Manufacture at the Colonial Frontier

Iron and Salt Production Experiments in the East Indies, 1765 – 1858

Dissertation submitted in fulfilment of the requirement for
the degree of Doctor of Philosophy

Yogesh Ram Mishra
Centre for the History of Science, Technology and Medicine
Imperial College London
Imperial College London PhD Dissertation
2012

Declaration of Originality

I certify that all the intellectual contents of this thesis are of my own, unless otherwise stated.

London, November 2011 Yogesh Ram Mishra

Acknowledgement

Many people lent their support, both intellectual and otherwise, during the field and archival research for this work. For allowing me to consult and use their archives, I thank the archivists and librarians of the following institutions: Indian Council for Social Science Research (Calcutta), Royal Asiatic Society of Bengal (Calcutta), West Bengal State Archives (Calcutta), Bihar State Archives (Patna), the District Records Room (Birbhum), Royal Asiatic Society of Great Britain and Ireland (London), Asian and African Studies, British Library (London), Institution of Civil Engineers (London), Imperial College London, and the Science Museum (London).

For many insightful sessions of discussion at the CHoSTM, Imperial College, I am indebted to Bruno Cordavil, David Edgerton, Hermione Giffard, Andrew Mendelsohn, Aparajith Ramnath, Jaume Sastre, Jaume Valentines, and Waqar S. Zaidi. For comments on the drafts at various stages, I thank William Burns, Ralph Desmairas, Neil Torrant and Michael Weatherburn.

For their generous hospitality and inspiring conversations, I thank the following in India: Professor Arun Bandyopadhyay (Calcutta University), Paramita Goswami (Bangiya Sahitya Parishat), Somendra Chandra Nandi (Kassimbazar Raj), Dr Manish Jain (DM, Burdwan), Md. Abdul Momin Midda (Burdwan University Library), Nirod Baran Sarkar (Burdwan), Sukumar Singh (Birbhum), Gopal Chakrabarty (Birbhum), Professor Kishori Ranjan Das (Birbhum), Naba Kishore Salui (Birbhum), Professor Ch. K. Deo (Rohini Zemindari, Deoghar), Prasanna Kumar Choudhari (Deoghar), Durlabh Mishra (Deoghar), Mohananand Mishra, D.Lit. (Deoghar), Rajesh Sharma (Munger), Srinarayan Singh (Munger), Mukul Kumar Sinha (Munger), Professor Panchanan Mishra (Bhagalpur University), Professor Surendra Gopal (Patna University), Professor Hetukar Jha, Professor (late) Vijay Kumar Thakur, and Professor Rateneshwar Mishra (Darbhanga University).

Some of the ideas in this thesis were presented in a preliminary form at the International Workshop "Pre-colonial and Colonial Perspectives on Science and Technology in South Asia", organised by the Karl Jaspers Centre at the University of Heidelberg. I have benefitted from the questions and views expressed by the workshop participants. I thank in particular Amelia Bonea, Paul Fletcher, Prabhat Kumar, Eleonar Marcussen, Soumen Mukherji, all from the Heidelberg University; Sandamalee Wijenayake and Anuththaradevi Widyalankara (Colombo), Charu Singh and Medha Saxena (the JNU), and Margo Liptsin (Harvard). Professor Dhruv Raina and Dr. Roland Wenzlhuemer also gave many useful comments on that occasion.

The research carried out for the purpose of the thesis was supported by the Hans Rausing Endowment. I offer my sincere thanks to its Chair and member trustees. During the writing stage, the Imperial College Hardship Fund, Institute of Historical Research, and the Churches Together UK partially supported my stay in London. I thank them all.

For introducing historian's craft to me, I remain grateful to Professor Kamal P. Malla, (late) Nayaraj Panta, Dr. Mahesh Raj Panta, Professor Dinesh Raj Panta, and Professor Prayag Raj Sharma. Dr. Pratyoush Onta, Ramapati Raj Sharma, Vinod Raj Sharma, and Professor Purushottam Lochan Shrestha constantly encouraged my pursuit.

For making the short visiting fellowship at the Graduate School of Asian and African Area Studies in Kyoto University very much productive, I am thankful to Dr. Diwakar Acharya, Associate Professor Tatsuro Fujikara, Bhaskar Gautam, and Professor Akio Tanabe.

Lastly, my supervisors Professor Andrew Warwick and Dr. Abigail Woods have helped shape the arguments developed in this work in many ways. I am deeply grateful to both for skilfully steering the research project, and for helping me bring together many disparate thoughts. Working under their keen supervision has really been a pleasurable and enlightening exercise.

Yogesh R Mishra

Abstract

This thesis discusses the fate of British East India Company's attempts to industrialise iron and salt production in India in 1765-1858. Standard histories of these early manufacturing ventures tell stories either of decline in a flourishing indigenous industry or of the governments' failures to modernise traditional sectors of commodity production. However, these accounts present simplistic portrayals of the Company's Indian organisation, the local manufacturing milieu, and of iron and salt production and processing technologies. Crucially, they downplay conflicts among various departments of the Company's Indian edifice, and divisions within the local social organisation of manufacture. The fact that the fiscal policy of the Company governments significantly influenced both manufacturing and market structure in the period is also overlooked.

This thesis, by contrast, decouples the actions of the Indian governments from London's thoughts and prescriptions. It then analyses the implications of the fragmented and evolving colonial edifice for the local industries of iron and salt. Being sensitive to the social, political and geographical differentiation in the colonial landscape, this work focuses on the iron and salt production at the social and geographical 'frontiers'.

It argues that the Company arrived at workable production arrangements in India through experiments in technology and colonial governance, while also discovering effective ways to govern the local manufacturing population. The experiment-based understanding developed in this work will make the messy and unpredictable development of these large-scale iron and salt enterprises comprehensible. Simultaneously, it will cast light on the critical inputs of hitherto unexamined factors such as pre-colonial production relations and the technological uncertainties inherent in the development of various manufactories. These findings will revise our understanding of the ways in which colonial policy was linked to industrialising attempts on the one hand, and technological change on the other.

Sources and abbreviations

BL	British Library London
BPRC	Provincial Revenue Council at Burdwan Proceedings
BRC	Bengal Board of Revenue Consultations
BRCSOC	Board of Revenue Consultations (Separate) Salt Opium and Customs Proceedings
CUP	Cambridge University Press
DCP	Provincial Revenue Council at Dacca Proceedings
IOR	India Office Records
JICA	Japan International Cooperation Agency
ODNB	Oxford Dictionary of National Biography
OUP	Oxford University Press
PNIC	Porto Novo Iron Company
SOAS	School of Oriental and African Studies London

Table

Table 1 Particulars of the Jumma of Tuppa Looney & the Iron Mehal rented & Khas from 1770 to 1777

Figures

Figure 1 A filtering mound or a *maidah*
Figure 2 The plan and elevation of a boiling house
Figure 3 The interior of a boiling house

Charts

Chart 1 The East India Company's Salt Organisation in Bengal in the 1780s
Chart 2 Organisation of the Salt Agency circa 1780s

Table of Contents

Abstract 5

Chapter 1 Rethinking Iron and Salt Manufacture in India, 1765-1858 9

Introduction - Reassessment of the Historiography of Iron and Salt in Colonial India – Subject Matter of the Thesis – Chapter Plan

Chapter 2 Landscape: Birbhum Iron Works, 1774-1779 25

Introduction - Political Economy at a Colonial Frontier: Birbhum, Western Bengal in the 1770s - Iron Manufacture and Trade in the 1770s in Birbhum - Two Early Iron Projects in Birbhum - The Critical Role of the *Chuar*s

Chapter 3 Organisation: Salt Manufacture in the Sundarbans, 1765-1780s 58

Introduction - Beginnings of the Salt Monopoly, 1765-1780 - The Salt Manufacturers' Diverse Responses to the Agency System - Salt Monopoly as a Critique of the State- and Market-Centric Narratives

Chapter 4 Organisation: The World of Illicit Salt, 1790s – 1810s 91

Introduction - The Emergence of the Notion of Illicit Salt - The Identity of Illicit and Licit Salt - The Diversity in the Illicit Salt Landscape - Problems in the Profit Argument - Illicit Manufacture as a *Normal* Activity

Chapter 5 Experimentation: Porto Novo Iron Company, 1820s-1850s 121

Introduction - The Iron Monopoly for the 'European Plan', 1824-1831- Porto Novo Works as a form of Commercial Speculation, 1831-1851 - Responses to the Porto Novo

Monopoly - Unsettled Technology of Charcoal Iron Making - The Porto Novo Story and Historiography of Colonial Manufacture

Chapter 6 Technology: George A. Prinsep's Salt Experiments, 1828-1839 155
Introduction - Ballyaghaut Experiments, 1828-1833 - Narrainpore Salt Works, 1835 – 1839 - Narrainpore Principles and the Future of Monopoly - Salt Experiments and Colonial State

Chapter 7 Conclusion 183
A Summary of the Findings of the Thesis - Implications for the Existing Historiography of Colonial India - Large-scale Manufactures in Colonial India: Experiments at the Colonial Frontier

Appendix A 191

References 195

Chapter 1

RETHINKING IRON AND SALT MANUFACTURE IN INDIA, 1765-1858

Introduction

This thesis is about the British East India Company's attempts to industrialise iron and salt production in India in 1765-1858. It discusses a number of aspects of the development of these large-scale manufacturing efforts. Scholars have long established the significance of iron and salt to both the local population and the East India Company's governments in India during the 18th and 19th centuries. These were essential articles of everyday consumption and use: salt as a culinary ingredient, and iron as a raw material for making agricultural and industrial implements. Hundreds of thousands of skilled artisans and labourers found employment in the production and processing of these commodities. Numerous cultivators in coastal India made salt not only to earn extra cash but also to pay their land rents. A large population in the iron ore-rich districts was engaged in mining, smelting, charcoal making and smithy operations. Well-established networks of moneylenders, peddlers and large convoys of travelling ascetics and Banjaras carried out the trade in these articles throughout the subcontinent.

The Company's servants in India recognised the economic and strategic significance of these commodities early on. Many made fortunes by privately investing in the inland trade of salt. Those at the helm of the Company's Indian governments institutionalised these profit-making activities in the late eighteenth century by monopolising the manufacture and trade of iron and salt. Throughout its rule, the Company's salt profits were second only to land revenues. As for iron, the local governments needed the metal for making weaponry and building infrastructure. In the beginning, they procured it from Britain, but this was time-consuming, costly and undependable due to sea voyage hazards. The governments therefore sponsored numerous surveys of local iron resources and encouraged private speculators to erect iron industries locally.

Existing histories of large-scale iron and salt manufacturing ventures in colonial India are pessimistic. They tell stories either of decline in a flourishing indigenous industry (in the case of salt) or of the colonial governments' failures to modernise a traditional sector of commodity production (in the case of iron). However, they ignore the divergent interests of the Indian governments relative to the policies framed in London. They also downplay conflicts among various departments

of the Company's Indian edifice, and divisions within the local social organisation of manufacture. Other accounts, which represent the manufactories as ventures of British capital, undervalue the crucial role played by local bankers and speculators in organising the governments' projects. Historians of technology have viewed the early industrialising attempts in terms of the transfer of European technologies, glossing over the fact that local knowledge was used extensively in these ventures. Lastly, economic historians have conceived the works as projects of commercial capital in the age of free trade, overlooking the peculiar condition of colonial India in which the fiscal policy of the Company governments significantly influenced both manufacturing and market structure.

These accounts have therefore adopted particular perspectives on the Company's Indian organisation, on the local manufacturing milieu, and on iron and salt production and processing technologies. In so doing, the authors miss the provisional character of production arrangements in these enterprises, and mistake consequences for causes in their analyses of the slow pace of development of Indian manufacture in this period.

This thesis, by contrast, posits colonialism as a notion to be investigated, and not as a self-evident explanation of industrial development, or its lack of development, in colonial India. It examines the notion by decoupling the actions of the Indian governments from London's thoughts and prescriptions. It then analyses the implications of the fragmented and evolving colonial edifice for the local industries of iron and salt. Unlike existing histories of manufacture, which are largely indifferent to the social, political and geographical differentiation in the colonial landscape, this work focuses on the social and geographical peripheries, denoted here by the term 'frontiers'. This term is useful in several ways. It covers the sites of iron and salt manufacturing in the colony. It conveys a sense of the temporary and fragmentary presence of governments in the manufacturing sites. It also helps to clarify how the local responses to the large-scale manufacturing projects were shaped by the governments' fiscal policy and by the pre-colonial production relations.

The thesis argues how, through experiments in technology and colonial governance, the Company's men arrived at production arrangements that worked in India, while simultaneously discovering effective ways to govern the local manufacturing population. The experimental understanding developed in this work will make sense of the messy and unpredictable manner in which these enterprises unfolded in the colonial landscape. Simultaneously, it will cast light on the critical inputs of hitherto unexamined factors such as pre-colonial production relations and

the technological uncertainties inherent in the development of various manufactories. These findings will revise our understanding of the ways in which colonial policy was linked to industrialising attempts on the one hand, and technological change on the other

Reassessment of the Historiography of Iron and Salt in Colonial India

Broadly speaking, existing histories of colonial India are concerned to find causes for the slow development of the iron and salt industries in the subcontinent. This historiography has inherited some key but questionable assumptions from accounts of economic history and history of technology in colonial India. In this section, I clarify what these assumptions are, and how this thesis avoids them by building on recent revisions in this literature.

Existing accounts of the production of iron and salt in colonial India focus exclusively on negative aspects of the interaction between the East India Company's governments and the Indian population. They maintain, for instance, that the activities of the colonialists were detrimental to local industries, such that the Company's monopoly on salt manufacture caused the complete extinction of the local salt industry by the mid-nineteenth century.[1] Histories of the Indian iron industries portray colonial activity as having failed to develop what they perceive as a 'traditional' sector of iron production.[2]

Some accounts develop specific themes where negative effects of the colonial enterprises on local artisans and local industries figure prominently. 'Deindustrialisation', for instance, is an oft-repeated description of the changes wrought in the local economy by the emerging socio-economic arrangements of production under colonial rule.[3] The term is used to denote several processes: a

[1] Narendra Krishna Sinha (ed.) *Midnapore Salt Papers: Hijli and Tamluk, 1781-1807* (Calcutta: West Bengal Regional Records Survey Committee, 1954); Radhamadhab Shaha, 'Saltworkers of Nadia, 1785-1795', *Bengal Past & Present*, Vol. 83 (Jan.- Jun., 1964), pp. 25-31; Balai Barui, *The Salt Industry of Bengal 1757-1800: A Study in the Interaction of British Monopoly Control and Indigenous Enterprise* (Calcutta: K. P. Bagchi & Co., 1985). India imported 300,000 tons of Cheshire salt in 1875, the same amount Bengal produced in 1800. See Samuel A. M. Adshead, *Salt and Civilization* (Hampshire; London: Macmillan, 1992), p. 136.

[2] S. G. T. Heatly, 'Contributions towards a History of the Development of the Mineral Resources of India', *Journal of the Asiatic Society of Bengal*, Vol. 11, Part 2 (1842), pp. 813-838; S. G. T. Heatly, 'Contributions towards a History of the Development of the Resources of India, Memoranda 2: The Working of Iron in Bengal', *Journal of the Asiatic Society of Bengal*, Vol. 12, Part 2 (1843), pp. 542-563; P. P. Pillai, 'Iron and Steel Production in India', *Economica*, No. 7 (Jan., 1923), pp. 55-66; Sabyasachi Bhattacharya, 'Iron smelters and the Indian Iron and Steel Industry of India: From Stagnation to Atrophy', *Journal of the Indian Anthropological Institute*, Vol. 5, No. 1-2 (1970), pp. 133-151; H. C. Bhardwaj, 'Development of Iron and Steel Technology in India during 18th and 19th Centuries', *Indian Journal of History of Science*, Vol. 17, No. 2 (1982), pp. 223-233.

[3] D. Clingingsmith and Jeffery G. Williamson, 'India's Deindustrialization in the 18th and 19th Centuries', *NBER Working Paper 10586* (Cambridge, Mass.: National Bureau of Economic Research,

transformation of artisans into cultivators and urban wage labourers in the period;[4] an increasing subordination of iron and salt makers to both the colonial organisation and market forces;[5] and the destruction of local industrialising capability.[6]

Other accounts concerned with local responses to the colonial ventures tend to speak either of the 'resistance' of manufacturers and the local elite to these ventures, or of artisans' 'insurgency' against the collaboration between colonial governments and local elites.[7] These histories recognise the agency of local iron- and salt-makers, but maintain that their reactions did not alter the Company's eventual domination of local arrangements in India.

Still other accounts link changes in the Indian manufacturing scene to those in British politics and ideology. For example, one historian has attributed the 1790s reforms in the salt monopoly to the romantic humanism then ascendant in Britain.[8] Others have related the 1830s increase in iron speculation to the rise in 'free trade' economic thinking among British investors.[9] Such tendencies to search for external causes to explain the colonial economy downplay the critical role of local factors.

