coining the term cyclone to define the particular storms that one sees in this region and his contribution to weather science, but his role as the president of the Marine Court of Enquiry in Calcutta (1830-1858) is hardly researched.¹⁶ His rules to *avoid, manage and profit from storms* emerging out of his work in the Marine Court, was critical to the theories of cyclone he develops, one that according to him was about negotiating a terrain marked by human error and ignorance. In the Marine Court he sought to order the perils of the sea into a legible legal register, while in his writing he sought to simultaneously develop a “serviceable truth” and profitable science of winds in the Bay of Bengal and South China Seas.¹⁷ His science of cyclone was born out of the very judicial structures that produced human error as an uninsurance liability. Indeed, analysing wreck and damage compensation cases in the Marine Courts in Calcutta (1770-78 and 1834-40)¹⁸ reveal how a punitive financial regime allowed the cost of weather risk to be transferred as a financial liability to the lower orders of the deck as I show in section III of this chapter. The cases surrounding the wrecked ship,

¹⁵ Charles Low, *History of the Indian Navy (1613-1863)*, vols. 1 and 2 (London: R. Bentley & Sons, 1977) frames his history of the Indian navy as one of fortification against “native” pirates, marauders and raiders; Michael N. Pearson, *The World of the Indian Ocean, 1500-1800: Studies in Economic, Social and Cultural History* (Burlington: Ashgate, 2005).

¹⁶ There has been some recent work on Henry Piddington’s storm science and his role in the institutionalization of meteorology in India. Sunil Amrith, *Unruly Waters: How Rains, Rivers, Coasts and Seas have Shaped Asia’s History* (New York: Basic Books, 2018); Sarah Carson recent dissertation pays substantial attention to Piddington. “Ungovernable Winds: The Weather Sciences in South Asia, 1864-1945,” (Ph.D. Dissertation, Princeton University, 2019). As of writing this piece it was still unavailable at the Mudd Manuscript Library.

¹⁷ Sheila Jassanof, “Serviceable Truths: Science for Action in Law and Policy,” *Texas Law Review* 93.7 (June 2015): 1723-1749.

¹⁸ The dates simply denote years I have so far processed, not the actual expanse of archival holding.

the legal debates and the nautical marketplace were critical to this science in service of better risk management in these choppy waters. He was not the first legal actor in the nineteenth century to worry about the science of forecasting. Already, in the sixteenth century we witness the emergence of a scientific curiosity about storms by Iberian theologians and lawyers investigating hurricanes in the Caribbean. One of the most noteworthy among them was López Medel, who was a high court judge and served in the appellate courts in Santo Domingo, Guatemala and New Granada from 1540-50 overseeing shipping and trading disputes (Schwartz 2015: 17). He wrote about *buracanes*, which he defined as ‘meeting and dispute of varied and contrary winds,’ later recognized as circular winds and defined as cyclones Piddington almost three centuries later. However, before I turn to Piddington and the science he extracted out of the Admiralty and Marine Court records of the EIC in order to protect the pilots and the lower orders of the shipping hierarchies, let me briefly situate my propositions within the debates in Indian Ocean history. In the first two sections I set the scene by first briefly outlining what sort of legal histories we might imagine from an archive of shipwrecks, and in the second I briefly outline how the history of shipwrecks was deeply connected to the expansion of maritime insurance and underwriting of imperial trade under EIC. The final two section turns to the colonial courtroom and the science it produced.

I. Wrecks in Legal History

Throughout the seventeenth century the Company lost nearly one quarter of its ships sent to Asia.¹⁹ These numbers began to decline and by 1760 to 1796 it was losing 20% of its ships to shipwreck on their way to Asia – a staggering number, nonetheless.²⁰ Wrecked ships left a vast legal and economic

¹⁹ Papers on Marine Subjects, IOR/L/MAR/C/325, British Library, London.

²⁰ The numbers are not vastly different if we look at the Dutch records. R. Bruijn, F. S. Gaastra, I. Schöffer, eds. *Dutch-Asiatic Shipping in the 17th and 18th Centuries: III Homeward-bound voyages from Asia and the Cape to the Netherlands (1597–1795)*. Springer, 2013.

archive behind and this archive has been a critical source for maritime histories.²¹ Yet, we have far fewer histories documenting the wrecks themselves and how these wrecks organized multiple archives of the state, including its science and bureaucracy.²² This is despite the fact that the unavailability of wrecks over the nineteenth century. Despite the arrival of steam technology, wrecks initially did not decrease. Indeed, the technological innovation meant risk-taking in turbulent weather initially increased as is borne out by the annual records published by the Marine Board in India, which established a Department of Wrecks in Indian Waters in 1864. The history of the Indian Ocean world has been nearly silent about these wrecks. The historiography has focused much more on exploring the series of changes that the Indian coasts began to undergo from the seventeenth century on.²³ Patterns of violence at sea along the western littorals of the Indian ocean began to transform coastal society and maritime trade, resulting in the juridification of the seas. M. N. Pearson, Sanjay Subrahmanyam, Ashin Dasgupta and K. N. Chaudhuri among others located the coming of the Portuguese as the moment when the Indian Ocean was reordered through the introduction of the *cartaz – cafila – armada* system.²⁴ This, they argued, resulted in driving out Arab traders and in the increased militarization of the coastal corridors, while also laying the groundwork for the emergence in European perception of the coastal littoral as a world of dissenters and outlaws.²⁵ Not to be outwitted in maritime expansion, the inland sovereigns, namely the Mughals and Marathas, also began to consolidate their naval power, with the Mughals continuing to remain in

²¹ If the capture of Santa Catarina in 1609 gave us Hugo Grotius's *Mare Liberum*, the seizure another Santa Catharina, a 220 ton ship have left historians with another large archive of papers and letters to reconstruct a slice of the maritime world of the eighteenth century. See Gagan Sood, *India in Islamic Heartland: An eighteenth-century World of Circulation and Exchange*. (Cambridge: Cambridge University Press, 2016).

²² Salvage footnote

²³ Ashin Dasgupta, *Merchants of Maritime India, 1500-1800* (Variorum, 1994).

²⁴ Charles Boxer, *Portuguese Sea-Borne Empire, 1415-1825* (Alfred Knopf, 1969).

²⁵ Subramanian, *The Sovereign and the Pirate*, 3-4.

control of the highly lucrative riverine and overland trade through the 17th and much of 18th centuries.²⁶ Within these dynamic moments of jurisdictional transformations new material and labor conditions emerged in the Indian Ocean's western littorals in the 18th century, rendering many traditional systems of salvage dues, forms of diplomacy and protection into outlaw and piracy. Studying a similar transformation in the Atlantic, Benton's work has helped us understand these transformations as an emerging system of "legal jockeying" in which existing obligations of protection were being renegotiated.²⁷ Turning to the colonial ethnographic archive of what was variously classified as "Malabari" piracy, Lakshmi Subramaniam recently documented this moment as a project of littoral governance, which was first arranged by the Portuguese, and later constituted a system for ordering maritime labor, through ideas of piracy and protection.²⁸

Moving away from piracy, recent legal history on the Indian Ocean has shown how circuits of law created a connected world of ideas, printing presses and texts.²⁹ This was a world where merchants, pilgrims, slaves and indentured laborers moved in huge numbers.³⁰ Nonetheless this

²⁶ Atul Chandra Ray, *A History of the Mughal Navy and Naval Warfare*, (Calcutta: The World Press, 1972).

²⁷ Lauren Benton, Adam Clulow, and Bain Attwood, eds. *Protection and Empire: A Global History* (Cambridge: Cambridge University Press, 2017).

²⁸ Malabari was a term used primarily by English merchants to describe a whole range of maritime activity along the western Indian ocean from the seventeenth century onwards as piracy. Lakshmi Subrahmaniam, "Piracy and Legality in the Northward: Colonial Articulations of Law, Custom and Policy in the Late Eighteenth-and Early Nineteenth-Century Bombay Presidency," *Journal of Colonialism & Colonial History* 15, no. 1 (Spring, 2014): <http://doi.org/10.1353/cch.2014.0014> (accessed October 21, 2019).

²⁹ Sanjay Subrahmanyam, "Connected Histories: Notes towards a Reconfiguration of Early Modern Eurasia," *Modern Asian Studies* 31, no. 3 (1997): 735-62; Drayton, Richard. "Maritime Networks and the Making of Knowledge," in David Cannadine, ed., *Empire, The Sea and Global History: Britain's Maritime World, 1760-1840*, (Palgrave Macmillan, 2007), 72-82; Ronit Ricci, *Islam translated: literature, conversion, and the Arabic cosmopolis of South and Southeast Asia* (University of Chicago Press, Chicago, 2011); Claude Markovits, *Merchants, Traders, Entrepreneurs: Indian Business in the Colonial Era* (Palgrave Macmillan, 2008). Bay of Bengal historians are also marking out their space separately from Indian Ocean history. See Sunil Amrith, *Crossing the Bay of Bengal*; Michael Laffan and Nikhil Menon ed. *Belonging Across the Bay of Bengal: Religious Rites, Colonial Migrations, National Rights* (London: Bloomsbury, 2017); Kalyani Ramnath, "Boats in a Storm: Law, Politics and Jurisdiction in Post-War South Asia," (Ph.D. Dissertation, Princeton University, 2018).

³⁰ Iza Hussin, "Circulations of Law: Cosmopolitan Elites, Global Repertoires, Local Vernaculars," *Law and History Review* 32 no. 4 (2014): 773 -795; Kerry Ward, *Networks of Empire: Forced Migration in the Dutch East India*

connected and amphibious world was a site of intense violence, dispossession and concretization of settler colonialism, out of which emerged new orderings of market practices and new modes of exchange and arbitrage, thereby framing the economy in its peculiar modern forms.³¹ Yet, these accounts of violence have hardly anything to say about the furies of the ocean and the ferocity of the storms.