Behind these thematic explorations lay particular portrayals of the industrialising ventures. Existing accounts universally regard the Company's salt

---

2004). For a recent critique of the theory of deindustrialisation, see Tirthankar Roy, *Rethinking Economic Change in India: Labour and Livelihood* (London: Routledge, 2005), pp. 106-118.

[4] Arguments for 'peasantisation' are available in Amiya Kumar Bagchi, 'Deindustrialization in India in the Nineteenth Century: Some Theoretical Implications", *Journal of Development Studies*, Vol. 12 (1976), pp. 135-164; 'Deindustrialization in Gangetic Bihar 1809-1901', in B. De et al. *Essays in Honour of Prof. S. C. Sarkar* (New Delhi: People's Publishing House, 1976), pp. 499-522. For arguments against, see Marika Vicziany, 'The Deindustrialization of India in the Nineteenth Century: A Methodological Critique of Amiya Kumar Bagchi', *Indian Economic and Social History Review*, Vol. 16 (1979), pp. 105-146; P. Harnetty, ''Deindustrialization' Revisited: The Handloom Weavers of the Central Provinces of India c. 1800-1947', *Modern Asian Studies*, Vol. 25, No. 3 (1991), pp. 455-510.

[5] A. M. Serajuddin, 'The Condition of the Salt manufacturers of Bengal under the Rule of the East India Company', *Journal of the Asiatic Society of Bangladesh*, Vol. 18, No. 1 (Jun., 1973), pp. 55-71; Smritikumar Sarkar, 'The Changing Image of the Craftsman: Blacksmith in Colonial Jharkhand', *Calcutta History Journal*, Vol. 18, No. 2 (1996), pp. 67-85; Smritikumar Sarkar, 'Social Organization of Artisan Production in India: Changing Role of the Market, Technology, and Merchant-Creditor: 18th to 20th Centuries', in B. B. Chaudhari (ed.) *Economic History of Indian from Eighteenth to Twentieth Century* (New Delhi: PHISPC and CSC, 2005), pp. 107-354.

[6] Indrajit Ray, 'Imperial Policy and Decline of the Bengal Salt Industry under Colonial Rule: An Episode in the "De-Industrialization" Process', *Indian Economic and Social History Review*, Vol. 37, No. 2 (2001), pp. 181-205.

[7] Meena Bhargava, 'Visibility through Resistance: The Malangis and Salt Making in Eighteenth Century Bengal', *Indian Historical Review*, Vol. 33, No. 1 (Jan., 2006), pp. 24-43; Balaichandra Barui, 'Resistance of the Bengal Zemindars to the East India Company's Salt Monopoly', *Calcutta History Journal*, Vol. 2, No. 2 (Jan.-Jun., 1978), pp. 136-170; Ranajit Guha, *Elementary Aspects of Peasant Insurgency in Colonial India* (Delhi: OUP, 1983), chapter 2. On the responses of the business class, see Siddhartha Raychaudhuri, 'Colonialism, Indigenous Elites and the Transformation of the Cities in the Non-Western World: Ahmedabad (Western India) 1890-1947', *Modern Asian Studies*, Vol. 35, No. 3 (2001), pp. 677-726.

[8] H. R. C. Wright, 'Reforms in the Bengal Salt Monopoly, 1786-95', *Studies in Romanticism*, Vol. 1, No. 3 (Spring 1962), pp. 129-154.

[9] For a general exposition in this regard, see H. V. Bowen, *The Business of Empire: the East India Company and Imperial Britain, 1756-1833* (Cambridge: CUP, 2006).

monopoly as a colonial enterprise intended to maximise Indian revenues.[10] They have thus attributed the decline in local salt manufacture to 'economic imperialism' in general, and to discriminatory tariff structures which favoured Cheshire salt in particular.[11] Some histories of the iron projects in colonial India view them in terms of European iron technology transfers, and explain their failure by citing local obstacles such as obstructive colonial officials, adverse policies, and the scarcity of both fuel and skilled labour.[12] Others analyse the projects as industrialising attempts by the Indian governments, and locate the reasons for failure in these governments' lack of 'economic sovereignty' or in their half-hearted attempts to 'modernise' the industry.[13] The rest see the ventures as pure capitalist enterprises, and have argued that persistent capital scarcity and unfavourable 'factor prices' in the colony determined their poor outcome.[14] As I will show below, these portrayals derive from partial selection of historical evidence.

Crucially, the above understanding of iron and salt manufacture is informed, however, by questionable assumptions that feature in the standard economic history and history of technology of colonial India. For instance, both the historiography of iron and salt, and the standard economic history literature portray the colonial edifice in India as a static colossus; they recognise neither internal divisions within that

[10] Barui, *The Salt Industry of Bengal*. See also, J. K. Nag, 'History of Bengal's Salt Industry', *Modern Review* (Sept., 1939), pp. 300-303; Roy Moxham, 'Salt Starvation in British India-Consequences of High Salt Taxation in the Bengal Presidency, 1765 to 1878', *Economic and Political Weekly*, Vol. 36, No. 25 (Jun., 2001), pp. 23-29; Miki Sayako, *Merchants, Markets, and the Monopoly of the East India Company: The Salt Trade in Bengal under Colonial Control, c. 1760-1836*, PhD Thesis, School of Oriental and African Studies, University of London (2005).

[11] A. M. Serajuddin, 'The Salt Monopoly of the East India Company's Government in Bengal', *Journal of Economic and Social History of the Orient*, Vol. 21, No. 3 (Oct., 1978), pp. 304-322; Sadanand Choudhary, *Economic History of Colonialism: A Study of British Salt Policy in Orissa* (Delhi: Inter-India Publications, 1979); K. V. Jeyaraj, *A History of Salt Monopoly in the Madras Presidency, 1805-1878* (Madurai: Ennes Publications, 1984); Satya Narayan Mishra, *Salt Industry in India* (New Delhi: Mohit, 2005). Adshead calls the salt monopoly a 'classic case of economic imperialism'. See Adshead, *Salt and Civilization*, p. 159.

[12] Andrew Grout, *Geology and India: 1770-1851. A Study in the Methods and Motivations of a Colonial Science*, PhD Thesis, School of Oriental and African Studies, University of London (1995); Girija Pande and Jan af Geijerstam (eds.) *Tradition and Innovation in the History of Iron Making: An Indo-European Perspective* (Nainital: Pahar, 2003); Jan af Geijerstam, *Landscapes of Technology Transfer: Swedish Ironmakers in India: 1860-1864* (Stockholm: Jernkontorets Bergshistoriska, 2004); P. Parthasarathi, 'Iron Smelting in the Indian Subcontinent', a paper presented in XIV International Economic History Congress, Helsinki 2006, Session 38. Available at http://www.helsinki.fi/iehc2006/papers1/Partha.pdf. [Accessed on 30/06/2008].

[13] Ian Inkster, 'Prometheus Bound: Technology and Industrialization in Japan, China and India prior to 1914-A Political Economy Approach', *Annals of Science*, Vol. 45 (1988), pp. 399-426; Ian Inkster, *Technology and Industrialisation: Historical Case Studies and International Perspectives* (Aldershot, UK; Brookfield, VT: Ashgate, 1998); Ian Inkster, 'Colonial and Neo-colonial Transfers of Technology: Perspectives on India before 1914' in MacLeod and Kumar, *Technology and Raj*, pp. 25-50. For an argument on 'half-hearted' attempt, see Pillai, ''Iron and Steel Production'.

[14] For the capitalist enterprise take, see Tirthankar Roy, 'Did Globalisation aid Industrial Development in Colonial India? A Study of Knowledge Transfer in the Iron Industry', *Indian Economic and Social History Review*, Vol. 46, No. 4 (2009), pp. 579-613; Morris D. Morris, 'The Growth of Large Scale Industry to 1947' in Kumar (ed.) *Cambridge Economic History of India*, pp. 553-676.

edifice, nor important evolving attitudes of the Indian governments to large-scale manufacture.[15] As well, the iron and salt stories both draw their 'declinist' narrative from the economic history literature, which overlooks regional, historical and commodity-specific disparities in commodity manufacture.[16]

The accounts of iron and salt share two key views with the standard technology transfer and diffusion literature. Firstly, they suppose that colonial space was technological terra nullius, as if what existed in the pre-colonial period were not technologies but merely arts and crafts.[17] Secondly, they approach technologies as simply, or only, instruments of European colonising powers.[18] Such perspectives, which assume Europe as the originator of all technologies, have shaped the historiography of manufacture in the colony in particular ways.[19] For example, since technology and industrial production are viewed as colonial inventions, their successes have been attributed to the effectiveness of the colonial rule; their failures, on the

[15] For changes in administrative and business interests of the Company and their Indian governments, see John William Kaye, *The Administration of the East India Company: A History of Indian Progress* (London: Richard Bentley, 1853); B. B. Misra, *The Central Administration of the East India Company* (Manchester: Manchester University Press, 1959); B. B. Misra, *The Administrative History of India, 1834-1947: General Administration* (London: OUP, 1977). In his study of the failure of the transfer of Swedish iron technology in India, Geijerstam has downplayed the effects of the changes in the government policy on the forestry. See Geijerstam, *Landscape of Technology Transfer*. For changing forestry policy in the Kumaon region, see Haripriya Rangan, 'Property vs. Control: The State and Forest Management in the Indian Himalaya', *Development and Change*, Vol. 28 (1997), pp. 71-94.

[16] This is Tirthankar Roy's criticism of the standard economic history narrative. See Tirthankar Roy, *Traditional Industry in the Economy of Colonial India* (Cambridge: CUP, 1999). For a nuanced study of the development of textile industry, see Ian Christopher Wendt, *The Social Fabric: Textile Industry and Community in Early Modern South India*, PhD Thesis, University of Wisconsin-Madison (2005). See also, V. I. Pavlov, *Historical Premises for India's Transition to Capitalism: Late 18th to Mid-19th Centuries* (Moscow: Nauka Publishing House, 1978), p. 57. Black smithy, carpentry and tanning works followed different courses. On smithy and carpentry, see Francis Buchanan, *A Journey from Madras through the Countries of Mysore, Canara and Malabar*, 3 Vols. (London: T. Cadell and W. Davies; Black, Parry and Kingsbury, 1807), Vol. I, pp. 265-268, p. 337; Vol. II, p. 108; Benjamin Heyne, *Tracts, Historical and Statistical, of India with Journals of Several Tours through Various Parts of the Peninsula; also an Account of Sumatra in a Series of Letters* (London: Robert Bladwin; Black, Parry, and Co. Booksellers, 1814), p. 69-73; R. Montgomery Martin, *The History, Antiquities, Topographies and Statistics of Eastern India*, 3 Vols. (London: Wm. H. Allen and Co., 1838), Vol. I, pp. 324-328. Leather industry is an evidence of such diverse development. See Roy, *Traditional Industry*, chapter 6.

[17] Jan Todd, *Colonial Technology: Science and the Transfer of Innovation to Australia* (Cambridge; New York: CUP, 1995).

[18] For the general arguments on technology as tools of colonisation, see Carlo M. Cipolla, *Guns, Sails, and Empires: Technological Innovation and Early Phases of European Expansion, 1400-1700* (New York: Pantheon Books, 1966); Daniel Headrick, *The Tools of Empire: Technology and European Imperialism in the Nineteenth Century* (Oxford; New York: OUP, 1981); Daniel Headrick, *The Tentacles of Progress: Technology Transfer in the Age of Imperialism, 1850-1940* (New York; Oxford: OUP, 1988); Satpal Sangwan, *Science, Technology and Colonisation: An Indian Experience, 1757-1857* (Delhi: Anamika Prakashan, 1991); Roy MacLeod and Deepak Kumar (eds.) *Technology and the Raj: Western Technology and Technical Transfers To India, 1700-1947* (New Delhi; Thousand Oaks: Sage Publications, 1995); Michael Adas, *Technology and European Overseas Enterprise: Diffusion, Adaption and Adoption* (Aldershot: Variorum, 1996); Jared M. Diamond, *Guns, Germs and Steel: The Fates of Human Societies* (London: Jonathan Cape, 1997); Roger Knight, 'Sugar, Technology, and Colonial Encounters: Refashioning the Industry in the Netherlands Indies, 1800-1942', *Historical Sociology*, Vol. 12, Issue 3 (1999), pp. 218-250.

[19] On the limitations of the transfer and diffusionist accounts of technology in the colony, see Suzanne Moon, 'Place, Voice, Interdisciplinarity: Understanding Technology in the Colony and Postcolony', *History and Technology*, Vol. 26, No. 3 (2010), pp. 189-201.

other hand, are linked to local factors well beyond the Company officials' control. Yet the literatures have not sufficiently explained why numerous officials showed keen interest in the local means and manner of making things. Nor have they sufficiently scrutinised the interaction between existing and transferred technologies, particularly with regard to the ways in which various elements from both were incorporated in salt and iron manufacturing. Moreover, the naïve view that transfer and diffusion were the dominant processes of technology change in the colony ignores the effects of the pre-colonial organisation of commodity production on these processes.

Recent writings on the economy of colonial India have begun to address some of these deficiencies. These revisionist histories see the varied development of commodity production ventures as decisive evidence against the standard economic accounts. They have explained the different paths of development of the iron and salt industries by referring to the crucial role of market-integration, commercialisation, capital and labour mobility, the costs of inputs and of transactions.[20] In addition, they underscore the ability of manufacturers and producers to make rational economic decisions about their own lives and livelihoods in the face of these market-related changes. The more radical versions of this literature argue for eschewing the notion of colonialism on the basis that it does not reveal the 'fundamental link between politics on the one hand...[nor] resources or the market for manual labour on the other'.[21]

While these revisions have correctly diagnosed the shortcomings in the standard economic literature, their solution of putting the market at the centre of their explanatory framework has a major drawback. Market governance was a top priority of the Company's Indian representatives throughout the period under study. The manoeuvring capability of the manufacturers relative to changes in the market was therefore constrained by government policies.[22] Such government practices as taxing smelting furnaces and artisans, the erection of salt custom barriers, regulation of

[20] On the critical contribution of the market integration to economic development, see Morris D. Morris, 'Towards a Reinterpretation of Nineteenth Century Indian Economic History', *Journal of Economic History*, Vol. 23, No. 4 (Dec., 1963), pp. 606-618; Morris, 'Growth of Large-Scale Industry'. On the industry-wide effects of market integration, see Roy, *Traditional Industry*. For evidence of increased market integration, see Roman Studer, *Market Integration and Economic Development: A Comparative Study of India and Europe, 1700-1900*, PhD Thesis, Oxford University (2009). For the evidence on improving factor prices in the Indian textile trade, see Stephen Broadberry and Bishnupriya Gupta, 'Lancashire, India, Shifting Competitive Advantage in Cotton Textiles, 1700-1850: the Neglected Role of Factor Price', *Economic History Review*, Vol. 62, No. 2 (May, 2009), pp. 279-305. On factor prices in general, see Roy, 'Did globalization aid'. On the effects of competition upon the production and trade of indigo, see Prakash Kumar, *Facing Competition: The History of Indigo Experiments in Colonial India, 1897-1920*, PhD Thesis, Georgia Institute of Technology (2004).

[21] Roy, *Rethinking Economic Change*, p. 183, fn. 11. The related exposition is spread out over the Chapters 2, 9 and 10.

[22] On the Company's early attempts to regulate the market places and inland trade routes, see Sen, *Empire of Free Trade*. Ritu Birla, *Stages of Capital: Law, Culture and Market Governance in Late Colonial India* (Durham; London: Duke University Press, 2009).

market prices, awards of monopolies and supply contracts to favourites, directly affected the working lives of the salt and iron manufacturers.[23] In a situation where the colonial governments were also the mighty merchants, the extent to which commodity producers were able to make occupational choices based solely on economic criteria should be empirically assessed, not simply assumed.

Similarly, recent critiques of the transfer and diffusion literature, which have argued for going beyond Eurocentric- and diffusion-focussed accounts, do not fully substantiate their own arguments. For example, these reassessments point to the inadequacy of the transfer literature without critically examining what was actually involved in the processes of transfer. This is evident, for instance, in the failure of these accounts to distinguish between factual and rhetorical uses of phrases such as 'European plan' and 'European manner' in the source documents.[24] Furthermore, the reappraisals accept the common, but in my view false, notion that the technologies being transferred from Europe to India were already in a state of regular and predictable performance in Britain.[25] In other words, their criticisms of the transfer literature are driven more by a desire to correct an unjust historiography than by substantial historical substance.