Beyond the seas, ships have increasingly been studied as sites for the experimentation of legal regimes and foundations to systems of imperial and racial governance. For instance, the Torrens system for the registration of ships served as a template for land settlement in Australia and Canada and much of the Malay Archipelago through the nineteenth century.³² Labor regimes and racial hierarchies developed in the slave ships were extended to plantations in the Americas.³³ Throughout the nineteenth century ships were also seen as floating observatories and experimental spaces for medical and botanical studies.³⁴ But that was not all. The regimes of credit, debt, salvage and protection that surrounded a ship often came unraveled in cases of wrecks.³⁵ Might we then be able to salvage a history of colonial weather science and imperial law from the flotsam and jetsam

Company (Cambridge: Cambridge University Press, 2009) and the recent edited volume Renisa Mawani and Iza Hussin, “The Travels of Law: Indian Ocean Itineraries,” *Law and History Review* 32, no. 4 (2014). Nandini Chatterjee and Lakshmi Subramanian, “Law and the Spaces of Empire: Introduction to the Special Issue,” *Journal of Colonialism and Colonial History*, 15, no. 1 (2014) DOI: [10.1353/cch.2014.0012](https://doi.org/10.1353/cch.2014.0012); Ramnath, “Boats in a Storm.

³¹ On the framing of the market through oceanic encounters with slavery/labor, trafficking/free trade and gold/capital see Johan Mathew, *Margins of the Market: Trafficking and Capitalism Across the Arabian Sea* (Berkeley: University of California Press, 2016).

³² Renisa Mawani, Law and Settler Colonialism, and “the Forgotten Space” of Maritime Worlds,” *Annual Review of Law and Social Science* 12 (2013): 107-31.

³³ Marcus Rediker, *Slave Ship in Human History* (Viking, 2007).

³⁴ Simon Naylor, “Log Books and the Law of Storms: Maritime Meteorology and the British Admiralty in the Nineteenth Century,” *Isis* 106, 4 (1025): 771-797.

³⁵ There is an extensive historiography on salvage and jettison in the Mediterranean world. Francesca Trivellato, “Amphibious Power?: The Law of Wreck, Maritime Customs, and Sovereignty in Richelieu’s France,” *Law and History Review*, 33 no. 4 (November 2015):915-944; Oliva Remie Constable, “The Problem of Jettison in medieval Mediterranean maritime Law,” *Journal of Medieval History*, 20, no. 3 (1994), 207-220.

left behind as ships floundered, returned battered from raging storms and sometimes sunk without a trace?

If “piracy” opened up fault lines between sovereignty, territoriality and coastal labor, turning them into key historiographic debates about the western Indian ocean, something else was afoot along the Bay of Bengal coasts. The turbulence along the Coromandel coast in the eastern side made the final journey of the goods from the hulls of the merchants ships to the coast in small *masoola* boats difficult and risky.³⁶ Further up the eastern seaboard, the River Hughli connected the Bay of Bengal to the inland markets in eastern India. This riverine route was imperiled with multiple unknowns and was famous for being one of the most treacherous routes: the shifting river, the seasonal sandbanks, and the need to depend on Indian pilot boats complicated landfall after a weary journey through the Bay of Bengal.³⁷ And if the monsoon winds were one of the central infrastructures of imperial trade before the arrival of steam navigation, then the knowledge about this particular infrastructure was nebulous for European sailors until the middle decades of the nineteenth century. Legal and maritime historians have produced sophisticated accounts of how the risks of piracy shaped questions of sovereignty, territoriality and labor in the oceans. In these rich histories of trade and circulation, the very materiality of the ocean and the winds that rage through it are invisible. Therefore, far less attention has been paid to the legal labor expended in the Marine

³⁶ Sinnappah Arasaratnam, *Merchants, Companies, and Commerce On the Coromandel Coast, 1650-1740*. Delhi: Oxford University Press, 1986.

³⁷ Navigational writing spilled much ink in documenting the coast and arguing about the superiority and authenticity of their accounts. Some of the major ones that ran into a few editions are: W. Herbert, S. Dunn, and W. Nicholson, W. *A new directory for the East-Indies: containing, I. The first discoveries made in the East-Indies by European voyagers and travellers. II. The origin, construction, and application of nautical and hydrographical charts. III. The natural causes, and observed phenomena, of the constant and variable winds, trade-winds, monsoons, and currents, throughout the East-India oceans, and seas. IV. A description of the sea coasts, islands, rocks, harbours, shoals, sands, sea-marks, soundings, &c. in the Oriental navigation. V. Directions for navigating in the East-India seas, to the best advantage, at different times of the year. VI. Directions for sailing to and from the East-Indies, as recommended and practised by experienced navigators and mariners*. 6 editions (London: Gilbert and Wright, 1791); Alexander Dalrymple, *Collection of Nautical Papers Concerning the Bay of Bengal Published at the Charge of the East India Company from the Mss. By Dalrymple 1784* (London: G. Biggs, 1785).

and Admiralty Courts in attempts to locate discernible patterns in the winds and tides that raged along the coasts and on the oceans born out of the demands of the insurance markets. The question then is what are the underlying concern and triggers that bring science, law and insurance together at this historical juncture. Attempting to answer this question will allow us to also explain why underwriting British trade in the eastern waters became so profitable, despite heightened El Nino weather activity increasing the number of cyclones and typhoons in the region. Is it simply the absence of regulation of the Bubble Act that allowed private underwriting business to flourish as Leonard argues? Or can we read the cyclones as ecological limits that were overcome by drawing cyclones into processes of accumulation?

The work of nature, like piracy, entered maritime law and insurance codes as risks, unknowable perils and categorizable and punishable series of human errors. Much labor was invested in the courts in classifying tropical wind behavior as avoidable dangers of the sea. As winds became a problem of knowledge, pamphlets, handbooks, and charts began to circulate to manage that problem. The marketplace of nautical knowledge (in the form of charts, bluebooks, navigation routes, drawings about sandbanks and lighthouses and handbooks to recognize tropical wind patterns) created and policed by seamen and underwriters alike made global trade in maritime insurance profitable, while laying the groundwork for both a serviceable science of climate and the administration of human error.³⁸

³⁸ The fight and control over information is critical and needs further attention in my paper. For instance, Francesca Trivellato argued that the asymmetries of information and thick webs of knowledge through which long-distance trade operated in early-Modern Europe also normalized distrust and suspicion of what came to be understood as “Jewish” trading practices as an archetype of financial misdemeanor in a Christian-inflected marketplace. Thus, she says that the role of mercantile law and theology cannot be disentangled from one another. Trivellato’s method is to analyze the material practices of market that enabled the circulation of in bills of exchange and marine insurance to understand the social life of Christian prejudice towards Jews, and to show how certain emerging trading practices were castigated as Jewish. This method is useful to understand how winds, tides and waves were abstracted as sets of information, either as estimates of risk and as forms of regulating mariner behavior in this world from the middle-decades of the eighteenth century. See,

Wrecks also generated many speculative schemes. Some of these wrecks produced Crusoe-like accounts written by stranded lascars and merchants, who were either interrogated by speculators about the nature of the islands where they were stranded or returned with ethnographic accounts of these islands to sell in the thriving marketplace. Shaik Jumaul (Sheik Jumal?), a lascar and a castaway, witnessed the remnants of the wrecked frigates *L'Astrobale* and *La Boussole* and engaged in the French La Pérouse's Pacific expedition in 1788. His accounts circulated widely in Calcutta and Madras in the early 19th century.³⁹ Other wrecks emerged in the archives entangled in legal battles around loss, compensation and accidents. To tackle the issue of salvage, wrecks and compensation, a Marine Court was established at the Council at Fort William in Calcutta. This court remained under the Council from 1748 to 1763.⁴⁰ Thereafter, marine cases were tried under the public branch of the Marine Department until Calcutta was elevated to status of the Court of Admiralty in 1784. As the Court of Admiralty, Calcutta's maritime jurisdiction expanded over an area stretching from Balasore in eastern India to Pegu in present-day Myanmar.⁴¹ A merchant's jury served these courts and

The Promise and Peril of Credit: What Forgotten Legend about Jews and Finance Tells Us about the Making of European Commercial Society (Princeton: Princeton University Press, 2019).

³⁹ Marine Surveyor Ritchie met Sheik Jumal in Murray Island in the Pacific in 1818 and swiftly documented Jumal's observations, accounts and narratives. By the time Ritchie had returned to Calcutta, he was ready to publish his conversations with Sheik Jumal, which appeared in *The Asiatic Mirror and Commercial Advertiser* in 1818 and later that same year in *The Madras Courier*. Garrick Hitchcock, "Manuscript XXXII: The Final Fate of the La Pérouse Expedition? The 1818 Account of Shaik Jumaul, A Lascar Castaway in Torres Straight," *Journal of Pacific History* 52, 2 (2017): 217-235; Peter Dillon, *Narrative and Successful Result of a Voyage in the South Seas, Performed by Order of the Government of British India, to Ascertain the Actual Fate of La Pérouse Expedition*, 2 vols. (London: Hurst, Chance and Co. 1829).

⁴⁰ Most of the actual records of cases are missing from this period. Systematic court records begin from 1770, housed in NAI, Delhi, WBSA Kolkata and BL, London. Much of the dispatches from the courts that were sent to London, later housed at the British Museum were destroyed during transfer to the British Library. Patchy records refereeing to cases are strewn across insurance papers in the Guildhall. I expect Glasgow to house further records, but research in Glasgow has been delayed by Covid and visa issues.

⁴¹ Cases from Aceh, Manila, Bencoolen and Ceylon were also tried in Calcutta during the eighteenth century.

formation of the jury was often dependent on the trading patterns and availability of a sufficient number of merchants, mariner and underwriters to serve on it.⁴²

The unknowns about seasonal landscapes in the Bengal delta, which was known to churn up new landmasses within a matter of hours, but also known to sweep entire landmasses away under the spell of heavy rains, carrying with it upturned boats, cast-away goods and people, became sites of legal contestations, but at the same time also an avenue for fast money by people posing as underwriters. The extent of human miscalculation and knowledge were often central to compensating wrecks, doling out punishments and disciplining maritime labor. The courtroom debates regarding the uncertainties about monsoon winds and the limits of human knowledge were shaped by the bureaucracy of imperial finance. Imperial finances were as much about securing trade and revenue extraction, as they were about the profits of the expanding insurance market. It is not for nothing that in deciding the landmark *Carter vs. Boehm* case in 1776 Lord Mansfield would call insurance “a contract based upon speculation.”