Subject Matter of the Thesis

This thesis, therefore, considers the notion of colonialism neither as a redundant form of explanation nor as a source of all the woes in colonial India, but rather as an historical problem in need of explanation. It examines how colonial policy altered the production of various commodities. One may expect to find dramatic changes in the

[23] On the effect of the tax on professions on the livelihood of artisans, see *East India. Correspondence relating to the Revision of Assessment in South Arcot; Meriah Agency in Ganjam and Orissa; Moturpha, &c., Taxes at Madras; Administration of the Hyderabad Assigned Districts; and the Public Works Department* (London: House of Commons, 1857). On the Great Hedge salt line, see Roy Moxham, *Great Hedge of India: The Search for the Living Barrier that Divided a People* (London: Constable, 2001). On how Company rule prioritised proprietary rights over usufructuary and commonage rights, see Ranajit Guha, *A Rule of Property for Bengal: An Essay on the Idea of Permanent Settlement* (Paris: Mouton, 1963). For a more nuanced elaboration of land rights, see David Washbrook, 'Law, State and Agrarian Society in Colonial India', *Modern Asian Studies*, Vol. 15, No. 3 (1981), pp. 649-729. On continuities among such rights in colonial India, see Peter Robb, 'Landed Property, Agrarian Categories, and the Agricultural Frontier: Some Reflections on Colonial India' in Gregory Blues, Martin P. Bunton and Ralph C. Croizier (eds.) *Colonialism and the Modern World: Selected Essays* (New York; London: M. E. Sharpe, 2002), pp. 71-99. On the Company's early attempts to regulate the market places and inland trade routes, see Sen, *Empire of Free Trade*.

[24] Hence the wide acceptance of the fact that such 'plan' and 'principles' were indeed existing as distinct categories in Europe and were clearly discernable in the iron and salt manufactories in India. See, for example, Abhay Kumar Singh, *Modern World System and Indian Proto-Industrialization: Bengal 1650-1800* (New Delhi: Northern Book Centre, 2006), p. 359.

[25] For a change in iron technologies in Britain, see Charles K. Hyde, *Technological Change and the British Iron Industry 1700-1870* (Princeton, N. J.: Princeton University Press, 1977); Richard Hayman, *The Shropshire Wrought-Iron Industry c 1600-1900: A Study of Technological Change*, PhD Thesis, University of Birmingham (2003). For the same in the salt making methods, see Albert F. Calvert, *Salt in Cheshire* (London: E. & F. N. Spon. Ltd., 1915).

local salt production arrangements due to the Company's monopoly over the article. As iron manufactories were in the hands of private entrepreneurs, the effects of the colonial fiscal measures might only be indirect on their fate. In particular, this work will discuss how changing policies affected the fate of technology in these industries, or vice-versa. The period, sites of study and the approach developed in this work will enable me address these issues. They will help me to account for important aspects of the development of these industries. These aspects include the diverse local responses to these industrialising attempts, the persistence of illicit salt production in Bengal, the critical role of technology in the failure of the iron ventures, and the consolidation of the Bengal salt monopoly after the 1833 Charter.

Periodisation

The study period of this thesis, 1765-1858, will help to link changes in the government fiscal policy to the development of large-scale iron and salt manufacturing in colonial India. In 1765, the Mughal Emperor, Shah Alam II, granted the Company a territorial revenue-collection contract, also known as Dewany, for the provinces of Bengal and Bihar. It was awarded to the Company in return for a fixed annual income to be paid to the Emperor's treasury. This grant transformed an armed band of the Company's merchants into revenue administrators for the Mughals, and a sort of government for the people in the provinces. Ninety-two years later, the Indian Mutiny of 1857 brought an end to the Company's rule in India. Although the Mutiny was successfully suppressed, news of its shocking scale made the Victorian bourgeoisie doubtful about the Company's ability to manage its Indian territories. This uncertainty reverberated through the British Parliament and led to the annexation of the Company's Indian territories by the British crown in 1858.[26]

Beneath this continuity of the Company's rule, however, the political economic contexts of commodity manufacturing changed dramatically. The Company's Indian edifice emerged in this period as a nation-state. From isolated warehouses and trading outposts in 1765, the Company's structure by 1858 had become a unified complex of bureaucracy, the military and a judiciary. It promulgated

[26] For two survey volumes on the history of British Empire in South Asia, see P. J. Marshall (ed.) *The Oxford History of the British Empire: Volume II: The Eighteenth Century* (Oxford; New York: OUP, 1998); Andrew Porter (ed.) *The Oxford History of the British Empire Volume III: The Nineteenth Century* (Oxford; New York: OUP, 1999). For a succinct overview, see Barbara D. Metcalf and Thomas R. Metcalf, *A Concise History of India*, 2e (Cambridge: CUP, 2006), chapters 2-4. On the significance of the 1857 mutiny in Indian history, see Smita Pandey, *Visions of the Rebels During 1857: Aspects of Mobilisation, Organisation and Resistance* (New Delhi: Rupa, 2008); Salahuddin Malik, *1857: War of Independence or Clash of Civilizations? British Public Reactions* (Karachi: OUP, 2008); Biswamoy Pati (ed.) *The Great Rebellion of 1857 in India: Exploring Transgressions, Contests and Diversities* (London: Routledge, 2009).

acts, farmed out revenue- and tax-collections, implemented infrastructure projects, awarded monopolies and supply contracts, compiled and maintained records, narrated histories of its rule, and entered into wars and treaties with local kings and royalties as sovereigns.[27] While most histories of colonialism recognise these broader changes, they have not related the changes to alterations in the conditions of large-scale iron and salt making. Rather, their stories of manufacture and the economy are set against a static political and territorial backdrop. This thesis will attempt to rectify such a portrayal by interweaving themes of manufacture and colonial consolidation.

At the same time, fragmentation in the local political-economic landscape affected the outcome of the early iron and salt ventures. The tension between the 'localist' Madras and the 'supreme' Bengal and frictions within commercial, salt and revenue departments of these governments considerably influenced the day-to-day functioning of the manufactories. Changing relationship between the government officials and private capitalists in India, and the officials' self-interests also help us to see the diversity within the Company's Indian edifice.[28] The attitudes of the local manufacturing population and their clients towards colonial projects also shaped activities in the iron and salt making sites. Unlike existing accounts, the stories presented in this thesis attend to the implications of these diverse strands for the development of large-scale iron and salt industries.

---

[27] Rajat Kanta Ray, 'Indian Society and the Establishment of British Supremacy, 1765-1818' in Marshall (ed.) *Eighteenth Century*, pp. 508-529. On the Company's revenue administration, see H. H. Dodwell, *The Cambridge History of the British Empire, Volume 4: British India 1497-1858* (Cambridge: University Press, 1929); Asiya Siddiqi (ed.) *Trade and Finance in Colonial India, 1750-1860* (New Delhi: OUP, 1995); Patrick Tuck (ed.) *The East India Company: 1600-1858*, 6 Vols. (London: Routledge, 1998); Sangha Mittra and S. R. Bakshi, *Administration of East India Company, 1740-1856* (New Delhi: Commonwealth, 2003). On the early problems of administering the Indian territories, see R. B. Ramsbotham, *Studies in the Land Revenue History of Bengal 1769-1787* (London: Humphrey Milford, 1926); H. V. Bowen, *Revenue and Reform: The Indian Problem in British Politics, 1757-1773* (Cambridge: CUP, 1991); Bhavani Raman, *Document and Raj: Scribes and Writing under Early Colonial Rule in Madras, 1771-1860*, PhD Thesis, University of Michigan (2007). On the recruitment of the Company military and civil servants, see Akshoy K. Ghosal, *Civil Service in India under the East India Company: A Study in Administrative Development* (Calcutta: Calcutta University, 1944); Ram Prasad Sikka, *The Civil Service in India: Europeanisation and Indianisation Under the East India Company, 1765-1857* (New Delhi: Uppal, 1984); Raj Kumar (ed.) *Military System of East India Company* (New Delhi: Commonwealth, 2004). On the legal history of the Company rule, see B. B. Misra, *The Judicial Administration of the East India Company in Bengal, 1765-1782* (Delhi: Motilal Banarsidass, 1961); S. V. Desika Char, *Centralised Legislation: A History of the Legislative System of British India from 1834 to 1861* (London: Asia Publishing House, 1963); Ramesh Chandra Srivastava, *Development of Judicial System in India under the East India Company, 1833-1858* (Bombay: Tripathi, 1971); Chuni Lal Anand, *Constitutional Law and History of Government of India etc.* (Allahabad: University Book Agency, 1990). For a more nuanced approach on the making of the colonial legal framework, see Jon E. Wilson, *The Making of a Colonial Order: Information, Uncertainty and Law in Early Colonial Bengal* (Cambridge: Centre of South Asian Studies, 2004).

[28] On the peculiarities of Madras, see D. A. Washbrook, 'Progress and Problems: South Asian Economic and Social History c. 1720-1860,' *Modern Asian Studies*, Vol. 22, No. 1 (1988), pp. 57-96; David Washbrook, 'South India 1770-1840: The Colonial Transition', *Modern Asian Studies*, Vol. 38, No. 3 (2004), pp. 479-516. On the relationship between the government officials and private capitalists, see Anthony Webster, *The Richest East India Merchant: The Life and Business of John Palmer of Calcutta 1767-1836* (Woodbridge: The Boydell Press, 2007).

Another key feature of the period was increasing control by the British Government over the Company's management of Indian affairs. The process began with the establishment of the Board of Control in 1784 and ended with the Crown's annexation of the Company's territories in the subcontinent in 1858. In this respect, ideological shifts in the British cabinet and changes in British politics influenced the Company's economic policy in India.[29] The ascendancy of liberalism, for example, resulted in the successive abolition of the Company's trading privileges and monopolies. The radical liberals in the British Parliament brought an end to the Company's commercial interests in India in 1833.[30] While most histories assume that the Company entered into its twilight years after this point, and end their narrative here,[31] this work will shed light on how, despite such ideological shifts in colonial policy in Britain, local governments continued until 1858 to consolidate their commodity production monopolies.

Sites of Study

In order to assess the effects of these political-economic and administrative changes on the iron and salt manufacturing projects, this thesis selects colonial 'frontiers' as its sites of study.[32] The term 'frontier' denotes places such as the shifting seashores and undulating interior hills in the presidencies of Bengal and Madras. These places appeared as 'margins' in the Company officials' imagination of India. With the ambition of governing the 'frontiers', these officials issued regulations and peremptory orders on mundane issues, and dispatched armies to enforce them.[33] However, in the period under study, their authority did not extend beyond the major navigable rivers and highways, and a handful of provincial towns and markets. As we shall see, the

[29] On the relationship between ideology and building of the colonial administration in India, see Robert Travers, *Ideology and Empire in Eighteenth Century* (Cambridge: CUP, 2007).

[30] Anthony Webster, 'The Political Economy of Trade Liberalization: The East India Company Charter Act of 1813', *Economic History Review*, Vol. 43, No. 3 (Aug., 1990), pp. 404-419; Yukihisa Kumagai, *The Lobbying Activities of Provincial Mercantile and Manufacturing Interests against the Renewal of the East India Company's Charter, 1812-1813 and 1829-1833*, PhD Thesis, University of Glasgow (2008).

[31] Anthony Webster, *The Twilight of the East India Company: The Evolution of Anglo-Asian Commerce and Politics 1790-1860* (Woodbridge: The Boydell Press, 2009).

[32] For an argument on placing borders and boundaries as the core concern of a historical narrative, see Steven G. Ellis and Raingard Esser (eds.) *Frontiers and the Writing of History, 1500-1800* (Hannover-Laatzen: Wehrhahn, 2006), 'Introduction'. For the non-geographical notion of frontier in the Brazilian empire, see David McCreery, *Frontier Goiás, 1822-1889* (Stanford: Stanford University Press, 2006). Also, see Steven G. Ellis et al (eds.) *Frontiers, Regions and Identities in Europe* (Pisa: Plus-Pisa University Press, 2009). These works are distinct from the use of the term frontier in, for example, Frederick J. Turner's 'Frontier Thesis'. See Frederick J. Turner, *The Frontier in American History* (New York: Holt, 1920).

[33] Ranjan Chakrabarty, *Authority and Violence in Colonial Bengal, 1800-1860* (Calcutta: Bookland, 1997).

administrative, legal and military excursions of the Company's governments were temporary at the frontiers.

The focus on political and geographical frontiers thus serves to avoid the essentialist perspective of the colonial officials who posited the continuity and centrality of colonial power in India. By placing its eyes on the frontiers, this thesis aspires to appreciate the implications of both the arrival and non-arrival of colonial rule at the local manufacturing sites. The view from the frontiers can dramatically alter the perspective, as some recent works have already indicated, on the conflicts and contradictions within the Company's structure.[34]

Attention to the dynamics at the frontiers helps me to account for the peripheral, social and geographical landscape of iron and salt manufacturing, and the marginal interaction of the artisans and their major clients, the cultivators, with colonial governments and the market. It also facilitates comparison between the new manufacturing arrangements under colonial rule, and pre-colonial social and economic relations, often based on ethnicity, religion and kinship. This further assists in disentangling the effects of government policy on local industry from the effects of the extant social organisation of manufacture, and in showing the rich interaction between the two.

Approach

This thesis interprets large-scale attempts to manufacture iron and salt in the colonial period as 'experiments'. The term 'experiment' was an actors' category and therefore reveals their understanding of the industrialising efforts. It makes comprehensible the effects of evolving political and economic contexts on large-scale production ventures. The term reveals the provisional nature of changes in both iron and salt production technologies during the study period. The key benefit of this interpretation is that it allows historical analysis of the interaction between colonial policy and technology with all sorts of contingencies in both. Existing accounts tend to treat Company officials' 'resolutions' literally, and regard local responses to them as well-informed actions. This work, on the other hand, appreciates that officials did not always know what sorts of production arrangements worked in the Indian milieu, and that the local population did not fully understand the consequences of the colonial enterprises.

[34] Ajantha Subramniam, *Shorelines: Space and Rights in South India* (Stanford: Stanford University Press, 2009), chapters 1-2. Some historical works on ethnicity adopt a similar perspective of frontiers, see Pamela K. Crosseley, Helen F. Siu and Donald S. Sutton, *Empire at the Margins: Culture, Ethnicity and Frontier in Early Modern China* (Berkeley, Calif.; London: University of California Press, 2006).

The tentative aspect of iron and salt production ventures becomes evident when one reads the East India Company documents 'vertically'. This method involves pursuing details on the everyday events in the salt and iron manufacturing sites through numerous levels of bureaucratic abstracts. While previous historians have drawn from the Indian summaries prepared for the consumption of the Company administrators and the English Parliament in London, I pay special attention to the particulars that were left out during the process of abbreviation at each level of reporting. For the most part, the archival work undertaken for the purpose of this thesis was therefore analogous to the digging in an archaeological site, where the organising element of the depth is power instead of time. This technique enabled me to reconstruct the manufacturers' views in spite of the overpowering official versions of the events. As well, 'enclosures' appended to the official correspondence, and petitions presented to various enquiry commissions made the 'digging' easier.

Previous historians of colonialism, particularly those from the subaltern school of Indian historiography, have adopted a similar approach to the colonial archives. However, they have not yet used it to examine the history of commodity manufacture. Moreover, they have not fully taken on board the important insight that many present-day social, political and economic categories of historical analysis were of colonial origin.[35] For example, historians have analysed changes in iron and salt manufacturing in the terms such as 'caste', 'illicit salt' and 'contract' which may seem neutral but which were actually developed by the Company officials for their own purposes. Consequently, the officials' political and socio-economic map of India has continued to inform historians' reconstruction of the colonial polity, society, and economy.

In order to unpack these categories, I approach the Company records ethnographically. I assume, for example, that local manufacturers viewed the Company's monopoly of salt manufacture as an alien fiscal arrangement that cared only about profit and tax. This reading enables me to explain why the manufacturers perceived making 'illicit' salt as a normal activity, and not as a response to colonial production as imagined by the reporting salt officials and by historians who based their accounts on the official reports.

These moves will help me to provide a new account of iron and salt manufacture in colonial India. As we shall see, the customary rights of the manufacturers to use local resources (regardless of ownership) played a critical role in

[35] B. S. Cohn, *Colonialism and Its Forms of Knowledge: the British in India* (Princeton: Princeton University Press, 1996); Tony Ballantyne, 'Archive, Discipline, State: Power and Knowledge in South Asian Historiography', *New Zealand Journal of Asian Studies*, Vol. 3, No. 1 (Jun., 2001), pp. 87-105.

the fate of early iron ventures. I show that their violent responses to colonial iron projects were not 'resistance' to colonial domination or claims to a territory, as previous accounts have argued, but expressions of their ancient rights to use local iron mines in an unrestricted manner.

In another episode, continuous adjustments to the Company's fiscal policy in India enabled its local governments to exert control over the large-scale manufacture of salt. My account of the Company's monopoly over salt production in Bengal demonstrates that its local government adopted extant organisational principles of production while also eliminating local intermediaries. Nonetheless, the diverse nature of manufacturers' responses constantly undermined the government efforts. This shows that colonial policy was not a charter of simple domination but a tentative plan to manage complex human interactions.