II. The Nautical Marketplace and Risk Management

The Company, along with multiple other firms, ran a thriving marine insurance business in the factory towns of India from the eighteenth century, at the same time when Lloyd’s was also beginning to emerge from its lowly origins as a coffee house to the respectability of actuarial experts.⁴³ By December 1771 Lloyds began to formalize plans to build a new coffee house, with a

⁴² It must be pointed out that merchant, mariner and underwriter were often overlapping categories in colonial South Asia.

⁴³ For the origins of Lloyd’s in a coffee house of ill-repute see Frederick Martin, *The History of Lloyd’s and of Marine Insurance in Great Britain* (London: Macmillan, 1876); A. B. Leonard, *Marine Insurance: Origins and Institutions, 1300-1850* (London: Palgrave, 2016); for the Dutch case see Frank Spooner, *Risks at Sea: Amsterdam, Insurance and Maritime Europe, 1766-1780* (Cambridge: CUP, 1983); Sabine Go, *Marine Insurance in the Netherlands 1600-1870: A Comparative Institutional Approach* (Amsterdam: Aksant Publication, 2009).

special room for subscribed members, standardized their policy language and rolled out laws for voting in their attempt to distinguish themselves from speculators and stock-jobbers in the Exchange alley.⁴⁴ European-style marine insurance was fast becoming a thriving business in the colonies. Premium-based insurance was beginning to replace earlier forms of sea loans and bottomry, offered by native financiers, or *shroffis*, (these insurance contracts were known as *awak* and *bima*).⁴⁵ These earlier loans were various forms of risk-sharing contracts, with the hull or cargo as collateral.⁴⁶ Forms of protection from loss and debt were not simply insured through loans, but by the seventeenth century one sees instances of seizure and captures as modes of recovering money from indebted merchants. Most of these cases involved British merchants capturing the ships indemnified or owned by Indian merchants.⁴⁷ There is very little systematic work on marine

⁴⁴ Minutes of the Committee of Lloyd 1771, CLC/B/148/A/001/MS31571/001, London Metropolitan Archive, (LMA).

⁴⁵ C. F. Trener, *The Origin and Early History of Insurance Including the Contract of Bottomry* (New Jersey: Repr. Law Book Exchange, [1926] 2009).

⁴⁶ The archival record on marine insurance in early modern India is till patchy and much work remains to be done there. I have located two instances of insurance fraud in the Surat Factory records in the latter half of the seventeenth century, which proves that there must have been a thriving insurance market. A Parsee and a Gujarati ship owner was in the habit of buying old or broken ships and setting them on fire to make insurance claims. For indigenous forms of insurance in the Mughal world see Najaf Haider, "Organization of Commercial Credit in Mughal India, (M.Phil Thesis: Aligarh Muslim University, 1989); "English Merchants and the Credit Marker in the 17th Century," *Proceedings of the Indian History Congress*, 48 (1987): 294-301; Ruqaiya Husain, "Banking, Bills and Insurance Roques' Report of the Sarraf's Practices and Devices," *Proceedings of the Indian History Congress*, 63 (2002): 369-377; for insurance by Armenian merchants see Sebouh Aslanian, "The salt in a Merchant's Letter: The Culture of Julfan Correspondence in the Indian Ocean and the Mediterranean," *Journal of World History* 19, 2 (2008): 127-188; for the Indian Ocean world see Lakshmi Subramanian, "Merchants in Transit: Risk Sharing Strategies in the Trading World of the Indian Ocean," in Himanshu Prabha Ray eds. *The Indian Ocean 1500-1800* (Delhi: OUP, 2006); see also Ron Harris, "The Institutional Dynamics of early Modern Eurasian Trade: The Corporation and the *Commenda*," *Journal of Economic Behavior and Organization*, 71, 3 (2009): 606-622. It must also be mentioned that a small, but nonetheless substantial set of insurance records dating from the 10th century can be found in the Cairo Geniza, see S. D. Gottein, *India Traders of the Middle Ages: Documents from the Cairo Geniza* (Leiden: Brill, 2008), 121-157.

⁴⁷ These are not being classified as either privateering, or capturing other ships (mainly Armenian, Portuguese, Dutch and sometimes French) which seems to be one of the primary modes of trade by the British during the early years. Instances of capture to settle debts crop up in the *Hughli Factory Records*, primarily in the latter half of the seventeenth century. (I am in the process of compiling these). One of the most sustained accounts of attempts at fraud and debt settlement comes from 1669 to 1680 between two Balasore merchants

insurance in the Mughal Empire, British India or the Indian Ocean.⁴⁸ What we know so far is that underwriting trade in opium and cotton in the Bay of Bengal was a lucrative business, one run often by “untrustworthy” merchants, whose credibility was firmly calibrated by the financial politics of the time.⁴⁹

For instance, in India alone more than a dozen insurers set up shop between 1780 to 1810.⁵⁰ By 1820, there were 13 established insurance companies in Calcutta, with agents in Canton and Bombay. One of the primary goods they insured in this trade was opium to China.⁵¹ Bombay had two sizable insurance firms. By 1806 merchants in Bombay had managed to more or less consolidated their risk investments into one insurance office known as the Bombay Insurance Society, with the propriety divided in 100 shares of 20,000 rupees each. One half of these shares

Khemchand and Chintaman (spelled also as Chim Cham and Chintamund) and two Company factors Henry Charnock and Capt. John Nicholson. See Thomas Bowrey, *A Geographical Account of Countries Round the Bay of Bengal, 1669 to 1679*, (Cambridge: Haklyut Society, 1805), 155-157.

⁴⁸ Work on the Atlantic shows how slavery and long-distance trade became sites for actuarial experimentation and spawned multiple court cases over these new financial instruments. Indeed, over the past decade historians have led the charge in seeking reparations from insurance companies that profited from life insurance for enslaved captives, a practice which laid the groundwork for the emergence of modern-day life insurance. The *Zong* incident of 1781 is one of the most infamous cases, where the owner Luke Collingwood ordered the jettison of 132 captured Africans then suffering from illness. This enabled Collingwood to make an insurance claim on his “human cargo” based on necessity to protect “property,” but not cover “death for natural causes.” Ian Beaucom, *Specters of the Atlantic: Finance Capital, Slavery and the Philosophy of History* (Raleigh, NC: Duke University Press, 2005); Todd L. Savitt, ‘Slave Life Insurance in Virginia and North Carolina’, *The Journal of Southern History* 43, no. 4 (Nov. 1977): 583–600; Cheryl Rhan-Hsin Chen and Gary Simon, “Actuarial Issues in Insurance on Slaves in the United States South,” *The Journal of African American History* 89, no. 4 (Autumn 2004): 348–57; Dan Bouk, “The Science of Difference: Developing Tools for Discrimination in the American Life Insurance Industry, 1830–1930,” *Enterprise & Society* 12, no. 4 (2011): 717–31; the practice of insuring “human cargo” extended beyond slavery to indentured laborers. Wendell Buck, *From Quill Pens to Computers: An Account of the First One Hundred and Twenty-Five Years of the Manhattan Life Insurance Company of New York* (New York: Manhattan Life Insurance Company, 1975), 11-13.

⁴⁹ Michael Greenberg, *British Trade and the Opening of China 1800-1842* (New York: Monthly Review Press, 1951), 170- 174; A. B. Leonard, “Underwriting British Trade to India and China, 1780-1835,” *The Historical Journal* 55, 4 (2012):983-1006.

⁵⁰ Leonard, “Underwriting British Trade to India and China, 1780-1835,”

⁵¹ John Phipps, *Guide to The Commerce of Bengal, for the use of Merchants, Ship Owners, Commanders, Officers, Pursers and others resorting to the East Indies; But Particularly of those connected with the Shipping and Commerce of Calcutta*, (Master Attendant’s Office: Calcutta, 1823). Appendix 1, 29.

were sold as Company papers and the other half being personal bonds.⁵² Apart from Bombay Insurance, which was a major agency, there was another insurance society, the Commercial Insurance Society, run by none one other than William Milburn, who also produced the seminal work *Oriental Commerce*, which formed part of nearly every East India merchant's library.⁵³ Madras at the same time had 3 small insurance companies, with insurance rates on bullion shipped between London to Madras priced between 4 to 5 percent.⁵⁴ Mauritius had five major insurance companies which employed both agents and surveyors.⁵⁵ Mauritius, like Calcutta, was not only a major clearing houses of trade, a hub of insurance but was also in the path of major cyclonic events throughout the eighteenth century.⁵⁶

Given that the rates of insurance for ships sailing to the Indian Ocean and the Bay of Bengal were the highest for any portion of the empire, underwriting was clearly emerging as a profitable side business. For instance, between 1789 to 1805, the premium rate from Bombay to China and back fluctuated between 12, 10, 9 and 8 percent. Premiums for trade in these eastern waters were especially high. In 1814 the premium on 150 bag of rice costing 3 ½ dollars shipped from Calcutta to Mauritius was 11 ½ percent.⁵⁷ The following table from *Milburn's Oriental Commerce* gives us an idea how "risks" at sea became the site for profit extraction through underwriting:

⁵² For detailed rates of insurance from Calcutta to the various ports of America, South America, New South Wales, China, and West Africa, ports in the Persian Gulf and the Dutch Archipelago see, Phipps, *Guide to The Commerce of Bengal*, 298; corroborate with *Milburn's Oriental Commerce*, 236.

⁵³ For an understanding of Milburn's investments in the insurance business see, Phipps, *Guide to The Commerce of Bengal*, 297. Phipps was merely following in his footsteps in his attempts to navigate the financial terrain, through developing some control over the informational terrain.

⁵⁴ Phipps, *Guide to The Commerce of Bengal*, Appendix 1, 10 -13.

⁵⁵ Phipps, *Guide to The Commerce of Bengal*, Appendix 1, 111.

⁵⁶ Martin Mahoney, "The 'Genie of the Storm': Cyclonic Reasoning and the Spaces of Weather Observation in the Southern Indian Ocean, 1851–1925." *The British Journal for the History of Science* 51, no. 4 (2018): 607–33.

⁵⁷ Phipps, *Guide to The Commerce of Bengal*, 272.

The amount of property insured at Bombay from the 1 st of Mar, 1806 to 31 st October, 1808, amounted to	Rupees 5,37,00,000
The premium paid by the trade on that sum amounted to	35,61,000
The losses by captures during the same period amounted to	4,94,000
The losses by sea risks ditto.....	5,52,000
The profits to the underwriters ditto	25,15,000 ⁵⁸

Apart from the joint-stock companies, which had a greater ability to pool risks, private individuals in Calcutta and Bombay were also underwriting oceanic trade. Indeed, private underwriting by Company merchants and some Indian entrepreneurs across the port towns had become such a thriving trade that, in 1781, an anonymous correspondent proffered this complaint in the *Hickey's Bengal Gazette*, one of the first English language newspapers in Calcutta: “When I reflect on the present state of private insurance and the number of desperate and needy adventurers who, without being in possession of almost a single Rupee.....plunge deeply into this alluring and attractive branch of business, I am filled with astonishment....Lately you can hardly shake a Plantain Tree, but out flies an underwriter...”⁵⁹ This discomfort with underwriters becomes clear if we understand that underwriting in places like Calcutta, Bombay and Canton were expanding without the regulatory orders of any guilds, or the jurisdictional curbs of the 1720 Bubble Act, which was promulgated to rein in speculative insurance practices following the crisis of the South Sea Bubble. There was a similar discomfort with the workings of the Exchange Alley in eighteenth-century London as investors were required to navigate ever-new and intricate instruments of finance, and the public perception was that “those with the most experience were not necessarily the most trustworthy.”⁶⁰

⁵⁸ *Milburn's Oriental Commerce*, 236.

⁵⁹ *Hickey's Bengal Gazette*, 20 Mat 1780 (cited in A. B. Leonard, 992).

⁶⁰ For an account of disputes over credibility of financial instrument and trust as a problem of “public knowledge” versus “private interest” in post South Sea Bubble London, see William Deringer, *Calculated Values: Finance, Politics and the Quantitative Age* (Cambridge, MA: Harvard University Press, 2018). The quotation in the text comes from p. 195.

But one question remains unanswered: If a greater number of wrecks occurred in Indian waters, then why was underwriting Bay of Bengal trade nonetheless so profitable?

Not just private merchants and private joint-stock, such as Oriental Insurance and Ganges Insurance, but also the East India Company carried out its own business of underwriting. The Company's underwriting business was so competitive that it took pride on the minimal payment of compensation, thus showing how it reaped a significant profit from underwriting European trade running to millions of Sterling from London to Canton.⁶¹ Between 1777 to 1793 the Company did not pay any settlements on East India commerce. Thomas Newte, a company merchant and shipowner reported to the parliament, that the Company saved from 8 to 10 million Sterling during that period. According to him: "That on an average, calculated on the whole Fleet for twelve years, the damage on goods, charged to the Owners on 237 Ships, whose cargoes, on a moderate calculation, must have been worth at least twenty million sterling, amounted to 31,591 points, or the astonishing small sum of £133 s 5 d11 each Ship."⁶²

These profits did not come out of efficient actuarial science, but rather were the result of high premiums from sailing in eastern waters and, as we will see in the next section, the punitive regime of the marine courts. In order to rein in speculative insurance ventures, a Select Committee on Shipwrecks reported to the House of Commons in 1836 stating that England was losing nearly

⁶¹ The Company had a separate department under its Marine auspices for compensation through Orphan and Widow's pension for people employed at a certain rank. It also had a range of compensation for injured seamen. However, apart from that, it seems that it ran a thriving insurance trade, which is evident from Parliamentary depositions. I have so far been unable to trace their risk or assurance books. On the other hand, the EIC ledgers have bi-weekly and monthly entries on insurance, depending on the volume of trade. IOR/L/AG/1/1/9; IOR/L/AG/1/1/10.

⁶² Thomas Newte, *Observations on the Important of the East-India Fleet to the Company and the Nation in a Letter address to the Right Hon. Henry Dundas one of his Majesty's Principal Secretaries of State and President of the Board of Control for the Management of the Affairs of India*. (London: J. Debrett, 1795). 8 million sterling = \$ 1,375,071,234.26 and £133 s 5 d11 = \$23,032.44 (approx.).

three million sterling per annum (£ 2,836,666) and had lost 894 lives to shipwrecks.⁶³ This report was prepared with the help of the accounting books of Lloyds and only reflects cases of ships insured by Lloyds.⁶⁴ The report details the reasons for which ship wrecked, floundered and the crew drowned. Among the many causes for wrecks two bore the highest responsibility. First, the committee wrote that often instruments of navigation, (namely depth recorders, barometers, and chronometers) were either faulty, absent or the crew was not sufficiently trained to use it. While many mariner-scientists were writing profusely about barometers and chronometers -- where to procure them, how to use them, how to care for them, and who among the crew were allowed to handle such delicate instruments -- a substantial concern around wrecks and their frequency was being debated as a question of liability and risk emanating from faulty use of instruments (Jennings, 1843). Second, they pointed out that the widespread use of premium-based marine insurance meant ship captains and merchants were indulging in risky voyages in stormy seas and as a result there were higher incidence of shipwrecks. While, there is no existing data that links the widespread use of premium-based marine insurance to increased numbers of shipwrecks, the report indexes some of the assumptions prevalent within the expanding nautical marketplace of the early nineteenth century. The specific concern for this Committee, widely reflected in the world of nautical writing too, was that the expansion of marine insurance had allowed ship masters to transfer the risk to the underwriters, which ultimately transferred the risk to the British public. (Nautical Magazine: 1832, 593) The result was fierce battles in the imperial admiralty courts adjudicating liability over wrecked ships and ultimately flinging blame for the wrecks on to 'the plainest sailor', to use one of

⁶³ "The Nautical Magazine.," *Nautical Magazine and Journal of the Naval Reserve* 1891-1903, no. v. (1832): v. 588-600

⁶⁴ This is not representative of total losses, but only those ships that were insured through Lloyds.

Piddington's oft-used descriptors, who routinely failed to navigate in the cyclonic and turbulent waters of the Indian Ocean.

Indeed, as historians of marine insurance have pointed out, underwriting did not come out of what one may call "hard facts," but was premised on the "underwriters' know-how, which was largely a measure of his local connections and access to reliable correspondents abroad, mattered a great deal."⁶⁵ Moreover, such practices were embedded in wider networks of the nautical marketplace of publication and both the government, the printers and the private merchants vied with each other to control the channels of information. Along with that there was also brisk business in navigational charts and Ship Chandler Bluebooks. These were annual publications that contained navigational charts stretching either from Bombay to Canton, or from Coromandel to Pegu, and they marked out dangers, rocks, islands and lighthouses, etc.⁶⁶ Throughout the nineteenth century much effort was spent in regulating the profitable market in navigational books and prints by classifying them as official and non-official, and in some cases of crew being penalized for the possession of "non-official" charts. Apart from charts, the Company increasingly sought to regulate the returns on salvage.⁶⁷ The Master Attendant at the port of Calcutta claimed one-third of salvaged property if it was recovered close to Calcutta, and a progressively higher percent the further downstream the salvage was. Furthest down, near Saguar Island at the mouth of the Bay of Bengal the Master Attendant claimed 65% of the value.⁶⁸

⁶⁵ Trivellato, *Promise and Perils*, 23.

⁶⁶ This trade was mostly in private hands and the Company tried and failed to regulate their sale. Even as late as 1865 the Marine Department complained of the existence of private, or non-official blue books 1876 Wrecks in Indian Waters file, 3-4

⁶⁷ While it is clear that there existed regulations pertaining to salvage under the Mughal Mir-i-Bahar (port office), I have so far not been able to locate the rates.

⁶⁸ Phipps, *Guide to The Commerce of Bengal*, 311.

Given the fact that Bengal's seaface was considered to be in a constant state of flux, it was always safer to dock large ships at the mouth of the Bengal delta (Balasore) and then navigate the passage up the River Ganges to Calcutta in smaller boats with the assistance of pilot sloops and schooners. Monsoon winds were central infrastructures of navigation. The navigational calendar divided the year into three blocks: N. E. Monsoon months (January-March); S. W. Monsoon (April-September), second N. E. Monsoon (October -December). The distance from Calcutta to sea was measured in nautical miles and days, which was used to calculate pilotage rates. During the month of April, it took a ship anywhere between 3-4 days to travel from the sea to Calcutta.⁶⁹ Indeed, the seasonal and monthly breakdown of freightage charges based upon the perceived dangers created new taxonomies of the natural world in the imperial ledgers and also produced new forms of coastal labors. Pilot boats were manned by local people who had specialized knowledge about the sands and shoals in this active tidal delta. The Indian pilots and their boats were sources of much consternation till 1699 when a 7-member crew set up the exclusive and coveted Bengal Pilot Service.⁷⁰ During any given year there would be 8 to 12 pilot vessels (brigs) of 180 to 190 tons. The Pilot establishment was headed by a branch pilot, 2 first mates, 2 second mates, 6 volunteers and 32 Indian seamen. For instance, according to an 1819 estimate, the salaries of the pilots varied from Branch Pilots making Rs. 700/month and the second mate Rs. 60/month.⁷¹

By latter half of the eighteenth century the post of pilot was very coveted, not just for the handsome salary, but because of the pension that came with serving the Bengal pilot, a channel that saw one of the highest global levels of traffic in commodities. Sometimes even the Court of

⁶⁹ Phipps, *Guide to The Commerce of Bengal*, 35. (Note: *Must convert rates*)

⁷⁰ Thomas Bowrey, *A Geographical Account of Countries Round the Bay of Bengal, 1669 to 1679*, (Cambridge: Haklyut Society, 1805), 166. There were two successful attempts earlier of piloting ships without the help of Indian boatmen in 1672 one Captain James, and later in 1679 by Captain Stafford.