A third episode brings to light the critical role played by uncertainties in charcoal iron technology in the development of the large-scale iron ventures in colonial India. My study of the Porto Novo Iron Company reveals that its failure was neither due to constraints in the local landscape nor due to adverse colonial policy. Rather, it was because the technology was immature even in Europe in the 1830s. This indicates that contemporary claims about technology transfer were wishful thinking rather than accurate descriptions of what actually happened.

This thesis also connects technological arrangements and the evolution of government fiscal policy in a novel way. My description of the introduction of the salt evaporation technique to Bengal reveals how the local government used certain aspects of the new technology to delay fiscal policy changes demanded by London. This shows that it was the actions of local governments in India, and not British policy on India, that determined the fate of the industrialising attempts.

In short, by looking at efforts to industrialise iron and salt manufacture in colonial India as experiments at the colonial frontiers, I capture the tentative and contested character of both colonial policy and technology in the period. I bring to light the critical roles played by hitherto unknown factors such as the relations of pre-colonial production and technological uncertainties in shaping attempts to industrialise. I reveal how technological change helped the local governments to defer implementing a specific fiscal policy demanded by London.

Chapter Plan

The chapters that follow are in roughly chronological order. They interweave the three interrelated themes of landscape, organisation, and technologies of large-scale

manufacture of iron and salt in the period 1765-1858. My enquiries into these themes will bring to the fore questions regarding the effects of geography, management and machines on the development of manufacture. They will also bring into focus the relationships between territory and violence, monopolies and smuggling, the evolution of the colonial state and the means of commodity manufacture.

The first three chapters draw attention to the emerging political economic order at the colonial frontier, and to the link between changes in the social and organisational aspects of manufacture and the rise of colonial rule. Chapter 2 is concerned with the effects of the extant relations of production on two large-scale iron projects of the 1770s and 1780s in the province of Birbhum. It will show that despite possessing legal and military assistance from the Bengal Government, the promoters had to abort these early ventures due to the violent acts of the local forest population (the *Chuar*s). The chapter interprets these repeated acts of violence as the *Chuar*s' efforts to reproduce pre-colonial production relations. The aim of Chapter 3 is to understand the means through which the fragmented community of colonial officials implemented the monopoly on salt manufacture in the coastal districts of the Bay of Bengal in the 1780s. I show that the Company's profitable Agency organisation was maintained not only by the physical and legal forms of coercion, but also by scarce employment opportunity in the salt districts and complicit role of the local landholders and merchants. The unprecedented nature of the Company's monopolising efforts and their consequences on local manufacture can be seen in the production of what the monopolists called 'illicit' salt. Chapter 4 shows that its manufacture and trade persisted because the manufacturers and traders considered such activities as 'normal' activities.

Chapters 5 and 6 focus on the relationship between various means of manufacture (such as machines, the organisation of production, and degrees of concentration) and the changing political and economic landscape. Chapter 5 examines the origins of the Porto Novo Iron Company in the 1830s. Unlike existing accounts, which treat the iron company either as a capitalist enterprise or as a case of technology transfer, I approach it as an experiment in charcoal iron technology, and in colonial policy towards large-scale industries. By highlighting the evolution of technology and the iron company's organisation, I show the inadequacy of the failure paradigm which underpins the standard historiography. Chapter 6 examines the relationship between the evolving means of salt making and the fiscal policy of the Bengal Government in the 1830s, in the context of the 1833 renewal of the Company's Charter. I show how a new technology enabled the Bengal Government to delay

implementation of the policies framed by the British Parliament and the Court of Directors in London. In the concluding chapter, I summarise my key arguments and outline some broader implications of the thesis. I will argue that when approaching the history of commodity manufacture in colonial India it is necessary to pay more attention to technological uncertainties, and the vestiges of the pre-colonial relations of production.

Chapter 2
LANDSCAPE
BIRBHUM IRONWORKS, 1774-1789

Introduction

This chapter tells the story of two early efforts at organising large-scale iron making in Birbhum, Bengal between 1774 and 1789. One was by a native, Indranarayan Sharma, another was by a Scot, John Farquhar. While Indranarayan claimed the familiarity and support of the local population, Farquhar received financial and military backing of the Company's Government in Bengal for his iron project. These speculators did not encounter any problems with their tools or techniques. Both employed large-scale smelting and forging units to produce cheaper produce. The province of Birbhum had abundant iron ores, rich woodlands for charcoal, a long tradition of iron manufacture and a brisk regional iron trade. Yet both projects had to be abandoned. This chapter discusses the reasons for the short-lived performance of these iron manufactories.

Previous historians dealing with Indranarayan's and Farquhar's ventures have not only agreed on the broad outline of the events, but also placed the Company Government at the centre of their narratives. Colonial historians concluded that the Government did not act resolutely to end its ambivalence towards the role of private capital in large scale iron manufacturing. The accounts of the revisionist historians are state-centric in that they attribute the fate of the two iron ventures to conflict between the Company's Governments in India and other native governments. They either assign a determining influence to the Company's colonial policy or attribute a decisive role to the anti-colonial responses of the local population. In their oppositional histories, there is no scope of action for any third force. In this chapter, I present a different perspective. Drawing upon new materials, I show the critical role played by the *Chuar*s, the iron-making people of the forest-clad mountains in Birbhum, in forcing the closure of these early iron projects.

The Company officials were chiefly concerned with their dynamic relationship with the Indian elite. They saw the actions of the people without property such as the roaming ascetics, vagabond *Banjara*s, and the forest dwelling *Chuar*s as sporadic and spontaneous. This is reflected in their archives, upon which most historical works on the power relations at frontier provinces such as Birbhum are based. These histories do not allow any agency to these people. When they feature in historical accounts, they appear as a 'body' of people unable to comprehend the evolving political and

economic order and unable to act in order to challenge on-going shift in the centres of authority.

Drawing upon anthropological and ethnographical works on the place of iron in the lives of the *Chuar*s, I propose here that a key to understanding their actions lies in the way they related themselves to the iron and forest resources. I show that their relationship with the iron mines, charcoal and other forest produce was founded on – and limited to – use. By contrast, both native landholders' and colonialists' appropriation of these resources was based on a notion of property in the strict sense of individual and exclusive ownership. These different understandings of resources had already been a source of conflict between the *Chuar*s and the local settled and landed population. The colonial practice of awarding exclusive rights over iron production sites to the favourites of the Company establishment exacerbated the tension. I argue that the *Chuar*s repeatedly destroyed Indranarayan's and Farquhar's manufactories in order to undo the changes in their relationship with iron these projects were bringing in.

The chapter is organized in four sections. The first is a general introduction to the frontier landscape of the iron ore-rich province of Birbhum, the political and commercial aspects of which was altering as the Company's Council in Calcutta began to function as the *Dewan* (following the grant of 1765). While many of these changes have been examined by other historians, my account emphasises their provisional nature. In the second section, I show how these changes triggered a tripartite contest among the Company officials, the Birbhum Rajah's men and (European and local) merchants for the control of the local iron supply network. My argument in the third section is that the *Chuar*s' action became critical to the fate of the ventures precisely due to the tense milieu of iron manufacturing. In the fourth section, I use these findings to evaluate the existing understanding of the fate of these early iron manufactories. I suggest that, given the *Chuar*s' distinct relationship with the iron resources, their actions are best interpreted as an extension of a longer political movement to undo certain changes to the landscape in the late eighteenth century. Finally, I consider some implications of these iron stories for unravelling the ways in which manufacture is entangled with the story of the colonial rule.

Political Economy at a Colonial Frontier: Birbhum, Western Bengal in the 1770s

After the grant of the *Dewany* in 1765, the British East India Company men were 'merchants as well as sovereign of the country'.[1] In the former role, they engaged in

[1] John Shore's Minute, 18/06/1789 in M. N. Gupta Rai Bahadur, *Analytic Survey of Bengal Regulations and Acts of Parliament Relating to India up to 1833* (Calcutta: University of Calcutta, 1943), p. 308.

trade, while in the latter, they appropriated revenue. Historians have concentrated on how the Company officials gradually and with great difficulty adapted to, and were guided by, these functions.[2] My interest in this section will be to ask how their duel interventions manifested in the iron ore-rich province of Birbhum situated in the western edges of the Bengal in the 1770s. The purpose is to detect the influence the arriving military and revenue elements of the Company Government had on the extant power structures and market places.

I show here that the distant and unfamiliar geography of the iron district made the colonial rearrangements of political and economic relations weak and provisional. I also show that the alternating responses of the local authorities exposed the attempts to defeats and reversals. The Company officials stationed in the landscape consistently used the term 'frontier' to describe the overpowering wilderness and ungovernable character of these places. I argue that the term can be usefully extended to describe the precarious state of political and commercial arrangements within which iron making and trading activities took place.[3]

The initial course of events after the grant of *Dewany* is well covered by the historians of the Company's revenue administration. One of the first representatives of the Company *Dewan* to appear in the Jungle tracts of Birbhum was Lieutenant Fergusson and his military contingent.[4] He was one of the Supervisors sent in 1767 by the Company's Council in Calcutta to reorganize the revenue administration structure in the area. These officers collected information on the annual produce of the cultivated land, ponds, mines, quarries and jungles in their directions. They then negotiated with local kings (*Rajah*s) and headmen of every significant territory, town and village for the revenue collection contract (*Jumma*) whereby these local elites promised to pay a stipulated amount in return for a robe of honour (*Khillat*) and a continuation of certain financial privileges. The Settlement, as this process was called, effectively relocated the source of sovereignty to the Company. The process is significant because it set the dynamics between conventional and new clusters of power in the colony.

---

[2] Rudrangshu Mukherjee, 'Trade and Empire in Awadh, 1765-1804', *Past & Present*, No. 94 (Feb., 1982), pp. 85-102; P. J. Marshall, 'Debate: Early British Imperialism in India', *Past & Present*, No. 106 (Feb., 1985), pp. 164-169; Rudransghu Mukherjee, 'A Rejoinder', *Past & Present*, No. 106 (Feb., 1985), pp. 169-173.

[3] On frontiers, see Chapter 1, fns. 32, and 34 above. Some historical works on ethnicity adopt a similar perspective of frontiers, such as Pamela K. Crosseley, Helen F. Siu and Donald S. Sutton, *Empire at the Margins: Culture, Ethnicity and Frontier in Early Modern China* (Berkeley, Calif.; London: University of California Press, 2006).

[4] Suchibrata Sen, *The Santhals of Jungle Mahals: An Agrarian History 1793-1861* (Calcutta: Ratna Prakashan, 1984), p. 4. On Fergusson's mission and local responses, see Binod Das, *Changing Profile of the Frontier Bengal* (Delhi: Mittal, 1984), p. 74-76.

A further redistribution of political authority occurred in the territories with, for instance, the establishment of the six Provincial Revenue Councils in 1773-1774. Formerly, the Birbhum Rajah was a *de facto* ruler of the western tracts with ancient hereditary rights to levy taxes, to transfer lands by sale, and to transmit them to their descendents.[5] His name and seal were used to endorse all financial transactions in Birbhum.[6] To his people, he was their king, the supreme embodiment of divinity and the final arbiter. Although he was a tributary to the Nawab of Bengal, his annual tribute was so small an amount that it was more a gesture of obeisance than any mark of subjugation to the Nawab.

After the Settlement, the Rajah was reduced to being a Revenue Farmer. He maintained his extended family and a retinue of palace officials with a monthly allowance that was a commission for timely revenue submission, not a guaranteed income. His dependence on the Company was complete. He needed the Company's authority to nominate his successor. Unable to raise his own army, he relied on the Company's military to subdue his own non-compliant revenue officials, to fight against warring neighbours and to subjugate rebellious villagers. His status had become so fragile that an outstanding balance might lead to deductions from his allowance or, worse, to the auction of his province (*Farm*) which could alienate him further from his seat of power and subjects.

Yet the face of the Rajah's revenue administration structure still retained pre-colonial features. His estates were classed according to the chief source of revenue. There were cultivated lands, specialized sites of production of valuable commodities such as iron in the Iron-estate (*Loha Mahal*) or timber or silk from the Forest-estate (*Jungle Mahal*). Each estate was managed by rent-collectors (*kutkinadars*), who acted as sub-contractors. They guaranteed a *Jumma* to the king and employed agents (*Dalols*) to ensure surplus rent collection. It was these agents whom land tillers and petty producers (*Ryott*s) faced in the farms and workplaces. What was not obvious to the *Ryott*s was that these agents and the Rajah's other officials were now policed by the Company's men. Their rent collection records (*Hasil*) were closely read for any laxity, and verified through the offices of the Company's representative (*Naib*), and by a military attaché (*Phouzdar*). Every excuse offered by the Rajah now generated a flurry of correspondence which vindicated or vilified his claims. While cultivators and petty

[5] W. W. Hunter, *Bengal MS. Records: A Selected List of 14,136 Letters in the Board of Revenue Calcutta, 1782-1807: With an Historical Dissertation & Analytical Index*, 4 Vols. (London: W. H. Allen & Co., 1894), Vol. 1, p. 41.
[6] For a history of Birbhum Rajah's family, see L. S. S. O'Malley, *Bengal District Gazetteers, Birbhum* (Calcutta: Bengal Secretariat Book Depot, 1910), pp. 1-9.

producers still paid a share of their produce or grain to the Rajah's men, they could also sense that he had not only lost authority but also his claim to be a neutral arbiter.

The political landscape of the Company's Bengal territories was changing in other respects as well. The Company Government had begun redrawing the boundaries of many revenue estates in order to establish an effective revenue administration. The Government was guided in this process by what it perceived as sound political and fiscal principles. The size of a revenue farm was kept moderate so that the failure of collection in one estate did not lead to a major crisis in the Government purse. For ease of revenue assessment, each farm had a uniform topography wherever possible.[7] Possibilities to contain all rebellious local landholders or population within one estate were also sought.[8] These imposed principles violated the very notion of integral autonomy of the local sovereigns. As a result, many kings complained about them. Some openly rebelled and had to be subdued by force.[9]

These political rearrangements gave legitimacy to the Company's long standing trading interests. The merchants trading under the Company flag could now claim unrestricted and duty free passage in the Company-managed territories. Since 1717, these merchants, unlike the 'native traders', had been enjoying exemption from any duty on their imports and exports within the Mughal dominions. After winning the Battle of Plassey in 1757, even the Company's military officials had begun to exhibit commercial and political ambitions. By the early 1760s, anyone with the Company's flag demanded trading privileges. The Nawab of Bengal complained in 1762 that, 'all the English chiefs, with their Gomasthas and agents in every district, act as collectors, renters, Zemindars and Talukdars, and setting up the Company's colours allow no power to my officers'.[10] The author of *Seir Mutaqharin* (1784) – aptly titled as *A Review of the Modern News* – also lamented that the European merchants had 'engrossed' all branches of trade that had been till then 'open to all'.[11] When a certain area in Calcutta was given to the Company's Council as their holdings (*Jagheer*), they

[7] Augustus Clevland, Collector of Bhagalpur in the 1780s, put forward this argument to regroup all areas of hill-tribes, which were till then under various collectorships. Augustus Clevland to Governor General in Council (GGC), 13/01/1780 (BL: *IOR/F/4/953*). Also, see: 'for establishing peace and good order in the Hill country connected with his collectorship his authority should be extended over to several places not within his limits...' (BL: *IOR/H/351*).

[8] An example is a formation of Colehan in 1837. H. Rickets, *Report on the District of Singbhoom* (Calcutta: Bengal Military Orphan Press, 1854), p. 63. For a similar experiment in the Jungle Mahals in 1772-1872, see Sen, *The Santhals of Jungle Mahals*, pp. 3-12.

[9] Boggrie Collector to the Calcutta Committee of Revenue (CCR), undated in *Bengal Revenue Consultations* (*BRC*), 30/09/1783 (BL: *IOR/P/68/26*).

[10] Mir Kasim to Robert Clive, 26/03/1762 in Bahadur, *Analytical Survey*, p. 307.

[11] Hence, its author wrote: [O]f the various branches of trade heretofore open to all, none is free. They are all engrossed by the Company themselves or by the English in general; as these, whether they enjoy the Company's service …or chance to be otherwise circumstanced, very seldom are without concerns in trade'. See Seid Gholam Hossein Khan, *The Seir Mutaqherin; or Review of Modern News: Being An History of India* (Calcutta: 1784), Vol. III, Section XIV, p. 203.

lost no time in claiming, first as a cost of 'pilotage' in the river Hoogly and then on the basis of 'ancient factorial rights', their own territorial privileges by exacting a port-duty on goods brought from the interior to Calcutta.[12]

Thus the revenue administrator (*Dewan*) was already assuming the role of government (*Sarkar*) by the 1770s. It is in the latter role that the Council would approve Indranarayan's proposal for iron manufactories, and grant John Farquhar the exclusive privilege of duty-free iron trade. While the significance of this outgrowth of a *Dewan* to the *Sarkar* has been remarked upon by historians, the consequences of the unclear legal basis upon which the transformation was taking place have not been adequately recognized. I will later show that the local powerful groups associated with the extant organization of iron manufacture and trade, while conceding the Company's *Dewani* role contested its privileges as the *Sarkar*.

Historians have noted how hand in hand with political supremacy went the Company's control over commercial affairs. Attempts to maximize duty on trade and manufacture illustrate this point. In the Mughal period, the levy on local goods was a combination of excise and income-tax. All such levies were grouped under the term *Sayer*, which literally meant the variable revenue arising from moveable goods.[13] The *Sayer* was collected by the Mughal officials only in the capital city. Elsewhere, transit duties under the name of *Sayer Chilke* (literally, 2-1/2 per cent or one in forty) were levied by the Zemindars and were accounted in their annual *Jumma*. In practice, however, it rose to 3 -1/2 per cent when added with other customary Zemindary duties such as *Dustoor* and *Monghun*.[14]

After the grant of *Dewany*, the Company Government's policy on custom and inland duties was blatantly guided by their own commercial interests. Although routinely calling it 'arbitrary and oppressive', the Government included the *Sayer* revenue in the Settlement accounts. Following a brief intermission from 1791 to 1801, inland duty was re-established and gradually extended to all important towns in Bengal. However, the *Sayer* collection was now not in the Zemindar's jurisdiction. All commodities passing through custom houses (*Chowky*s) were brought to the official warehouse and valued by Company servants. After the duty was paid, they issued a

[12] J. P. Grant's Minute, 26/04/1786 in Bahadur, *Analytical Survey*, p. 306.
[13] The *Index and Glossary to the Regulations*, Vol. III (1832) defines *Sayer*: 'Sayer. What moves. Variable imports, distinct from land-rent or revenue, consisting of customs, tolls, licenses, duties on merchandize, and taxes on houses, shops, bazaars &c'. See H. Yule and A. C. Burnell, *Hobson-Jobson: A Glossary of Colloquial Anglo-Indian Words and Phrases of Kindred Terms, Etymological, Historical, Geographical and Discursive* (London: Linguasia, 1886 [1989]), p. 799.
[14] Bathoe to Burdwan Provincial Revenue Council (BPRC), 23/06/1774 (BL: *IOR/G/6/1*).

forwarding pass (*Rowanna*) to the owner who then could travel in Company territories without further hindrance, at least theoretically.[15]

Yet the existing accounts have not fully registered the qualitatively different privileges Company merchants now enjoyed compared to the pre-*Dewany* days. The goods produced or bought with the Company's investment were all exempt. In other words, the political ascendancy gave the Company merchants definite advantage over the local traders even in the inland trade (that before 1765 was limited to the overseas trade only). Local manufacturers and traders were subject to exactions, carried on now in and around the Company's *chowky*s by its British and local servants. Local manufacture had now to negotiate the Company's new commercial regime in accessing both local and overseas markets. A consequence of the development was that the manufacture and trade of everyday commodities like iron and salt – especially that carried out by local merchants and traders – faced unprecedented restrictions. As I will show later, local iron merchants and traders had good reasons to resent this situation.

Added to the new arrangements to regulate the passage of local commodities was the Company Government's eagerness to regulate the market-places. It asked the six Provincial Councils to prepare 'a list of *Gunge*s' in their division in 1774 in order to classify existing markets on the basis of their ownership, history and revenue status. The purpose was to 'annex' these spaces.[16] Erecting a new market place now required the Councils' permission.[17] The Councils in turn always gauged the political and commercial implications in granting such consent. They did not allow, for instance, any mix-ups in the functions between *Hauts* (for selling and buying daily provisions) and *Gunjes* (for large scale commercial transactions).

Looking at the subsequent consolidation of the Company's rule in India, historians have identified the origins of colonial rule in some of these changes. Yet it has not been fully recognised that neither the Company's Court of Directors in London nor their officials in the East Indies had any master-plan, any long term set target to pursue. No one in London or in the colony precisely knew where the day-to-day attempts to maximize profits were leading them. The political and economic

[15] *Regulation IX* of 1810, modifications *Regulation XXI* in 1817 and 1827. In practice, 'piece-goods' – a short hand for all country-made articles – were charged no less than 7½ per cent duty in between the place of its manufacture to the point of sale. Bahadur, *Analytical Survey*, p. 315.
[16] GGC to BPRC, 10/05/1774 (BL: *IOR/G/6/1*).
[17] I am here glossing over a colonial typology of trading places. For such typology, see R. Montgomery Martin, *The History, Antiquities, Topographies and Statistics of Eastern India; Comprising the Districts of Behar, Shahabad, Bhagulpoor, Goruckpoor, Dinajepoor, Puraniya, Rungpoor and Assam etc. etc. collated from the Original Documents at the E. I. House with the Permission of the Honourable Court of Directors*, 3 Vols. (London: Wm. H. Allen and Co., 1838); Rajat Datta, 'From Medieval to Colonial: Markets, Territoriality and the Transition in Eighteenth Century Bengal', *Medieval History Journal*, Vol. 2, No. 1 (1999), pp. 143-167.

alterations in the colony were driven by the immediate aim to achieve and consolidate their positions of privilege than by any policy already framed in London.

What is also overlooked is the fact that these changes had not achieved permanence in the 1770s. To begin with, many landholders and merchants flouted the new revenue directives. The Council-appointed contractors often suffered abuse from the Zemindars.[18] Attempts to control market places and passages of goods continued in the 1790s and beyond, indicating how ineffective these instruments of annexation were.[19] In fact, market places went on to become bones of contention not only between the Company and the landholders, but also among local elite households well into the nineteenth century.[20]

The Zemindar and his custom officials continued collecting their own customary *Sayer*. This continuity shows that the emerging commercial order could not replace the extant ways of resource accumulation and redistribution networks. Rather, a state of disorder resulted due to the interaction between the two. In the pre-colonial period, the Birbhum Rajah collected as many as twenty kinds of *Sayer*. Besides duties on production sites and market-places, they also included taxes on professions and on implements. A significant portion of this collection was however reinvested back in the local communities, for example, in the guise of supporting religious ceremonies and ascetics and charitable institutions. In 1786, the Company government abolished the *Sayer Chalanta*, causing an annual loss of Rs 8431 to the Rajah. In 1791, all types of *Sayer* were terminated and the Rajah was offered, as compensation, a deduction of Rs 20000 in his *Jumma*. But these measures neither reinvigorated trade in the province nor prevented rampant extortions. The abolition simply made the taxes invisible and also absolved the king from any responsibility to maintain the market-places. As a result, the commercial places and routes became crumbling, anarchic thoroughfares.

Crucially, the Company-induced reconfiguration of the power structure in the province had not achieved solidity by the 1770s. On the contrary, once the military marches passed through, the local landscapes reverted to their pre-1765 shapes and ways. The provisional nature of political economic changes brought in these landscapes was a result not only of the uncertainty with which the Company Government ran its revenue maximising program, but also of the distance and

[18] Guru Prasad Dass, Renter of Hautmendy in Pergunnah Mozuffershy to BPRC, 9/07/1776 (BL: *IOR/G/6/8*). For landholders' petition on opening up new *hauts*, see Abdulla Chowdhary, Pergunnah of Kaakjole to CCR, 20/02/1781 (BL: *IOR/P/68/6*).

[19] For a 1790 directive, see Bengal Board of Revenue (BBR) to Birbhum Collector, 26/04/1790 in Asoka Mitra (ed.) *West Bengal District Records New Series. Birbhum 1786-97 & 1855* (Calcutta: 1954), p. 84.

[20] Sudipta Sen, *Conquest of Market Places: Exchange, Authority and Conflict in Early Colonial India*, PhD Thesis, University of Chicago (1994).

wilderness of these places. The peripheral situation made the Company's presence not only temporary but also vulnerable to the counter-influence of the Birbhum Rajah and other local powerful men. The political dynamics in the western edges of the Company's Bengal territories, as a region where iron making and trading was widespread, is crucial to my story.

There is another important aspect to the peripheral situation of Birbhum. More than two-thirds of this province consisted of dense forests and hard mountains which very few Europeans had ever ventured to cross.[21] The region seemed to them strange and sparsely populated. The Company officials would thus suddenly find a 'body' of population emerging out of these forests, crossing the rivers Ajay and Damodar, making incursions in the towns and villages, and then retreating to the impassable woods and ridges. The language of these people was incomprehensible, the manners and customs unfamiliar to the officials. The people did not seem to own lands. They were not settled. Their social organization did not look congruent to those of the Hindus and Muslims. They did not have *Rajah*s or rulers. They had neither a caste-system nor observed any of the rituals the British had so far known or read. Colonial officials, after the natives, called the 'body' of people *Chuars* or *Kols*. Later in the late nineteenth and early twentieth centuries, as ethnological theories entered contemporary 'science', the undifferentiated 'body' of *Chuars* and *Kols* also would turn out to be a composite of a great many distinct 'tribes' labelled as Santhals, Mundas, Oraons, Agarias etc.[22] Even the notion of 'tribe' would be contested.[23] But in the 1770s, the very suffix *–bhum* in the name Bir-*bhum* signified to the Company officials a province where wilderness was proximate and imminent.[24]

The term 'frontier' was used by the Company officials to describe their sense of geographic and political remoteness in these forest margins. The term also conveyed their desolation on seeing how ineffective were their endeavours to inaugurate civilization and to establish order there. They perceived the landscape and the population as being too resilient to change. For instance, even in the early twentieth

[21] Ranjan Gupta, *The Economic Life of a Bengal District Birbhum 1770-1857* (Burdwan: University of Burdwan, 1984), p. 10.
[22] E. T. Dalton, 'The 'Kols' of Chota-Nagpore', *Transactions of the Ethnological Society of London*, Vol. 6 (1868), pp. 1-41; J. Crawfurd, 'On the Supposed Aborigines of India as Distinguished from its Civilized Inhabitants', *Transactions of the Ethnological Society of London*, Vol. 6 (1868), pp. 59-71; H. H. Risley, 'The Study of Ethnology in India', *Journal of the Anthropological Institute of Great Britain and Ireland*, Vol. 20 (1891), pp. 235-263. I am using the term as actors' category, and not as an ethnic or racial label.
[23] Binay Bhusan Chaudhari relates the word *Chuar* to the Bengali meaning 'wild, ferocious and ill-mannered'. See B. B. Chaudhari, ''The Myth of the Tribe'? The Question Reconsidered', *Calcutta History Journal*, Vol. 16, No. 1 (1994), pp. 125-156, fn. 21.
[24] Heinrich Ferdinand Blochmann observes that all 'jungly and hilly frontier districts' had names ending with *–bhum*. See H. F. Blochmann, *Contributions to the Geography and History of Bengal* (Calcutta: The Asiatic Society, 1968 [1873-1875]), pp. 16-17.

century, a colonial district officer noticed that the region 'had formerly been frontier'. Another contemporary colonial ethnologist found that the local population were, 'the most unimprovable...who finding the old country becoming too civilized for them, fly from the clearances they have made, hide themselves in the hill forests, and relapse into their conditions of savages'.[25] Needless to say, the people living in these forest and mountain edges such as the *Chuar*s would not have understood the Company officials' view. The term 'frontier' then expressed a gulf between the intended effects of the policies formulated in Calcutta or Burdwan and their poor fate in Birbhum. As I will show later, the notion of frontier will be useful in explaining why the results of the efforts to organize iron manufacture were unpredictable in the region.

Iron Manufacture and Trade in the 1770s in Birbhum

When the various offices of the Company Government began arriving in the frontier province of Birbhum, it started to alter the local landscape of iron manufacture and power relations within the trade. Specifically, I demonstrate in this section that control over the iron supply network became a focus of triangular conflict among the Company officials, private European merchants and the Birbhum Rajah. The conflict played out in day to day scuffles about advances, debts and control over mines. The local actors representing these three influential parties were the iron-estate (*Loha-Mahal*) farmers appointed by the Government; iron procurement agents affiliated to Calcutta merchants and Birbhum palace officials. While such a neat tripartite division hides the shifting loyalty of the men involved in local contests, it helps to highlight the forces affecting the local iron making and trading scene. But before I characterise how the politics of the iron trade was playing out in the market place, a short introduction to iron making and the iron makers of the province will be helpful.

Historians of iron manufacture in colonial India have not described the world of the people who mined the ore, smelted and forged iron and sold it in much of the province and adjoining areas. References to their tools and technique and to the ways they organized iron making and preserved and transmitted their knowledge are scattered in late eighteenth and early nineteenth century published accounts. A few early twentieth century anthropological works also contain information on the craft and culture of the iron making 'tribes'. While the know-how of iron making and the nature of its produce might have changed in the intervening two centuries, some elements deeply embedded in sacred rituals must have changed more slowly than others.

[25] Cited in K. Sivaramakrishnan, *Modern Forests: State-making and Environmental Change in Colonial Eastern India* (Stanford: Stanford University Press, 1999), chapter 2, p. 34.

The Company surveyor Francis Buchanan crisscrossed the Chotanagpur plateau on the western and north-western borders of Birbhum several times during his survey of Bhagalpur. In 1810, he met a 'tribe' he called *Kols* in the western part of Birbhum who claimed to be the discoverers of the use of the ore.[26] His description suggests that iron mining and smelting was very much a family-managed work for a community that was always on move. Men dug the ore with 'stick pointed with iron like a chisel' and burnt wood to produce charcoal, women prepared the charge by hammering the ore to fine pieces, winnowing it to separate stones or soil and mixing it with charcoal powder. Furnaces were erected in temporary shades and were each managed by a family. In other places, they collected the ore from the river beds.[27] Both men and women blew the bellows made of hide and bamboos.[28] Mid-nineteenth century surveyors confirmed Buchanan's point that the rudimentary digging technique used by the Kols did not allow them to dig deeply, so they kept on moving to newer mining sites. As they always smelted or refined the ore near the mining sites, theirs was a mobile workshop. This perfectly suited their roaming habits.[29] They worked for three months from September. At other places like Banka, Buchanan found them working for five months, chiefly when they were free from farming activities.

Local iron makers' knowledge of iron was internalized due to their long association with the work. They had their own ways to locate a potential mine, to classify the ores (*bel*) according to their yield, prepare and mix charcoal with ore in a given ratio (*bichun*), construct and operate smelting and forging furnaces so as to produce iron with the desired malleability, and to work with it to make agricultural implements. [30] Verrier Elwin, whose early twentieth century anthropological monograph reveals the central place of iron technique in the lives of the forest inhabiting Agaria people, has noted that many of these processes were ritualized, which made the transmission of technical knowledge effective. He shows that details about the construction of the bellows, for example, are woven in songs. One song disclosed suitable construction materials: 'The bellows are made of *khamar* wood/The

[26] C. E. A. W. Oldham (ed.) *Journal of Francis Buchanan Kept During the Survey of the District of Bhagalpur in 1810-1811* (Patna: Superintendent Government Printing, 1930).
[27] Martin, *Histories, Antiquities and Topographies*, p. 191.
[28] Oldham, *Journal of Francis Buchanan*, p. 33.
[29] T. Oldham, *Report of the Examination of the Districts in the Damoodah Valley and Beerbhoom, Producing Iron Ore* (Calcutta: Military Orphan Press, 1852). Buchanan saw that miners in Kukoriya 'lived' 2 miles away from the mines. In Pahiridihi, mines extended 'from thence to Chandan, distance about eight coses' (Oldham, *Journal of Francis Buchanan*, p. 14). At Nuni, he was told that 'most of the miners had retired to Dumka', while at Dumka, he was told that 'the last spring all the miners had retired to some other places' (p. 46). All these entries suggest a high degree of mobility of the miners and not, as Buchanan suspected an effort to conceal their vocation.
[30] Oldham, *Journal of Francis Buchanan*, pp. 32-34.

skin of cow hide/The feed-poles of bamboo/The *Agaria* girl blows the bellows'. Another one revealed the making of bellows: 'There is the Bamboo Maiden where the string is tied/There is *Dhikan Mata* where the two poles are fixed/I go to see/O Wind Maiden this is for you'.[31]

Geologists and surveyors sent by the Company in the early and mid-nineteenth century described how the province was well endowed with iron ores. They found that the entire mountains ridges and undulating plains north of the river Damodar were covered with hematite-rich iron ores. They also noted how extensive these mines were and how intensively they had been worked by the native population.[32] The bed was generally found 15 to 50 feet below the surface. The term 'mine' used in these descriptions may be misleading as at places, it was easily accessible to the simple digging tools. From these accounts, we can infer that the miners generally smelted iron on the spot by erecting clay furnaces and they used charcoal as a fuel. There are indications of some degree of specialization among the iron workers. Some did nothing but forge crude iron, while others employed 'part of their time' in making agricultural implements and utensils.[33]

Some miners sold ore to itinerant merchants (*Beparrie*s), who took it to the established manufacturing marts (*Aurung*s).[34] These places had relatively larger and more permanent iron furnaces and workshops (*Saal*s) to smelt and refine iron. 25 Maunds of iron was produced in each smelting operation. Iron was sold in various states: as ore, as smelted sponge-like mass, or as forged or cast pieces, or in the forms of some agricultural or household implements such as hooks, spear heads, knives or tongs. Although there was no *Gunje* yet in the province,[35] traders or their agents from cities like Bhagalpur, Patna, Dinajpur, Musrhidabad and Calcutta converged and bought these articles against grains or cowries in these marts. Here, the Rajah's men

[31] Verrier Elwin, *The Agaria* (London: OUP, 1942), chapters VI and VII. Especially, see pp. 183-184. On the function of rituals as technical formulae in non-literate and pre-literate iron-smelting societies, see Philip de Barros, *The Bassar: Large-scale Iron Producers of the West African Savanna*, PhD Thesis, University of California at Los Angeles (1985).