⁷¹ Phipps, *Guide to The Commerce of Bengal*, 68.

Directors in London had a hand in recruiting people to this service.⁷² Kipling's admiration for the work of this department is evident: "but the Pilots of the Hugli know that they have one hundred miles of the most dangerous river on earth running through their hands—the Hugli between Calcutta and the Bay of Bengal and they say nothing. Their service is picked and sifted as carefully as the bench of the Supreme Court, for a judge can only hang the wrong man, or pass a bad law; but a careless pilot can lose a ten-thousand-ton ship with crew and cargo in less time than it takes to reverse her engines."⁷³ Kipling is not alone in recounting these matters. (Add Millburn's account and check Bengal Pilot Department files)

The dangers of navigation produced a whole host of early modern Bengali didactic-maritime poetry known as the *Mangalkavyas*, locating wrecks within a cosmological worldview. While we do not have any actual records of human jettisoning during cyclones, the practice does crop up in the poetic genres right up to the latter half of the nineteenth century.⁷⁴ The insurance premiums calibrated to winds and monsoonal directions, the freightage charges on season of sail, the ability to gather winds and sail profitably through a cyclone, the jockeying for the Pilot position and finally the vast nautical market in publication were just some of the early attempts to financially capitalize on the perceived environmental limits and weather disturbance in these eastern waters. Yet, we must ask what happened when ships were lost?

III. Cyclones in the Courtroom

⁷² Phipps, *Guide to The Commerce of Bengal*, 69.

⁷³ Rudyard Kipling, *An Unqualified Pilot*.

⁷⁴ Rabindranath Tagore, *Debotar Grash* (God's Hunger).

Between 1760 to 1796 EIC has lost 20% of its ships to shipwreck on their way to Asia.⁷⁵ Many of these wrecks occurred in the Bay of Bengal, especially in the last stretch of the journey. A rain-fed, tidal and changeable landscape, mariners' and hydrographers' first attempts at control began with sketching the coasts of the Bay of Bengal. These sketches and charts were often contentious. There were slanderous debates between mariners about the place of shoals and accuracy of each other's charts.⁷⁶ From 1753, the East India Company began employing an official hydrographer, Alexander Dalrymple. Under Dalrymple's oversight the official process of systematizing coastal charts began. But before Dalrymple's charts could be published and widely circulated, cases began piling up in the Marine Courts in Calcutta.

Two representative shipwreck cases debated in the Marine Court in Calcutta reveals how the legal 'fact of wreck' was established and shows legal imperatives that drove the science of cyclone forecasting. The night that descended upon the sloop Betsey Galley on April 25th, 1778 proved fateful. Betsey was wrecked upon the Long Sand in the Bay of Bengal at the mouth of the delta, with 13 members and its cargoes going under water before reaching the port of Calcutta.⁷⁷ Navigating into Calcutta, which was situated almost 100 miles from the Sagar Islands in the Bay of Bengal was difficult as the ships would have to sail through a network of mangrove islands, tidal sand flats and seasonal salt marshes, which annually changed shape, disappeared, or sometimes suddenly reappeared.⁷⁸ Logs of ship warned that when storms and "hurricanes" occur at the mouth of the

⁷⁵ See H. V. Bowen, John J. McAleer, and Robert J. Blyth, *Monsoon Traders: The Maritime World of the East India Company* (London: Scala, 2011), 118.

⁷⁶ See the contrasting tide charts and maps in the following collections from the seventeenth century: Private Papers of Barlow, IOR/X/9128, British Library; Papers Concerning New Harbour in Bengal, IOR/H/Misc/396:1765-1809, British Library; Alexander Dalrymple, *Collection of Nautical Papers Concerning the Bay of Bengal Published at the Charge of the East India Company from the Mss. By Dalrymple 1784* (London: G. Biggs, 1785).

⁷⁷ Betsy Galley Case, Home Public No. 6-12, National Archives of India (NAI), New Delhi.

⁷⁸ Capt. John Ritchie, *Instruction for sailing in the norther part of the Bay of Bengal, Part 1, Survey of the coast from point Palmiras to the braces of the outlets of the Ganges and of Interjacent Rivers from Hughly River to Roymongul, 1775, [reprinted*

river Hooghly they can become disastrous because the sea inundates the low-lying alluvial lands and ships often founder.⁷⁹ Rudyard Kipling wrote about the Hughli thus: “Men have fought the Hughli for two hundred years, till now the river owns a huge building, with drawing, survey, and telegraph departments, devoted to its private service, as well as a body of wardens, who are called the Port Commissioners.”⁸⁰

Betsey’s wreck was fiercely debated in the Marine Court of Enquiry in Calcutta over 4 months. The petitioner was Capt. John Raitt and Mr. Weller (who was the merchant invested in the sloop), who claimed to the Court that Thomas Broad, the master attendant in charge of the pilot schooner to the Betsey Galley, did not offer any assistance and must be held responsible for the wreck. The Committee of Insurance deposed in the Marine Court and supported the claim against Thomas Broad, deeming him, the negligent master of the pilot schooner, responsible for the wreck, and seeking to debar him from future navigational duties. As the petitioners pointed out, it was a dark summer night and the ship was going fast.⁸¹ Not only did the pilot sloop fail to keep ahead of the Betsey Galley, but the sloop also rendered no assistance after the wreck, although it was no more than a few leagues ahead. However, the captain’s incriminations against his attendant should hardly surprise anyone or be enough to establish the reason for the wreck. However, the mariner’s jury and the Judge concluded that Broad’s “obstinacy and misconduct” was to blame since: “he having positively refused to make a proper signal for the sloop to come ahead of the ship notwithstanding it

in its second edition in 1801] in The Oriental Navigator, or New Directions for Sailing to and from the East Indies, China, New Holland Etc. etc, etc also for the use of the country shups, trading in the Indian and China seas, Pacific Ocean etc etc etc, (London: Robert Laurie and James Whittle, 1801) p.285

⁷⁹ William Reid, *An Attempt to Develop the Law of Storms by Means of Facts, Arranged According to Place and Time; and Hence to Point out a Cause for the Variable Winds, with the View to Practical Use in Navigation*. Illustrated by Charts and Wood Cuts (London: J. Weale, 1838), 284

⁸⁰ Rudyard Kipling, *An Unqualified Pilot*.

⁸¹ By 1801, ships were debarred from navigating without pilots at night. Phipps, *Guide to The Commerce of Bengal*, 36.

was night, the channel very narrow and she was going fast through the water which circumstances he was repeatedly put in mind of by the captain.”

The Committee of Insurance, in whose interest it was to locate blame on the negligence of the master attendant or the pilot sloop, offered depositions in the court documenting prior instances when Thomas Broad failed in his duties while attending other ships.⁸² Turning to precedence made the wreck appear to be caused not by the cyclone, but instead due to Broad’s navigational misconduct. As legal historians have pointed out, reputation and credibility were deeply entangled in court room decisions through the eighteenth and nineteenth centuries, especially prior to the arrival of expert evidence and forensic criminology.⁸³ Even then, and to an extent now, credibility performs a critical role in establishing the plausibility of the narratives offered. Both defendant and plaintiff brought to the court their narrative about the probable causes for the wreck of Betsey Galley.

Betsy Galley sank in the month of April. April is the nor’westers season and is marked by sudden storms and coastal surges which can make riverine travel and navigation tricky in the Bengal delta. Bengali weather proverbs for farmers and fishermen are sedimented with knowledge about what to sow in your field and when to row your boat in the months of April

Chaitre thar thar
Baishake jhad pathar
Jaishte tara phute
Tabe janbe barsba bate

Spring’s steamy heat
Means summer’s hailstorm
Mid-summer skies, Brings a good monsoon⁸⁴

⁸² Betsy Galley’s wreck was followed by the wreck of Snow Mars where Captain French was held responsible. Original Consultation, Nov.9, 1778 no. 9, NAI, New Delhi; this was followed by a letter from the Insurance Company suggesting measures for the careful observance of duties by pilots, Original Consultation, Nov.9, 1778 no. 9, NAI, New Delhi.

⁸³ Tal Golan, *Laws of Men and Laws of Nature* (Cambridge: Harvard University Press, 2009), 5-51.

⁸⁴ Sudeshna Basak, *Cultural History of Bengali Proverbs*, (Kolkata: Ananda Publishers 2007), 25-26 (translations have been modified).

Apart from these weather proverbs, European “moral meteorological” accounts were also in circulation in the eighteenth century.⁸⁵ One such account narrated how the River Hughli was punishing the Dutch factors in 1679 for their sack of the English in 1623. Nature here seemed to dole out corporate revenge, as one of the oft-repeated English accounts of justice for the massacre by the Dutch:

Sometimes before the breakeinge up of the Monzoone [April], came down the River with Such Violence that it Seemed to be displeas'd with all that were here, more Especially the Dutch and Shewed them displeasure at once, takeinge away all their whole Factory, Storehouses &c., and hurried them into the River, and a great depth too, for in the very place where the Dutch Factory stood, wee die our ships....and its is called Hughly hole.⁸⁶

Caught in these turbulent waters known to sailors as the *Hughli hole*, Broad pointed out that he steered the boat based on the direction of the incoming gales, which he had successfully done many times, yet the winds changed course and the ship foundered. Following the adversarial interrogation of the admiralty court, Broad was called for questioning, which consisted of questions about the usual role of the pilot schooner during storms and about whether he felt that he performed his duties. Like a well-honed defendant, he answered questions about the usual duties and responsibilities mostly thus: “It is sometimes usual and sometimes not.” And for questions where they tried to assess his opinion, he offered stock answers, for instance: “How come the ship [was] lost? Broad’s stock answer was: “If you put any particular questions to me I shall answer them.” Thereafter he demurred and the interrogation remained inconclusive.