[32] Oldham, *Journal of Francis Buchanan*, pp. 13-16, 48-49, 178; On the Ramghur iron manufacture, see D. H. Williams, *A Geological Report on the Kymore Mountains, The Ramghur Coal Fields and the Manufacture of Iron, &c &c.* (Calcutta: Bengal Military Orphan Press, 1852), pp. 56-59. Thomas Oldham found many abandoned regions full of refuse and slags in 1851 which indicated to him, 'the extent to which these operations had been formerly carried on, and of the long time during which they had been continued'. See Oldham, *Examination of the Districts*, p. 7.

[33] Martin, *Histories, Antiquities and Topographies,* p. 265.

[34] The *Hobson-Jobson Dictionary* defines *Aurung* as 'a place where goods are manufactured, a depot for such goods'. See Yule and Burnell, *Hobson-Jobson Dictionary*, p. 40.

[35] William Higginson to BPRC, 12/06/1774 (BL: *IOR/G/6/1*). Market-places were 'discovered' subsequently. In 1787, it was reported that there were 6 *Haut*s under regulated tenure which paid 7 Annas 10 Paisas for 3 months that year. Birbhum Collector to BBR, 16/08/1787; Mitra, *Birbhum*, p. 8. For *Gunje*, see the entry in the *Hobson-Jobson Dictionary*: 'The *Gunje* signifies a range of buildings at a place of traffic, for the accommodation of merchants and all persons engaged in the purchase and sale of goods, and for that of their goods, and of the shopkeepers who supply them'. See Yule and Burnell, *Hobson-Jobson Dictionary*, p. 403.

watched over transactions. They levied duties on furnaces, and taxed each smelting and refining process. In 1845, the amount of tax on an iron product was slightly more than 4 per cent of its selling price.[36]

The picture offered by a 1778 letter shows that iron manufacture and trade in this frontier region had a well-established pattern. Both 'natives' (the *Chuar*s) and long-settled 'outsiders' (people from the plains of Bengal) worked together in large iron mines in Ramghur, an adjacent district in the province. Merchants or their agents from Calcutta frequented these mines seasonally (as the rains severely affected the trade routes).[37] Undervalued and forcible purchase of iron from the whole village by the agents and traders was common.[38] So was making an off-the-book payment to local landholders and the Company's custom officials for permission and protection of the trade.[39] Ignoring such obligations or relying on wrong patrons could cost iron merchants dearly.[40]

A summary of the extent and volume of iron production and trade in Birbhum in the 1770s is presented by the following table. I have reconstructed it from an official letter written by the Naib of the province to the Burdwan Revenue Council (Table 1).[41] It gives the details of revenue collections for the years 1770 to 1777 in various iron-estates that were under Company jurisdiction.

Table 1 Particulars of the Jumma of Tuppa Looney & the Iron Mehal rented & Khas from 1770 to 1777

Pergunnah Beerbhom &ca.

Bengal Year	Region	Farmer	Jumma of the *Maal* Revenue	Jumma of *Sayer* Revenue	Total *Malguzaree*
1177	*Tuppa* Looney				
	Mahomed Bazar	Anund Sing	4920:3:16	-	4920:3:16
	Rampoor &ca	Ram Cannoy	2896:11:6	59:1:8	2955:12:14

[36] 25 Maunds of iron were sold to refiners for 25 Rupees. The tax on each smelting operation was 1 Rupee. In addition, refiners paid a tax of 6 pice per Maund. See W. Jackson, 'Memorandum on the Iron Works of Beerbhoom', *Journal of the Asiatic Society of Bengal*, Vol. 16, Part 2 (1845), pp. 754-756. 1 Md equals 82.28 lbs.

[37] Ramghur Collector to GGC, 19/01/1778 in Heatly, 'Contributions', pp. 553-555.

[38] Domum Chand Serma & other ryotts to BPRC, 5/12/1774 (BL: *IOR/G/6/2*).

[39] The Jehanabad officials under whose jurisdiction the custom check-point fell apparently sheltered the traders. Ramkunt Darogah Kootcharpore in Jehanabad to BPRC, 16/06/1774 (BL: *IOR/G/6/1*).

[40] A Petition from Ram Jy and others, Bhagalpur Merchants to Captain James Browne, 1/05/1775 (BL: *IOR/G/6/4*).

[41] Birbhum Naib to BPRC, 14/07/1777 (BL: *IOR/G/6/*11). The different values presented in the table have been reorganized from the data provided by the Naib in the correspondence.

	Kynjooly &ca	Nilamber Ghose	1088:4:13	-	1088:4:13
	Deocha &ca	Bancharam Roy	2611:3:8	-	2611:3:8
	Khas Iron Mahal	Barycheat Thackoor	-	1468:8:2	
			11016:7:3	1525:9:10	11849:0:13[42]
1178	Tuppa Looney				
	Mahomed Bazar	Brijakishene Ghose	4720:1:14	-	4720:1:14
	Bylsua &ca	Juguttlull Bucksey	75:0:0	-	75:0:0
	Ramppor &ca	Casmoy Gapt	3596:13:17	79:8:3	3676:6:
	Kynsooly &ca	Nelamber Ghosh	1238:2:17	-	1238:2:17
	Deocha &ca	Bancharam Roy	3144:6:17	-	3144:6:17
	Khas Iron Mahal	Bancharan Roy Sickdar	-	766:8:12	766:8:12
			12774:8:16	846:0:15	13620:9:11
1179	Tuppa Looney &ca	Ram Roy	12968:8:8	79:8:3	13048:0:11
	Iron Mahal &ca	Do	-	766:8:12	766:8:12
			12968:8:8	846:0:15	13814:9:13
1180	Tuppa Looney &ca	Ramjoy Roy	12596:3:5	79:8:3	12675:11:8
	Iron Mehal &ca	Do	-	766:8:12	766:8:12
			12596:3:5	846:0:15	13442:1:0
1181	Tuppa Looney &ca	Ramjoy Roy	12719:10:0	79:8:3	12799:2:3
	Iron Mehal &ca	Do	-	766:8:12	766:8:12
				846:0:15	13565:10:15
1182	Tuppa Looney	Rayjoy Roy	12719:10:0	79:8:3	12799:2:3

[42] The sum is not correct.

	&ca				
	Iron Mehal &ca	Do	-	766:8;12	766:8:12
			12719:10:0	846:0:15	13565:10:15
1183	Tuppa Looney &ca	Rayjoy Roy	12719:10:0	79:8:3	12799:2:3
	Iron Mehal &ca	Do	-	766:8;12	766:8:12
			12719:10:0	846:0:15	13565:10:15
1184	Tuppa Looney &ca	Rayjoy Roy	12719:10:0	79:8:3	12799:2:3
	Iron Mehal &ca	Do	-	766:8;12	766:8:12
			12719:10:0	846:0:15	13565:10:15

This data suggests that the business was pursued intensively in the entire province except in its south-eastern fringes. The northern half denominated as *Tuppa* Looney was a chief source of iron revenues. Then there was a *Khas* iron estate. While the revenue collection in *Tuppa* was contracted out, that in the *Khas* estate was managed by the Rajah's officials. The classification by *Maal* and *Sayer* in the table is also significant. The former was revenues from land and its produce, while the latter stood for duties on transit. The amount under *Maal* shows that iron manufacture was vigorous in several hamlets. In 1800, about 100 mines were reported in operation scattered throughout the northeast and central regions.[43] The produce from the *Khas* was proportionate to the export trade.[44]

This table is also helpful in seeing the structural reorganization of iron production and trade in Birbhum in the 1770s. It shows that as the decade wore on, there was an increasing concentration of manufacture in terms of both spatial and organizational management. Within a few years, the iron revenue administration of entire province became the responsibility of one person, Rayjoy Roy. The concentration intensified discontents among the manufacturers and, assuming the *Sayer Jumma* was proportionate to manufacturing and trading activities, contributed to halving of the iron business in the province in seven years.

The dynamism of the Birbhum iron market in the 1770s, however, lies in the relations of production. A large part of iron trade was conducted through a system of advance: merchants and subcontractors advanced payment to their supplying traders for future sale, while the traders would do the same to itinerant peddlers, and the last

[43] Birbhum Collector to BBR, 12/04/1800 in Gupta, *Economic Life*, p. 221.
[44] Gupta, *Economic Life*, p. 223.

to the petty iron producers such as miners' and smelters' households and smiths. This system of advance (called *Dadni*) was widespread in colonial Bengal.[45] The system could reduce commodity manufacturers to debts. The supply source might go dry as smelters sometimes moved to a site of rich farming possibilities but poor mining prospects. They also might decide to engage in other value-adding activities, such as the manufacture of iron implements. However, a more widespread cause of debt was the increasing competition among the creditors, with the Company merchants entering into the market. An increased advance or a higher rate of purchase was beneficial for those who could pay it back. But it also increased the possibility of defaulting.[46]

Various affluent local groups were already in competition to own and secure the iron supply network. Although it is difficult to demarcate these groups clearly, they seem to be centred on Rajah's office and the big merchants who were involved in cross-province trade since the pre-colonial times. After 1765, the Company officials appeared as another centre of interests. These centres operated through their subcontractors, European speculators, and agents, respectively. These representatives wanted to acquire a regular supply of iron from a limited area. While the affiliations of these men were unclear and their motivations murky, fights to control a given supplier or manufacturer were not uncommon.

These dynamics of control over the marketplace unfolded within a larger tussle about governing between the Rajah and the Company officials. The outcomes of these contests were unpredictable due to the frontier nature of the landscape.

A series of events in *Tuppa* Loony in March 1778 illustrate these points. As mentioned above, the *Tuppa* had a strong base of iron production and trade. It had Iron Farms, where mining and smelting activities were concentrated, and iron marts.[47]

---

[45] On the system of *dadani*, see A. K. Sinha, *Transition in Textile Industry*: *The Textile Industry in Bihar, 1783-1833* (New Delhi: Capital Publishers, 1984), pp. 64-87; Binoy Shankar Mallick, 'English Trade and Indigenous Finance in Bengal and Gujarat in the Seventeenth Century: A Study of Dadni System and the Rate of Interest', *Studies in History*, Vol. 2, No. 1, New Series (1986), pp. 31-45; Sushil Chaudhury, 'Merchants, Companies and Rulers: Bengal in the Eighteenth Century', *Journal of Economic and Social History of the Orient*, Vol. 31 (1988), pp. 74-109; C. Palit and P. K. Bhattacharya, *Business History of India* (Delhi: Kalpaz Publications, 2006), p. 154 ff.

[46] For textiles, see Tirthankar Roy, *Traditional Industry in the Economy of Colonial India*, (Cambridge: CUP, 1999). For salt, see Balai Barui, *The Salt Industry of Bengal: 1757-1800* (Calcutta and New Delhi: K P Bagchi & Co., 1985); Indrajit Ray, 'Imperial Policy and the Decline of the Bengal Salt Industry under Colonial Rule: An Episode in the 'De-industrialization' Process', *Indian Economic and Social History Review*, Vol. 38, No. 2 (2001), pp. 181-205. For metals, see Smritikumar Sarkar, 'From Autonomy to Subordination: A Study of the Changing Organization of Artisanal Production in Colonial Bengal: the Cases of the Kansaris and the Sankharis', *Calcutta History Journal*, Vol. 16, No. 2 (1994), pp. 105-52; Smritikumar Sarkar, 'Social Organization of Artisan Production in India: Changing Role of the Market, Technology, and Merchant-Creditor: 18th to 20th Centuries' in B. B. Chaudhari (ed.) *Economic History of Indian from Eighteenth to Twentieth Century* (New Delhi: PHISPC and CSC, 2005). pp. 107-354.

[47] Birbhum Naib to BPRC, 14/07/1777 (BL: *IOR/G/6/11*).

In January that year, Rajnarayan Ghosh, Birbhum Rajah's sub-contractor in Loony, filed a suit against two debtors in the Company's court at Burdwan. These debtors, Ratan Kumar and Loharam Das, apparently owed Ghosh a total of 635 Rupees and 47 Mds of iron as a 'balance of accounts in trade'.[48] The debtors lived in Deucha, the Bribhum iron mart. The court subsequently wrote to the Company *Naib* of Birbhum to apprehend these debtors and deliver them to a peon sent by the court. In February, the *Naib* replied that he had forwarded the court's summon to the *Tuppa*'s police official at Deucha. He also wrote that one of the debtors had been apprehended, but the accused was forcibly taken away by a party of people. The insolent party also 'beatt (sic) and maltreated' the policeman and the court peon.[49]

The details of this event graphically portray not only the nature but also the vulnerability of colonial measures to control iron manufacture and trade. The Company court peon Najif handed over the Naib's *perwannah* to *thanadar*'s brother, Govindram, who clandestinely but by a 'gentle method' seized Loharam Das. But before the peon could bind his girdle and take charge of the debtor, a group of ten or twelve men was already carrying off Loharam. When he intervened by showing the court's warrant, these men threatened him, told him to stay away and disappeared in the dark.[50]

The defiant behaviour of the group was more than an act of rescue. It was also an expression against the emerging political economic order. Thus when Govindram tried to justify his actions by saying he had only been following the *sunnad* sent by the Company *Dewan*, the leader of the mutinous group, Panchanan Hazra, reportedly retorted, 'I will beat the *sunnud* with my (an obscene word)'.[51] Panchanan did not stop beating and tearing clothes of the accompanying Company militiaman even when the latter 'called out protection in the name of the Company, the Adaulut and the Chief'.[52] It was this action of 'open defiance of Government', and not the carrying off a debtor, that received the gravest attention of the Burdwan Council. Its Birbhum resident William Pye convinced the Council that Panchanan's reply to his enquiry was 'an insult to the Dignity in which every Court of Justice ought to be presented inviolable'. In Pye's opinion, permitting such an act to continue would be 'highly

[48] The name Loharam or 'Iron God' indicates this person's long familiarity with the iron trade.
[49] A Minute by Mr. Mariott, the Superintendent of Adaulut, 16/03/1778 (BL: *IOR/G/6/12).*
[50] Before leaving, Govindram told the policeman, 'not to...say to anybody that he would produce the people & dispatch them afterwards'. Zebaundundy of Ghulam Nejiff, 16/03/1778 (BL: *IOR/G/6/12*).
[51] See a translator's note in the text: 'Muckerjeah said why do you quarrel with me. The Dewans *sunnud* has come to me. I therefore have seized upon the Assamee. Do you read the Sunnad. This he paid no attention to saying I will beat this sunnud with my (this word in the original is obscene) therefore release the Assamee' (BL: *IOR/G/6/12*).
[52] Zebaunbundy of Mirza Pheekoo; Zebaunbundy of Govindeeram Sharma, Brother of the Tannadar Tuppa Lonee (BL: *IOR/G/6/12*).

prejudicial to the welfare of the Inhabitants & totally subversive of the Authority of your Board'.[53]

Panchanan legitimised his actions differently. He accused his rival of inciting the attention of the Company court, which was now preventing him from collecting his debts due from Loharam Das. But far from being an anti-colonist, he was an agent of a private English speculator, William Brighthall Sumner, of Calcutta. He had advanced money to Loharam for a 5-year exclusive supply of iron. He also had an allegiance with a Portuguese Commissioner, John Rodriguez, who ran a parallel revenue court in Deucha.[54] Months of deliberation and voluminous correspondence ensured that Rodriguez was answerable for his conduct. It was discovered that the Company Government had not yet revoked its previous delegations of judicial authority upon which the Portuguese was acting. Hence, the charge of forgery against the man appears to have simply collapsed for the want of 'papers of proofs of any sort'.[55]

In short, the landscape of iron manufacture and trade in Birbhum was characterized by competitive claims over the long established supply network. Indeed, the iron scene was so charged that contests often assumed political overtones. As shown above, the Company's assumption of the governmental role had not materially affected the outcome of the conflicts even in the 1770s. Its presence in the frontier remained precarious.[56] Its Iron Farmers continued to suffer tough resistance from other intermediaries, whose stakes in the iron business were high.[57] There was nothing in this landscape that was inherently favourable or unfavourable to the Company's interests, yet its dynamics made the outcome of any new venture unpredictable.

Two Early Iron Projects in Birbhum

[53] William Pye to BPRC, 27/03/1778 (BL: *IOR/G/6/12*).
[54] For Hazra's negotiating and yet defiant tone, see: 'I have no concern of any kind with Rajenarrain Gohoss if the Gentleman summons the Assamies I will send them. I am only a servant and there is large outstanding Ballances due from the assamies to my Master Mr. Sumner & if I dont demand to collect them what answer can I give to my Master. Were I to depart from this place the whole of the Business would go to ruin. If the Gentleman will take the Assamies I will sustain no loss'. Punchanund Hazra to William Pye, 27/03/1778 (BL: *IOR/G/6/12*).
[55] John Rodrigo to William Pye, 22/03/1778; BPRC to GGC, 16/03/1778 (BL: *IOR/G/6/12*); A Copy of the Summons, 19/05/1778 (BL: *IOR/G/6/13*).
[56] For a similar event from another frontier area, see BPRC to William Pye, 19/03/1778 (BL: *IOR/G/6/12*). In this case, the Company's Chief at Zehanabad sent a peon to extract revenue balance from four of his ryots, they 'beat and abused' the peon. The ryots ignored several summons and, according to a junior officer at the station, 'are continually making opposition to the officer of Government'.
[57] When Council's iron contractor went to catch his debtors in the Tuppa, they were routinely 'rescued', and his messengers were beaten up and kidnapped. See Zebaunbundy of Mugutt Roy, 16/03/1778 (BL: *IOR/G/6/12*). Panchanan also once imprisoned five iron estate farmers claimed by Rajnarayan, the Company Iron Farmer, as his debtors.

It was in this dynamic frontier landscape of the 1770s that the two first large-scale iron works were established. Indranarayan's 1774 proposal for erecting iron works at Hautguacha (present day Hatgacha) and Farquhar's 1777 proposal for the same at Deucha differed considerably in their details and in their potential for impact on the existing iron network.[58] Nonetheless, they were both plans to centralize and control iron manufacture in the province. They sent worrying signals to the holders of iron-mines and merchants dealing with iron trade. However, as this section shows, both industrialising efforts met the same fate and at the hand of the same people, the *Chuar*s.

Indranarayan Sharma's proposal of September 1774 was to lease nearly 75 square kilometres of dense jungle around the village of Hautgautcha. Although it is not clear what specific products he intended to produce or how, two features in the proposal are worth stressing.[59] First, in seeking permission of the Burdwan Council for exploiting the iron resources of a place not yet surveyed and not yet included in their annual rent rolls, Indranarayan employed a strategy of submission to attract the Company's patronage. In not applying to the rightful Birbhum Rajah, he acknowledged the Company's rights over the territory. In addition, he utilized the Company's favourite trope of reclamation saying the forest land had once been a flourishing area of iron mines but was broken due to the 'incursions of the Choars' and the famine of 1770.[60] His argument to facilitate the process of making the 'marauding' *Chuar*s the 'subject' of the Government fitted well with the colonizing aims of the Company Government. Civilizing them *and* employing them in the extraction of a valuable article was a doubly beneficial object, especially when he was assured a full cooperation by the refractory population. He specifically stated that 'the *Choar*s & Mountaineers who at present infest…will themselves engage in the working of Iron. They gave me assurances of this'.[61]

Second, Indranarayan's terms were less demanding than those of contemporary and latter European speculators. He planned to use local labour and personal capital unlike the others who preferred European craftsmen and demanded

[58] The earliest account of these events is S. G. T. Heatly, 'Contributions towards a History of the Development of the Resources of India, Memoranda 2: The Working of Iron in Bengal', *Journal of the Asiatic Society of Bengal*, Vol. 12, part 2 (1843), pp. 542-563. Subsequent works have relied on Heatly's work. Compare, H. R. Sanyal, 'The Indigenous Iron Industry of Birbhum', *Indian Economic and Social History Review*, Vol. 5, No. 1 (1968), pp. 101-108; O. P. Jaggi, *Technology in Modern India*, *History of Science, Technology and Medicine in India: Vol. 10* (Delhi & Lucknow: Atma Ram & Sons, 1984); Gupta, *Economic Life*, pp. 196-202.

[59] Inder Narain Sermano to BPRC, 17/09/1774 (BL: *IOR/G/6/2*); Heatly, 'Contributions', pp. 543-544.

[60] This was the Great Famine of eighteenth century Bengal in which one third of the population perished. See W. W. Hunter, *The Annals of Rural Bengal* (London: Smith, Elder & Co., 1897), pp. 26-27.

[61] Inder Narain Sermano to BPRC, 17/09/1774 (BL: *IOR/G/6/2*).

pecuniary assistance or exclusive privileges to sell their products to the Company.[62] His terms of disengagement were also simpler. At the end of the lease period, he would not ask for any compensation for his investment and trouble but simply a preference for 'farming' it again. The Company could disallow him by purchasing his buildings at a price judged by its own assessor (*Aumeen*) and not necessarily based on his accounts.

Deemed manifestly advantageous to the Company, the Bengal Government awarded Indranarayan a deed and an executive permission (*Aumilnama*) within a month of application. The lease was for ten years, and Sharma would pay a total rent of Rs 3600 over the period compared to the Rs 766 others paid for far more privileges (see Table 1 above). Unable to locate any further trace of the project, S. G. T. Heatly, the first historian to narrate the story in the 1840s, inferred that the speculator must have abandoned the project on having 'second thoughts' over these very 'sanguine' terms. Latter historians have simply echoed Heatly.[63] But contemporary sources suggest that Hautgaucha alone was capable of producing between 1210 tons to 3500 tons of refined (*pukka*) iron per annum.[64] A sample computation shows that the venture had a minimum annual return of 24% on investment.[65] It is unlikely that Indranarayan, who had traversed the area thoroughly, would have failed to see the potential benefits of the venture.

---

[62] The Company Government's earliest 'exclusive rights' to any commercial investment was granted to Messrs. Rendall and Achison in 1768 for supplying 24 million bricks to the Company at a stipulated rate within three months. See Rev. J. Long, *Unpublished Records of the Government*, 2e (Calcutta: Firma K. L. Mukhopadhyay, 1973 [1869]), p. 640. In 1774, Messrs. Sumner and Heatly received 'exclusive rights' of selling coal in the Company territories for 18 years in return for their investment for mining coal north of the Damodar River. GGC to BPRC, 11/08/1774; Extract Proceedings of GGC, 11/08/1774 (BL: *IOR/G/6/2*).

[63] Heatly, 'Contributions', p. 544. Gupta, *Economic Life*, pp. 194-197.

[64] The higher estimate is obtained as follows: (a) full capacity rent agreed by Indranarayan was Rs. 5000 per annum; (b) The rent per smelting furnace per annum reported by Farquhar was Rupees 134/16 (See Farquhar's letter dated October 15, 1778 below); and (c) W. Jackson in 1845 reported a production of 25 maunds per furnace in a 4 days 4 nights smelting exercise, which might not have changed significantly over the course of period (Jackson, 'Memorandum on the Iron Works'). Iron manufacture season lasted for three months a year, making 15 smelting per annum per furnace a safe guess. Buchanan puts this figure as 45 (Oldham, *Journal of Francis Buchanan*, p. 33). The total estimated production of Hautgatcha would then become 5600 tons of *kucca* (the smelted sponge like mass) iron. Major James Franklin in 1829 reported 63% of *kucca* iron yielded *pukka* (i.e. comparable to so called *European* Iron imported in India) iron (BL: *MSS EUR D 154*). V. Ball however put this refining ratio up to73%. See V. Ball, *A Manual of the Geology of India, Part III: Economic Geology*, Published by the Order of the Government of India (Calcutta: Government of India, 1881). The lower limit could be worked out like this: (a) Conventional rent extracted by Zemindar on *pukka* iron was Rupees 2.50 per 25 *maund*s. Since the Board agreed to the annual rent of Rupees 5000 from Indranarayan, the Hautgatcha fields was capable of producing 1210 tons per annum.

[65] The investment estimate is based on (a) Full capacity production of 3500 tons; (b) the cost of production estimated by Major Franklin as 1 Re. 12 *Anna*s. The profit on the other hand was based on (a) the minimum production of 1210 tons; (b) and the contemporary sale price of 4 Rupees per *maund* as reported in the above mentioned petition by Daomum Chund Serma and others thereby yielding a minimum of 2 Rupees 4 *Anna*s per *Md* of profit.

Two hitherto unnoticed documents confirm this point. They also provide additional technological and organizational details of the project. The first, dated March 1, 1775, suggests that his attempts to establish a *Haut* were thwarted by the Birbhum *Naib*, who was preventing itinerant traders from congregating near the project site. As a result, his 'Manufacturers' had to cover a long distance for daily provisions. Upon application, the Provincial Council agreed to let him erect the market for the purpose. At the same time, it informed the *Naib* to block iron trade in that *Haut* in line with its efforts of controlling market places early on.[66]

Another document – a petition Sharma submitted to the Council in April 1777 – reveals other important aspects of his project. First, its technical and organizational arrangements were gigantic by contemporary standards. Its pre-production investment had already exceeded Rs 30000 (equivalent to £3000). A strip of land many miles long was cleared for building roads. Charcoal was transported from afar and stocked in guards' protected precincts. A 'water raised foundry' had been erected near the foot of a hill thus making the iron works, possibly the earliest instance of use of the water-driven bellows in iron smelting and forging furnaces in India. Second, as his proposal indicated, Indranarayan had recruited local charcoal makers, miners, smelters and blacksmiths. Thus his 'Manufacturers' were the '*Chouar*s &ca. inhabiting the ironworks and its environs'. There were three *Chuar*s' settlements (*deehs*) established for making charcoal.[67]

The April 1777 document is also useful in reconstructing the events leading to the ruining of Indranarayan's venture. In October and November 1776, two successive 'invasions' by the 'body of *Chuar*s' completely destroyed his iron works. The *Chuar*s killed two of his guards, carried away all the cattle, plundered everything valuable and burnt down what they could not take away. He could not get any assistance from the Company's civilian and security representatives in Birbhum. Instead, the invaders 'exalted their success' as if they bore protection from these officials. In the aftermath of the 'invasions', his workmen lived in fear. Most of them left the site. The remainder demanded more wages. This, coupled with added costs in security, left him financially unable to carry on the work. He now asked the Council to send an assessor (*Aumeen*) to estimate his losses so as to have a comparable deduction in his annual rent.[68]

The document thus suggests the critical role of the *Chuar*s in circumscribing the fate of Indranarayan's ironworks. Curiously, both his workmen and the 'invaders'

[66] Indernarrain Serma's petition to BPRC, 1/03/1775 (BL: *IOR/G/6/3*).
[67] Inder Narain Sarma to BPRC, 21/04/1777 (BL: *IOR/G/6/10*).
[68] The Council in response asked its *Naib* at Birbhum to send an assessor as requested and to file the reply back which apparently he did. I have not been able to locate any more related papers.

were the *Chuars*. Those employed by him quickly went over to the party of invaders causing him to employ security guards to 'prevent those I had settled from Emigrating again to Plunder'.[69] The ravaging *Chuar*s remained around Hautgatcha throughout the winter, prompting him to seek the Council's military help to drive them out.

Indranarayan's story is too sketchy to yield information on the role of the two other important stakeholders, the landholders and merchants, in shaping the fate of his ironworks. As I have mentioned above, the Birbhum Rajah laid hereditary claims over all iron mines in his territory. His office regulated the iron mining, smelting and trading practices by imposing various rents, taxes and duties on the iron products and marts. The merchants on the other hand were the links through which iron ores and finished products were conveyed from the mines to roadsides, to markets and then to buyers. It was through them that iron travelled from its sources to manufacturing and commercial cities. As Hautgatcha was an abandoned site in the forest and was not included in Rajah's annual rent roll, there was little reason for him to complain except by way of envy. And the Hautgatcha experiment was destroyed before its products arrived in markets. It was perhaps too early to detect the merchants' response.

Yet the missing roles of the landholders and merchants in the Indranarayan's story should not be generalized as John Farquhar's venture in Deucha, which was proposed in 1777 and executed in the coming decade, shows. Unlike Indranarayan, whose person and whereabouts is shrouded in mystery, John Farquhar is a well known personality. After taking his MA in Marischal College in Aberdeen, Farquhar went to London to try his luck in the overseas voyages. While bound towards China as a surgeon's mate, he jumped ship and became, on the sole basis of 'a small knowledge of physic', a 'surgeon' on a vessel going to Calcutta whence he was subsequently appointed as a Company Writer. But it was his interest in chemical experiments and commercial ventures which earned him money and friends in high places, notably Warren Hastings, the Governor General.[70]

Where Indranarayan was silent about his prospects, John Farquhar spoke loudly of his commercial ambition. In 1777, Farquhar drew up jointly with Thomas Mottee, another influential Calcutta diamond merchant, a proposal for raising an iron foundry at Jerria in Panchet. Their aim was to furnish 'extremely soft' iron for the commercial and military benefits of the Company. They wanted to fabricate guns and shot, and to substitute for imports of 'cast iron pots, frying pans, and other utensils'

[69] Ibid.
[70] On Farquhar's life, see J. R. Teignmouth, 'The Late Mr. Farquhar', *The Asiatic Journal and Monthly Miscellany,* Vol. 29 (1829), pp. 15-17; T. F. Henderson, 'Farquhar, John (1751-1826)' rev. H. V. Bowen in *ODNB* (Oxford: OUP, 2004). Also available at http://dx.doi.org/10.1093/ref:odnb/9179.

from China and 'foreign' territories. They also aimed to supply cylinders for sugar mills and boilers for sugar works, salt and saltpetre works. Nails, poles, gates, rails for staircases and balconies would also be produced 'to enhance beauty and convenience' of the Bengal houses. Furthermore, the Company Government could export their products to the British wire-drawing industry and artillery. This would equip their mother country against an increasingly hostile France. Farquhar, in short, projected his iron project as a one-step solution of all the Company's iron-related aspirations. Indeed, the liberation of the *Calls* (or *Chuars*), who lived in Panchet jungles 'totally unacquainted with the conveniences and comforts of a settled and civilized state of life', Indranarayan's principal objective, also got a mention in their project proposal.[71]

The terms demanded by Farquhar and Motte far exceeded Indranarayan's propositions. They wanted a sufficient quantity of land in the *Pergunnah* for erecting the iron works, warehouses, habitations of their workers and labourers. They also asked for the *exclusive privilege* of manufacturing iron in the 'European manner' in the whole district of Birbhum, and of selling it free from Duty anywhere in the Company territories for nineteen subsequent years. They were not prepared to submit to control from the Burdwan Council or any other local Company officials. Their European artificers should enjoy the same great privileges as other workmen employed by the Company contractors. In return, they promised to erect and maintain the iron works at their own expense and to supply 'any number of shots and shells' as and when required by the Company at 80 per cent of their current landing price at Fort William.[72]

The Company's local officials were cautious of the likely success of the project. M. Ramus, the Collector of Ramghur, pointed to the local shortage of labour. The Provincial Council thought the struggle with the landholders would be the greatest problem. These officials therefore recommended that the speculators first negotiate with the landholders and other inhabitants.[73]

The Zemindar's reaction to the news of the venture confirmed the apprehension of the local Company officials. When a native assessor (*Aumeen*) subordinate to the Company resident at Panchet was sent to Jerria to procure the old accounts of the iron estates there, he found that the whole of the Zemindar's household 'had gone into the jungles'. When served with a Company *perwannah*, the Zemindar showed his willingness to trade in iron with the Company Sarkar, but

[71] Messrs. T. Motte and J. Farquhar to the GGC, 4/11/1777 (BL: *IOR/G/6/12*).
[72] Ibid.
[73] BPRC to GGC, 11/03/1778 (BL: *IOR/G/6/12*).

refused to summon the landholders of the estates.[74] Upon hearing this, the Burdwan Council asked its resident to apply the 'best endeavours' in his power to gain such information, including the use of force if necessary.[75] The reason for the Zemindar's non-cooperation was obvious: the Company project 'would be no farther a prejudice than by obliging those to discontinue the business, who have for many years past been concerned in it, and who have made the necessary advances for a continuation'.[76] It was more than a question of loss of trade or profit. The project's potential monopoly of iron manufacture was inconceivable to the landholder, who had not yet even submitted to the Company's revenue demand.