However, the Insurance Committee and the merchant’s jury turned to another source to ascertain the truth about the wreck, namely Broad’s prior mistakes of navigation. Upon hearing all the testimonies, the judge decided that the total loss of the vessel was owing to an error in

⁸⁵ Mark Elvin, “Who Was Responsible for the Weather? Moral Meteorology in Late Imperial China,” *Osiris* 13, 1(1998), 213-237.

⁸⁶ Thomas Bowrey, *A Geographical Account of Countries Round the Bay of Bengal, 1669 to 1679*, (Cambridge: Haklyut Society, 1805), 170.

judgement on Broad's part, and was not due to the nor-wester that suddenly set in. The main thrust of the evidence that was brought to establish an error in judgement were the prior instances of errors by Broad. This judgement, like many were based tangentially on the evidence in the ship-log, barometric pressure, or the unnavigability of the channel on a dark night. Indeed, in multiple case, the moment of wreck is often reconstructed by turning to other instances of failure of the captain or pilot's duty, including character assessments such as wanting in attention or given to liquor. The personal character, social standing, networks of credibility and the ability of the defendant to draw upon powerful witnesses played a critical role in establishing the depth and nature of human error. Within the space of the Marine Court, trying to separate human miscalculation from unavoidable natural disaster was complicated. While the evidentiary base attesting to the ability to forecast natural disaster was thin, the jury could marshal evidence of earlier occasion of miscalculation and negligence on the mariner's part. This evidentiary battle highlights the epistemic struggle to assess the ability to navigate avoidable dangers involving gales, winds and cyclones by means of a science of prediction. Prior navigational conduct therefore performed critical work in establishing error beyond doubt. In the end, like cases of this nature tried through the 1770s, Broad was fined, his salary and his handsome Bengal Pilot pension was docked to compensate the losses.

By 1830 Piddington was presiding over the Marine Court, but the nature of adjudication of wrecks navigated a terrain not very different from the one we witnessed in the case of Betsey Galley. The Barge Amherst was partially wrecked in October 1838 mid-way on its voyage from Myanmar to Calcutta.⁸⁷ Dalrymple's work as the Company's official hydrographer had transformed the landscape of navigation prints, with official charts in circulation by the last decade of the eighteenth century. He was followed soon after by James Horsburgh, who served the Company from 1810-1836,

⁸⁷ Marine Index no. 2, 9-11, January 9, 1839. West Bengal State Archives (WBSA), Kolkata.

keeping extensive records of the tides of the Bay of Bengal coasts. Horsburgh also introduced the need to take extensive depth soundings to detect shoals and shifts in the coastline, while regularly updating those surveys.⁸⁸ By 1832, the Royal Admiralty in England recognized that the tidal charts in India were more complete and detailed than the ones pertaining to the English coasts.⁸⁹ The arrival of Horsburgh and his diligent publication of official nautical charts introduced a new standard of judgment. In cases of accidents, ships which were found to be in possession of non-official charts could be penalized. However, given that the route from Burma to Calcutta was so treacherous, Horsburgh's directions were considered insufficient. A mariner under the pseudonym "Nautics" suggested that: "Should ships frequenting Rangoon, attend only to Mr. Horsburgh's directions, without waiting for a pilot, (which at times they may be compelled to do from stress of weather) they will surely run aground and suffer considerable damages."⁹⁰

The Amherst was supposed to set sail from Kyaukphu one early October morning in 1838. However, the ship was delayed due to low winds. When the ship finally set sail, it reached a rock face then known to sailors as the Terribles. Unable to stay on course, the Amherst hit those rocks on the night of October 22 and was damaged, but managed to reach Calcutta, half-damaged, with its logbooks intact. Again, in this instance the logbook, the detailed notes of arguments and conversations kept by both Captain Bedford and attendant Captain Jump would have allowed the Marine Court of Enquiry to establish that the swinging barometric pressure and winds veered the ship off its course. The notes, the witness depositions, and the log show that Jump disagreed with

⁸⁸ Papers of James Horsburgh, Mss Eur F305, British Library.

⁸⁹ Beaufort to Captain Horsburgh, 1 November 1832, PRO, ADM.1.3478, National Archives, Kew.

⁹⁰ Sailing Directions for Rangoon Bar, communicated by "NAUTICS" to the Calcutta Journal, January 1823, cited in Phipps, *Guide to The Commerce of Bengal*, Appendix 1, 145.

Capt. Bedford's directions, who insisted that the ship should have continued to sail in the direction it was headed. Had he followed Jump's chart, the ship might have been saved from hitting the rocks.

There is a twist in this case. The day after Amherst dropped anchor in Calcutta following this fateful journey, Capt. Jump deposited his papers with the port authorities as Piddington had required all sailors to do. Thereafter Jump quietly slipped out of Calcutta that very afternoon, boarding a ship to Bombay and then London and in the process forfeiting part of his pay. The court spent a considerable time deciphering Jump's sudden disappearance and gathering evidence of his prior conduct in their attempt to piece together his character. The court ultimately decided his fate in absentia. It ruled that Jump could not man another Company ship or ship in his Majesty's service as he was deemed too incompetent. His incompetence, the court declared, was not his ability to decipher winds, but in his inability to be judicious enough to, first, disregard his master's misreading and veer the ship in the right direction, and, second, not stay back in Calcutta to offer witness in the court of law. The archival trail breaks off here, and we do not know if, along with barring Jump from duty, and docking his salary and pension, the merchants invested in Amherst were duly compensated for their partial loss.

What these court minutes reveal is how the multiple iterations and reconstructions of the wreck in the courtroom are embedded within the socio-political hierarchies of the world outside.⁹¹ Indeed, a detailed analysis of the decisions of the Marine Court reveals that, according to the Court's decisions, ships sunk or foundered more often because of human error stemming from altercations between master and pilot, inexperienced pilots, drinking and "rottenness of native crafts" rather

⁹¹ Initial perusal of cases in MSA, Mumbai reveals that similar pattern was followed to recoup damages in Bombay Presidency through the 1840s. There were regular court martials in such cases which ended in punitive damages placed on the pilots, master attendants and second mates.

than the turbulence of the seaboard.⁹² Legal decisions, as we know, are a product of “social, political, epistemic struggle” and in this case these struggles set the background for discerning the nature of wind patterns and the causes of wrecks.⁹³ This narrative reconstruction of the moment of wreck, which made human character central was crucial to adjudicating damage claims throughout the first half of the nineteenth century.

What are we to make of this docking of salary and pension to compensate wreck cases? We see that in instances of distinguishing between natural factors versus human error in adjudicating wrecks, the hapless pilots, master attendants, and second mates overwhelmingly bore the blame. What we see here is a risk-distribution system at work in which the Government’s or Company’s duty to provide safe passage and protect capital was being shifted as a liability onto the lower orders of the shipping world.⁹⁴ Do these cases give us a tool to understand the question of protection and the nature of weather risk-management in the Bay of Bengal differently? While the economic history of protection has primarily focused on protection for and against monopoly or “corporate privilege,” theorized as economic rent by Frederick Lane, and as protection rackets by Charles Tilly, it is instructive to turn to Niels Steensgaard’s formulation that protection is not so much a service or a commodity, but rather a means through which risk is converted to a form of revenue.⁹⁵ Insurance

⁹² In my research I have so far come across one detailed case of acquittal, that of a Bengal Branch pilot, Mr. Edmund Bartlett. In 1851, he was charged initially with neglect for not having made due preparation for a gale of wind while piloting the vessel *Cauvery* when it foundered. Apart from that he was charged with unseamanlike behavior (what exactly that might mean is not elaborated) and he was also charged with not reducing the sail when a reverse gale wind began to plummet the vessel. However, the mariner jury got embroiled in the technicality of the correct way and pressure calculation needed to reduce the sail and, in the process, Bartlett was acquitted. IOR/M/C/712, British Library, London.

⁹³ Bhavani Raman, Aparna Balachandran and Rashmi Pant, *Iterations of Law, Legal Histories from India* (Delhi: Oxford University Press, 2017) 2.

⁹⁴ Maria Fusaro observes similar patterns in her material from 16th Mediterranean trade.

⁹⁵ Niels Steensgaard, *Carracks, Caravans and Companies: The Structural Crisis in the European-Asian Trade in the Early 17th Century* (Odense: Studientlitteratur: 1973) and for also “Violence and the Rise of Capitalism: Frederic C. Lane’s Theory of Protection and Tribute.” *Review (Fernand Braudel Center)* 5, no. 2 (1981): 247–73. <http://www.jstor.org/stable/40240903>.

agents, underwriters, shippers, and EIC merchants who formed the jury of a marine court (unlike men of law, this jury bitterly fought to be constituted of ship captains and merchants through the 19th century)⁹⁶ could transfer the cost of the risk to individual pilots as liability and damage compensation through much of the eighteenth to the middle decades of the nineteenth century. One even wonders if cyclones, instead of becoming ecological limits to the expansion of trade, may have been turned into risks from which one could extract profits. These profits took the form of high-premium insurance on the one hand and a punitive maritime legal order on the other.

The court debates over wrecks left Piddington, with a vast set of storm narratives, to construct his science in the service of the mariners. He wanted his science to act as a protection not just from cyclones but also wanted to protect sailors and pilots like Broad and Jump, who were being fleeced by the insurance agents and the mariner's jury who shifted the liability for wrecks during cyclones unto them.

IV. Science from the Legal Archives

What was the afterlife of these cases that were indexed in the records of the Company's maritime dealings in the East? In a recent work, Lorraine Daston asks why the archives of science are "mostly invisible in accounts of the sites and practices of science."⁹⁷ Daston recounts two primary causes for rendering the archives of the sciences invisible. First, the historian's archive dominate our imagination of archival research. The second reason has to do with the very relation an archive forges with memory and the present in the sciences, as well as the dizzying variety of medium and

⁹⁶ Piddington wrote multiple petitions to reform the Marine Court jury through 1840s.

⁹⁷ Lorraine Daston, *Science in the Archives: Pasts, Presents, Futures* (Chicago: Chicago University Press, 2017), 2. Daston offers a caveat that she is working with a capacious definition of science and history, while pointing out that we cannot take the rigidity of the boundaries between collections and archives as a given. Any attempt to separate them might dwindle into temporal anachronism.

their associated practices. Yet, what characterizes scientific archives according to Daston is the fact that they are opportunistic (such that the material can be reconfigured to serve new lines of inquiry) and open-ended (to be put through multiple interpretive sieves).⁹⁸

What I want to propose is that these cases, with their judgements did not just produce the liable error of human actions, but the logbooks, the depositions, barometric data and the judicial logic organizing these papers became a critical part of the archive of weather science. Two things connect the labors in the Marine court in Calcutta and the gradual transformation of the ocean as an object of scientific inquiry: the preponderance of wrecked ships and Henry Piddington. Let us turn briefly to Piddington's work in order to elaborate how the structure of adjudication coupled with the demands of insurance markets shaped the archive of cyclonolgy and defined the object of inquiry as a problem of knowledge. In the twenty odd years since his entry into the Marine Court Piddington consulted on multiple cases and analyzed 250 ship logs from mariners plying in the Bay of Bengal, and collected storm observations from port masters in various ports in India. In 1839 Piddington published his first storm observations as cyclone memoir from 1839 in the *Journal of the Asiatic Society of Bengal*. Between 1839 to 1851 Piddington published 23 memoirs of cyclones with each running anywhere between 11 to 100 pages. Apart from adjudicating cases, Piddington also wrote extensively about weather. His stated intention was "to enable the plainest ship master, then, clearly to comprehend this science in all its bearings and uses..."⁹⁹ His practices of assembling an archive to construct what he called a *law of storms* involved a process of acquiring and retrieving material, reconfiguring that material, and then transcribing this body of information into a narrative.¹⁰⁰ For

⁹⁸ Daston, *Science in the Archives*, 5-6.

⁹⁹ Henry Piddington, *The Sailor's Horn-Book for the Law of Storms: Being a Practical Exposition of the Theory of the Law of Storms, and Its Uses to Mariners of All Classes in All Parts of the World, Shewn by Transparent Storm Cards and Useful Lessons* (London: Smith, Elder, 1848), i.

¹⁰⁰ Daston, *Science in the Archives*, 9.

meteorological sciences it is the process of reconfiguration that will drive the interpretive framework, and as Daston points out, this reconfiguration can include patterns, periodicities, taxonomies or generalizations.¹⁰¹ However, the legal archive of imperial trade complicates the neat sequence of reconfiguration.

Piddington published *Law of Storms applying to the tempests of Indian and Chinese Seas* in 1842, a year before the Amherst cases was tried in the courts. Piddington was also a keen observer of storms in the Bengal delta, leaving behind copious writings about storms, often called his cyclone memoirs (24 in all), as well as multiple books and was in the process of building his own ‘storm library’ (Piddington, 1848: 7). This allowed him, among other things, to complete the puzzle that Medel ascribed as the indistinctive directions of the *buracanes* winds, laying the groundwork for the development of a rotational theory of winds.¹⁰² He standardized the definition of a cyclone. In order to come up with a name for rotational wind Piddington moved away from terminology expressing strength to those expressing wind direction. He clarified that ‘Cycloidal’ was a known word expressing ‘a relation to a defined geometrical curve, and one not sufficiently approaching our usual views, which are those of something nearly though not perfectly circular.’ He then proposed to use a single word cyclone, which would be used to express ‘the same thing in all cases; and this without any relation to the strength of the wind’ (Piddington, 1848: 11). This laid the groundwork for his practical new science of cyclonology, which he developed over three books: *The Hornbook of Storms for the India and China Seas* (1842), an expanded version as *The Sailors Hornbook for the Law of Storms* (1848) and a textbook titled *Conversations about Hurricanes: For the use of plain sailors* (1852). Piddington’s

¹⁰¹ Daston, *Science in the Archives*, 10.

¹⁰² German geographer Bernhardus Verenius had understood the whirlwind nature of hurricanes as early as 1650, and by the nineteenth century the idea of circular winds had taken hold among the mariner-scientist who were studying oceanic winds. Colonel William Reid’s “Law of Storms” (1838) which was a direct influence for Piddington, lays out most of the features of circular storms, but stops short of naming them cyclones (Sen Sarma, 1997).

Laws of Storms, unlike earlier theories, had a practical utility, which was to help captains and sailors recognize the difference between straight and circular winds in order know when to cut through the wind, and when to circle around the storm. Earlier winds were classified according to their strength. In Piddington's system there were two classes of winds: straight winds and circular winds. Straight winds included trade winds, monsoons, nor-westers and Harmattan, among others. Circular winds included hurricanes, whirlwinds, waterspouts and bursting spouts, to name just a few.¹⁰³

If mariners were preparing their logs with an eye towards the centrality of the logbook for adjudicating potential settlement cases, then Piddington was prospectively archiving the same logs with an eye towards preserving and passing on this data for the future generations of weather scientists. His goal was to ease adjudication and to instruct the seamen. He wanted to develop a “new science of cyclonology” and he intended for this science to act as a form of insurance and protection against wreckage.¹⁰⁴ Thus centralizing the movement of the winds, over its strength was critical to Piddington's project since the practical utility of his research was to help captains and sailors recognize the difference between the winds in order know when to cut through the straight wind, and when to circle around the cyclonic storm and even profit by the speed to move the ship steadily to its destination. By collating, juxtaposing and analyzing these multiple logs, pressure charts, and wreck cases, he was able to develop a toolkit to predict and profit from storms. His practices of assembling an archive for the “law” of storms involved a process of acquiring and retrieving material, reconfiguring that material, and then transcribing this body of information into a narrative interpretive framework. Each storm that Piddington adjudicated upon, observed in situ, read about

¹⁰³ Piddington, *Sailor's Handbook*, 7-8.

¹⁰⁴ Henry Piddington, “A Twenty-fourth Memoir on the Law of Storms, being the Calcutta and Sunderbund Cyclone of 14th and 15th May, 1852,” *Journal of Asiatic Society of Bengal* 24 (1855), 397–461.

in logbooks and heard during deposition was situated in deep historicity.¹⁰⁵ We do not know just how isomorphic the data gathered in these cases were. What we do know is that he fretted about the incommensurability of the instruments, latitudes, and methods of recording barometric pressure. He worried about the capacities for observational vigil.¹⁰⁶ His solution to these problems was to propose the storm card as a critical tool in both teaching about cyclones and preventing wrecks.

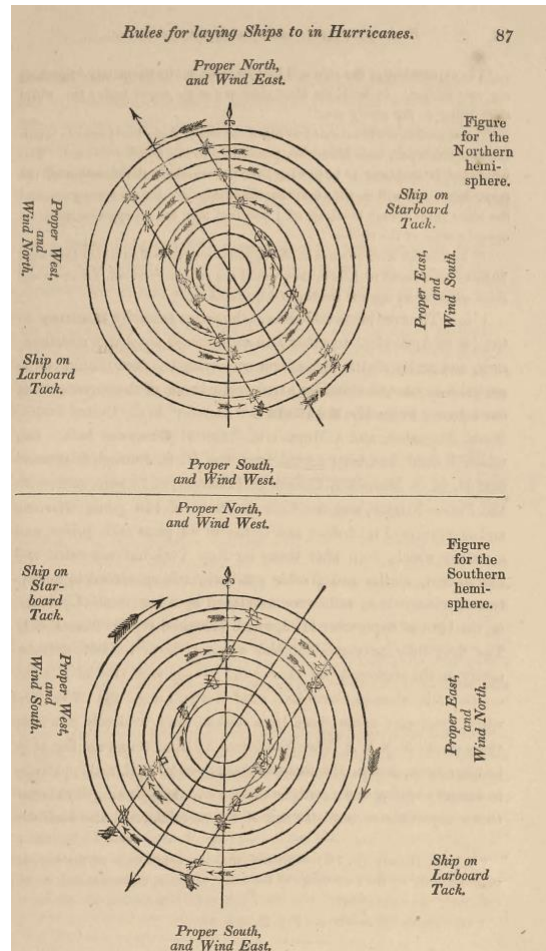


Figure 2: Diagrams taken from Piddington's *Conversations about Hurricanes*

¹⁰⁵ On the historicization of other natural events, like earthquake by seismologists see Miyake (2022: PAGE NUMBER, forthcoming).

¹⁰⁶ Henry Piddington, *Conversations about Hurricanes* (London: Smith, Elder, 1852), 60-63.

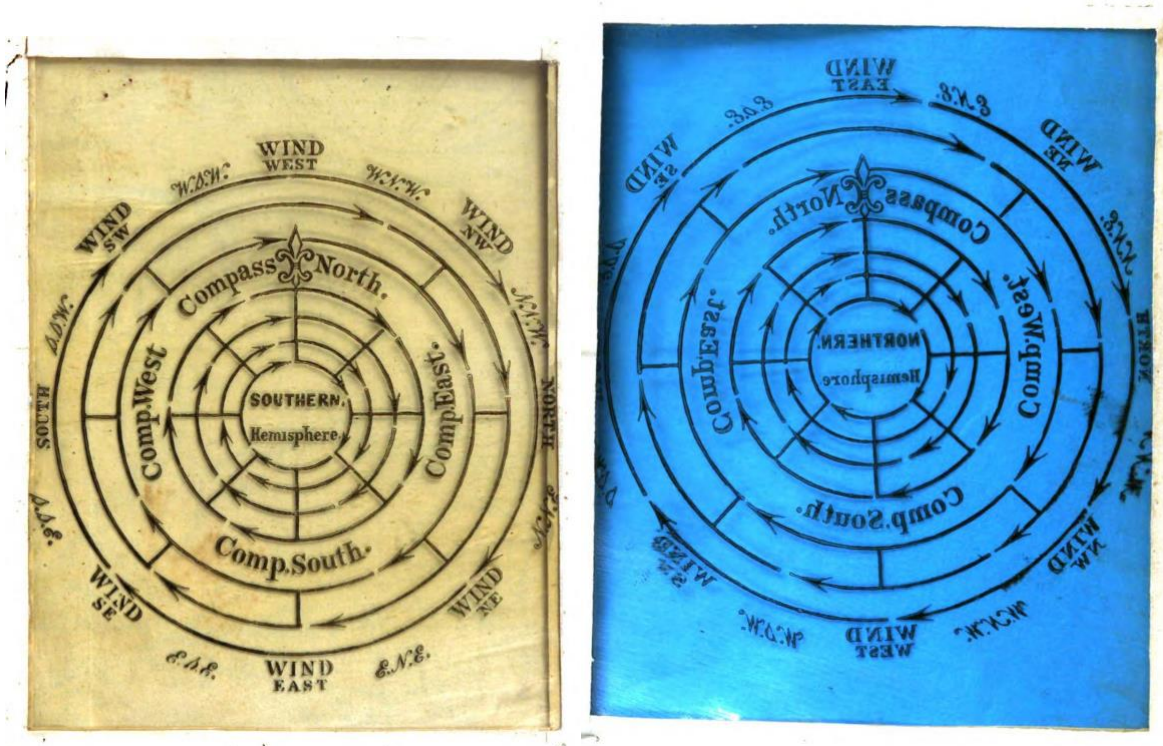


Figure 3: Piddington's Storm Card, 1848 Courtesy: British Library

For Piddington, the storm card is a distilled version of the law of nature applied to the business of common life – his science that should be conducted in the cabin tables of a ship. Piddington's storm science was geared towards teaching sailors to recognize the center of the cyclone and to devise methods to avoid it. According to him the safest way of managing a vessel in a storm is by following the wind direction and sailing on its rotatory or circular course than straight through it. In order to do that a sailor had to see a particular kind of storm – not one where strong winds blew in multiple directions, but one where there was a circular pattern to it with a center that one must, at all cost, avoid. However, he is quick to point out that what the sailor is discerning with the storm card are not tracks of storm, but the 'tendency of the paths of the usual Cyclones' (Piddington, 1848: 42). It is precisely because of these his directives to use the storm cards were accompanied by excerpts of captains logs which he meticulously collected from ships that docked at Calcutta and Madras.

Storm cards not only order the moments before the storm, but also make historical wind movements legible and transform them into a set of universal signs to be read and deciphered in order to avert a wreck. And given his role in the Marine Court he also hoped that they would ease adjudication about wrecks. The storm card was a technical tool that helped the captain verify the wind direction. By standardizing storm science Piddington had also hoped to develop plausible narrative about the moment of the wreck were they to occur and plot when and where mistakes were made. He was also fully aware of the difficulties of rendering the volatile tropical skies into a set of laws and diagrams. Therefore, Piddington recommended that mariners follow the storm card, but cautioned against ‘the mischievous and ignorant notion that there is any fixed law for the tracks of these terrific meteors, especially in narrow seas with volcanic islands or continents within, or near to, or limiting them’ (Piddington, 1848: 62). Moreover, Piddington saw his storm card as an evolving tool and he requested the sailors to offer feedback for improving upon the tool. Indeed, the storm card made the sailor’s tacit knowledge into a discernible evidence of his ability to read wind direction reflecting his capability as an experienced sailor. Thus, the storm card performed two functions: it was a critical tool of pedagogy for sailors and it sought to standardize narrative science of cyclones. What is perhaps interesting is that the skill of reading the storm card became a prerequisite for the sailors and critical in deciding damage cases thereafter.¹⁰⁷ From 1865 the Marine Board began to keep official lists of the number of wrecks, their causes, and compensation and sought to propose solutions to prevent future wrecks. The *Report from the Wrecks in Indian Waters* reveals that the inability to read the wind movement later became critical in deciding the causes for the wrecks where the failure to avoid storms was classified as human error through a series of categories of “Neglect of the Master.” For instance between 1865 -1876 there were a little over 300 full and partial wrecks in

¹⁰⁷ Piddington, *Conversations*, 61-73.

Indian Waters, of which 95 were attributed to natural causes categorized as “stress of weather,” “gale,” “fog,” “heavy weather,” “high seas,” “cyclone”, “hurricane,” “eddies,” “tides and currents.” 210 of the 300 wrecks were due to human error classified as “carelessness of either master, pilot or tindal,” “incorrect charts,” “incendiarism,” “mistaken light reading,” “given to drunkenness” and “overladen.”

V. Conclusion: Climate and Commodity

In the Bay of Bengal, the line between what was knowable in the “blooming, buzzing”¹⁰⁸ world of storms and gales, and how material practices of rowing, towing and navigating the seaboard were translated into empirical knowledge was intricately linked to the “insurantal imaginary” which in turn filtered colonial weather science.¹⁰⁹ The archive of cases, witness depositions, logbooks, accounts of fights between master and pilot and ethnographic European accounts of *tindals* (boatswain), and Indian shiphands formed a critical evidentiary base that organized Piddington’s science of cyclonology. This is a prosaic archive of law stitched together by mariners, sailors and administrators in conversation with underwriters, creditors and merchants, often in an effort to estimate compensation. Unlike the other colonial courts, the Marine Court also followed a jury system comprised of merchants, underwriters and mariners who brought with them not only expertise of the seas, but also networks of credibility and social hierarchies. If the social world of these seamen impacted the jurisdiction of wrecks, then it also produced an archive for colonial weather science, an archive cobbled together by no one other than Piddington himself. It was his science that ultimately also shaped the categorization and administration of human error at sea by

¹⁰⁸ Lorraine Daston, “Cloud Physiognomy,” *Representations* 135, no. 1 (2016): 45-71, 48.

¹⁰⁹ Guerrero, “Insurance, Climate Change and the Creation of Geographies of Uncertainty in the Indian Ocean Region,” 240.

the middle decades of the nineteenth century. Ignorance, or what in the classification of human behavior at sea was variously deemed the inability to read the winds, carelessness and negligence, became a tool to turn risk into revenue, but also created spaces out of which knowledge about readable wind patterns were generated.

This archive of wrecks also pluralizes the origin narratives of climate science by relocating it to the areas where maximum capital was invested and maximum profits could be reaped through the long nineteenth century. It allows us to see how weather-related threats were financialized and annexed within capitalist processes of accumulation and it puts middling characters of the empire, the petty sailors, merchant juries, low-level administrators and private underwriters at the heart of this history. What this chapter has attempted to show is that the making of the science of storms took place in the judicial and bureaucratic domains, as much as in the observatories and meteorological departments. What got bracketed as natural disaster within these domains became the site for extraction of profit as well as a site to conduct scientific studies. As consensus gathered around the predictability of tropical cyclones, compensation for wrecks decreased yet premium payments remained high. One might even go so far as to say that the absence of knowledge about the unknowables, as much as knowledge itself, became a function of power in these marketplaces.¹¹⁰

¹¹⁰ There has been some work on how ignorance and occlusions organized the business of science. See the classic work by Naomi Oreskes and Erik M. Conway, *Merchants of Doubt: How a Handful of Scientist Obscured the Truth on Issues from the Tobacco Smoke to Global Warming* (New York: Bloomsbury, 2010); Robert N. Proctor and Londa Schiebinger, *Agnotology: The Making of Unmaking of Ignorance*, (Paolo Alto: Stanford University Press, 2008). While they have paid attention to agnotology and doubt in the shaping (or repressing) science and the public discourse around it, the question of ignorance operated differently in the colony. In the nineteenth century the ignorance of the colonized was located in religion, poetry, myths and superstition and would be overcome through science, Christianity and colonial domination. The condition for free inquiry in the colony was also one that was only possible as an instrument of colonial domination. Gyan Prakash, *Another Reason: Science and the Imagination of Modern India* (Princeton: Princeton University Press, 1999), see especially 69-71.

Today, Lloyds, among others plays a critical role in funding climate models – while at the same time it substantially controls both the insurance market and how climate destabilization may affect this lucrative market. It is currently involved in an ambitious project to delineate spaces of high climatic risk and predict the future in order to shape what they term: “today’s climate security discourse.”¹¹¹ Eminent panel of scientists, climatologists and eschatologists are investigating peril index, estimating carbon taxes and insurable hazard. These nomenclatures mean a lot – they define the terrain of expertise and influences the movements of global capital, labor and goods. They have the capability of influencing geopolitics and mobilizing discourses of climate knowledge. Turning away from the metropolitan stories makes us realize the relation between corporations and climate science is not always one of obfuscation and climate change denialism.¹¹² There is another story which this chapter tried to document. Turning to this moment of company’s thriving rule in the Indian ocean we see that early meteorological knowledge was born in the crucible of ideas of profitability and the overcoming of ecological and limits. Turning to the Indian Ocean helps us understand how this space faced with the exigencies of global trade, became the space of legal experiments, a laboratory of climate science and perhaps even a commodity frontier in climate and weather disturbance.¹¹³

¹¹¹ 360 Risk Report, 2019.

¹¹² Naomi Oreskes and Eric Conway, *Merchants of Doubt* focuses only on fossil corporation. Focusing on financial institutes reveal a different relation to climate knowledge.

¹¹³ I am extending Beckert et. al. understanding of commodity frontier where institutes of law, finance and science come together for resource extraction to apply it to atmospheric resources. See: Beckert S, Bosma U, Schneider M, Vanhaute E. “Commodity frontiers and the transformation of the global countryside: a research agenda,” *Journal of Global History*. 2021;16(3):435-450. doi:10.1017/S1740022820000455 and for an important critique and corrective to their formulation see Findlay R, O’Rourke KH. “Commodity frontiers: a view from economic history,” *Journal of Global History*. 2021;16(3):462-465. doi:10.1017/S1740022821000024.