Anticipating hostilities from the Panchet landholders, Farquhar changed his site to Deucha in Birbhum, even after receiving permission for Panchet mines.[77] He perhaps thought that the Birbhum iron estates, having been under the fiscal management of the Company for a decade now, would be more manageable. Deucha was also a more accessible site to the Company army than Panchet, where he felt exposed to the incursions of the *Chuar*s and 'other country people'.[78]

Although admired for 'his peculiarities, his parsimonious habits, his shrewdness, his eye ever watchful over his interests', Faruhar found himself tested by the natives when he arrived in Birbhum in the middle of June 1778.[79] He had already procured fiscal control over the Iron Mahal in the expectation that such a pre-emptive measure would be better than a protracted conflict.[80] Farquhar had also acquired, through his friend the Governor General, the rights to collect transit duties. He therefore had the tools to deal both with refractory landholders and iron merchants.[81]

The office of the Birbhum Rajah collected the transit duties before Farquhar's acquisition of the rights. It now lost a significant sum. But the office reacted to the news of these measures of appropriation in two ways. Citing his illness, the Rajah did not personally respond to Farquhar's letters.[82] At the same time, his office increased the *Jumma* amount in the *Loha Mahal* in the beginning of that year from Rs 766 to

[74] Seebnarain the Aumeen, 11/03/1778 (BL: *IOR/G/6/12*).
[75] BPRC to William Hewitt at Patcheat, 11/03/1778 (BL: *IOR/G/6/12*).
[76] M. Ramus to GGC, 19/01/1778 in Heatly, 'Contributions', pp. 553-555.
[77] Heatly, 'Contributions', p. 555.
[78] In Birbhum, 'the peons requisite for the collection of the duties would afford sufficient protection to the works against the hill people without a guard of sepoys, which I am informed will otherwise be absolutely necessary'. Quoted in Heatly, 'Contributions', p. 555.
[79] Heatly, 'Contributions', p. 546, 556.
[80] Clause 8 of the proposal reads: 'That, as the Exemption from Duty of our bar Iron may be prejudicial to the interest of the person who farm the Loha Mahal in Beerbhoom, we engage to take these farms on the Terms and conditions by which they are at present held'. See Messrs. T. Motte and J. Farquhar to GGC, 4/11/1777 (BL: *IOR/G/6/12*).
[81] 'but the many inconveniences I foresee...if possessing no influence against the miners, oblige me to request that you will be pleased to grant me the farm of the duties on the Beerbhoom iron'. Quoted in Heatly, 'Contributions', p. 556.
[82] BPRC to GGC, 16/03/1778 (BL: *IOR/G/6/12*).

3262. Farquhar soon discovered that both *Tuppa* Loony and *Khas* Loha Mahal were subcontracted by the office to the same person, Rajnarayan Ghosh.[83] What Farquhar found intriguing was while the *Jumma* for the Iron-Farm was more than quadrupled, the annual rent for the *Tuppa* was significantly lowered.

Subsequent enquiry led the Company Government to dispossess the Birbhum Rajah from his hereditary rights over the iron-estates, and to favour Farquhar with privileges unimagined three years earlier by Indranarayan. The Burdwan Council found the 'strongest collusion' between the Rajah and the possessor of Iron-Farm. But since no existing rule or practice had been broken, the Council could not interfere in what appeared to be a mutually satisfying contract. Nevertheless, the Council removed the Iron Farm from the Rajah's annual rent roll and let it to Farquhar for a lower rent of Rs 766 with an extra permission that the latter could deposit rent directly to the Council. Hence, the Rajah was even stripped of his nominal rights as a principal farmer of the province.[84] The step was highly unusual even by the contemporary standards. The Government dispossessed a compliant landholder from his estates without even bothering to accuse him of some vague crime such as producing too many children, or spending extravagantly or practicing dishonesty.[85]

Equally unprecedented was Farquahar's aggressive implementation of his project. Not satisfied with the right to collect all iron-related taxes and duties in the province, he also requested the Board of Revenue to transfer a group of fifty armed retainers to his command. He further stated that the group, which protected the iron estates in Deucha, should refashion 'their appearance such as to keep the Hill people in awe'. He wanted to 'clothe them uniformely (sic)' and to grill them in combat training. He would teach them, for example, 'to fire at the mark'.[86] The Council granted this measure as well.

Farquahar's iron project thus arrived in the colonial frontier with the full backing of the Company's colonizing apparatus. Yet such unfaltering support from the government could not save him from the same kind of fate as Indranarayan's

---

[83] *Tuppa* was a mid-level political – cultural unit in medieval Northern India, the largest being a *pergunnah* (a territorial whole governed by a *Rajah*, also variously called as *raj*, or *ilaqa*) and the smallest being a *gaon* (a territorial parcel, a village). The Company preferred *pergunnah* level Settlements. See Kashi N. Singh, 'The Territorial Basis of Medieval Town and Village Settlement in Eastern Utter Pradesh, India', *Annals of the American Association of Geographers*, Vol. 58, No. 2 (1968), pp. 203-220.

[84] John Farquhar to BPRC, 23/11/1778; BPRC to BBR, December 7, 1778; Extract Letter from BBR to BPRC, 18/12/1778 (BL: *IOR/G/6/13*).

[85] As the colonial government would do later to the Birbhum Zemindar in order to annex his state, see *Trial of Mohammed Zaman Khan, Zemindar of Birbhum on Charges of Prodigality, Profligacy and Incapacity, dated 1794-1796* (BL: *IOR/F/4/19/767*).

[86] Farquhar to BBR, 20/06/1779; BBR to BPRC, 6/07/1779; BPRC to Farquhar, 10/07/1779 (BL: *IOR/G/6/14*).

earlier attempt. In 1832, a Colonel Forbes, surveyor of the Rajmahal Canal, came across the ruins of Farquhar's project in a wild patch of land: 'Broken up for its materials, and consequently neglected, it is believed that at present no part of the dam [...] remains'. The dam bringing the water to the rolling mill at the project site, which was 'the best specimen of masonry at the time [...] to be met with in India', was completely erased from the landscape. Farquhar himself talks of 'cutting down a Jungle [...] erecting dwellings and several necessary building...preparing materials for forming a dam and ...cutting a part of a canal for supplying the bellows wheel with water'.[87] The extensive infrastructure was taken over by the 1830s by the wild forest.

Curiously, it was not Rajah's sabotage but a series of incursions from the *Chuar*s which ruined Farquhar's ironworks. That Farquhar was frequently targeted by these armed bodies can be inferred from his substantial security costs. He also mentioned that the repair of frequently damaged parts and maintenance of remaining structures in the aftermath of the *Chuar*s' ravages was now proving too costly for him. There is some indication that his industry began operations, but the furnaces and foundries were not running at their full capacities.[88] The losses by 1787 were so great that his local representative was taken into Government custody for failing to pay the nominal rent. By that time, Farquhar was clearly disinclined to make any further investment in the concern. He requested the government to contribute to his security expenses and to remit the rents.[89] This was more or less the end to Farquhar's interest in the Birbhum ironworks.[90]

The two Birbhum iron works of the 1770s could not be more different in terms of the ethnic affiliation, the temperament of their originators, and the sources of their strength. Indranarayan was a hesitating 'native' claiming prior assurance of support from the *Chuar* manufacturers. Farquhar was a bold Scot who brought with him not only exclusive iron manufacturing and trading privileges but also full fiscal and military backing from the Government. Yet their projects met a common fate in the hands of the *Chuar*s.

The Critical Role of the *Chuar*s

[87] A Proposal to Construct a Canal between the Ganges at Rajmahal and the Hooghly at Mirzapur (BL*: IOR/F/4/1552/6225*). Forbes cites the Company's commercial resident at Surool in Birbhum.
[88] Farquhar, for instance, had advanced money to the *Chuar* smelters in Gamra to procure smelted iron from them. See Heatly, 'Contributions', p. 559; Oldham, *Journal of Francis Buchanan*, p. 46.
[89] J. Sherburne to John Farquhar, 24/06/1787 in Mitra, *Birbhum*, p. 7.
[90] Farquhar retained his lease till 1795. See Gupta, *Economic Life*, p. 202. By that time, he had already found a lucrative career as the sole government contractor of the gunpowder. The latter business would earn in fortune, which was valued at his death in 1826, over a million Sterling pounds. See Henderson, 'John Farquhar'.

The evidence presented in the previous section calls for a closer look at the place of iron in the lives of the *Chuar*s and a re-examination of their role in the contests among the Rajah's officials, contractors and iron merchants over the iron supply network. In this section, I look at how the Bengal Government officials viewed the *Chuar*s' movements in the markets in the plains and interpreted their actions. I also show how current interpretations owe their framework to the colonial officials' understanding of property relations in Bengal. I argue that in straight-jacketing the *Chuar*s' understanding of their relationship with the natural resources in terms of ownership, these interpretations missed the rationale of their response to the early Birbhum iron experiments.

Contemporary sources are full of accounts of the *Chuar*s' insurgent activities. The extent and intensity of these activities in and around Birbhum was overwhelming both to the Birbhum Rajah's authority and to the arriving colonial rulers. For example, on November 5, 1781, the Rajah asked for military assistance from the Government to quell a large body of armed men in the jungle fringes of his territory. The rebellious *Ghatwal*s, who shared ethnic composition with the *Chuar*s, and their *ryott* followers, were refusing to pay rents of any kind.[91] When four Company *sepoy*s made an appearance in the villages, they 'immediately rose to the amount of several hundreds...[and] rushed in upon the *sepoy*s and took their arms away'.[92] Soon, the discontent spread into other areas in the province. The Boggrie Zemindar 'now openly *joined the Choar*s'. He was at a place called Chattergunje with 'the heads of *Choar*s'. The insolent group, according to the Company officials, were given pistols, swords and country-made matchlocks by the iron smelters of the western Birbhum. Two military companies were sent to seize the Zemindar and 'all those...who are concerned in the Disturbances, and have *united themselves to the Chuar*s'.[93] The Government's armed expedition failed. The Government confiscated lands, houses and other properties of the rebels and announced a reward of Rs 3000 for anyone apprehending the 'Principal Ringleaders' including one Koosel Patter who headed the *Chuar*s.[94]

After an interval, the insurrection intensified. This time, it was chiefly directed against the Company Government and allied Zamindary households. The bodies of

[91] 'Now Bishundeo Gaatwall of Pergunnah Sohimnu, Juswunt Sing Gawtwall of Pergunnah Sigoor, Khoosh Narrain Sing & Bridjoo Sing Gaatwalls of Pergunna Sirain, & Juddoloo Nundan Gautwall of Pergunna Bindra, with other Gautwalls of Pergunnah Deoghur, have entered into a combination not {to} appear before [the amlah sent by Zemindar] and have assembled a large Body of Burkondasses at a fort, which they have constructed in the Pergunnah Roohinnee, from whence they issue and carry away the Ryots and say they will not pay a Cowry of their rents....'. See Rajah Behader Zemman Cawn to CCR, 5/11/1781 (BL: *IOR/P/68/11*).
[92] Captain MacGregor to CCR, 19/11/1781 (BL: *IOR/P/68/11*).
[93] Boggrie Collector to CCR, 30/09/1783 (BL: *IOR/P/68/26*). Emphasis added.
[94] CCR to William Pye, 8/10/1783 (BL: *IOR/P/68/26*).

*Chuar*s, consisting generally between 400 and 1000 men and in certain instances in the thousands, brought the Company's settlement operations in the province to a standstill.[95] In May 1785, nearly a thousand armed 'plunderers' poured down from the western forests and crisscrossed the entire province destroying official buildings and markets established by the Government. Again, in December 1788, a 500 strong 'band' of 'marauders' attacked a market town close to Suri, the Company's Birbhum capital. In June 1789, the chief manufacturing and trade centre of the district Illambazar was ransacked in broad day light.[96]

Several features of the insurgent activities, which a historian has called a 'protracted civil rebellion' in the Birbhum peripheries, stand out.[97] First, although most of the 'invaders' were allegedly from Radshy and other neighbouring districts north and west of Hautgaucha, the *Chuar*s in the western frontiers of Bengal generally were used to enjoying their excursions unobstructed. The Birbhum Rajah's officials customarily accommodated these movements.[98] Described by the Company sources as 'marauding' and 'incursions', the movements involved frequenting areas that were recently 'cleared' of jungles and were settled by zealous outsiders.[99] They especially envied articles such as charcoal, timber, coal, silk and iron, all of which originated from their forests.[100] Thus they carried away 'the Charcoal Bullocks with Pack & Saddle', and plundered a large number of smelting furnaces (*pans*).[101] On the other hand, articles of daily necessity such as salt, cloth, grain and betel were left untouched except in the times of scarcity such as during the famine. And, they never targeted their own men or the poor cultivators.[102] Their aims were the Company and

[95] L. S. S. O'Malley, *West Bengal District Gazetteers*, *Santal Parganas* (Calcutta: Bengal Secretariat Book Depot, 1910), p. 17; W. W. Hunter, *Annals*, Vol. 1, p. 83. A Petition of Lala Ramnath enclosed in G. H. Barlow to Criminal Court Remembrancer, 21/10/1789 in Gupta, *Economic Life*, p. 63.
[96] Hunter, *Annals*, Vol. 1, p. 77, 79.
[97] Gupta, *Economic Life*, p. 202.
[98] Wazed Alley Cawn, a Fouzdar appointed by the Beerbhum Rajah, said: 'Last year the Disturbances raised in the Pergunnah Noonee &ca in Beerbhoom by the Hill people you are acquainted with. This year *according to their custom* those people have begun to Plunder & Disturbe [sic] pergunnahs that are contagious to them'. Mahomed Reza Cawn to BPRC, 16/09/1777 (BL: *IOR/G/6/11*). Emphasis added.
[99] One of the earliest reports on these disturbances came from Panchet: '[in] the time of harvest the Chouars from the Jungles raise disturbances prevent the ryott from escaping & destroy the Crop. This occasions a delay in the collections & cannot be remedied without Proper Guards being placed at the Tannahs'. Naib of Panchet Zemindar to BPRC, 12/12/1774 (BL: *IOR/G/6/2*).
[100] In one such incursion to *Tuppa* Loony, a great 'body' Hill Robbers came, plundered and burnt the village Kalyan Deeh. The Birbhum Naib's people followed them across the river Brahmany 'but there being a great Number of thieves there & the place Very Dangerous' the followers desisted from going any further. Birbhum Naib to BPRC, 26/11/1776 (BL: *IOR/G/6/9*).
[101] Petitions from the Riotts of Sookdebpoore &ca. to BPRC, 4/03/1777 (BL: *IOR/G/6/10*). These manufactories were already manned Burgundosses and Chowars.
[102] Proceedings Bengal Judicial Committee (Criminal), 14/09/1798 in Sen, *Santhals of Jungle Mahal*, p. 53. The pattern continued well into the early and mid-nineteenth century. See K. K. Datta, *The Santal Insurrection of 1855-57*, (Calcutta: University of Calcutta, 1940); J. C. Jha, *The Kol Insurrection of Chota-Nagpur* (Calcutta: Thacker, Spink and Co., 1964); J. C. Jha, *The Bhumij Revolt, 1853- 33: Ganga*

Zemindari officials, moneylenders and merchants. In other words, their 'depredations' were efforts to reclaim their customary rights over resources (such as land and forests) and practices (such as agriculture and crafts).

The Company officials on the other hand interpreted these activities through their own understanding of land proprietorship. They drew their perspectives on the land rights from what they thought as the Indian custom and the contemporary British law.[103] For instance, they classified man's relationships with resources into two types: occupancy and tenancy. In this scheme, the ruler had an 'undisputed right to disposing of unoccupied waste and forest land', while 'shared ownership' or 'holding in common' did not exist.[104] The Company officials misunderstood local property relations, which were much more complex than they realized and involved a structure of obligations and responsibilities.[105]

The *Chuar*s' relationship with the forest lands did not fit neatly into the Company's classification. Hence, their activities were incomprehensible to the officials, who interpreted their actions as threats to order and tranquillity. Some anxious officials also conjectured that the *Chuar*s' insurgencies were designed by a few dissenting Zemindars.[106] The link was credible as the *Chuar*s' incursions appeared to the officials to be growing more frequent and violent as the Settlement operations drew to a close.[107] Hence, they concluded that either through collusion with local feudatory – or failing that, by using military suppression – the *Chuar*s should be subdued.[108] This was a naïve way to look at the significance of the *Chuar*s' behaviour

---

Narain's Hangama or Turmoil (Delhi: Munshiram Manoharlal, 1967); Ranajit Guha, *Elementary Aspects of Peasant Insurgency in Colonial India*, 2e (Durham; London: Duke University Press, 1999).

[103] W. W. Hunter, *Bengal MS. Records*, Vol. I.

[104] The Company officials' view on the land rights in Bengal was informed, for example, by a particular view of history of the subcontinent. It accepted a theory of 'Aryan or Hindu' invasion in Bengal, and a theory that the sovereign, by virtue of being an outsider, was never the 'owner of the soil'. He was only a sharer in the land-produce. The officials inherited this view from the Mughal sources which placed origins of Settlement in 'District farming systems' of the late Mughal period (1658-1765). The information was also refracted through their knowledge of the land rights in England and Europe. See B. H. Baden-Powell, *The Land Systems of British India: Being a Manual of the Land-Tenures and of the Systems of Land-Revenue Administration Prevalent in the Several Provinces*, 3 vols. (Oxford: Clarendon, 1892); B. H. Baden-Powell, 'The Origin of Zemindari Estates in Bengal", *Quarterly Journal of Economics*, Vol. 11, No. 1 (1896), pp. 36-69.

[105] C. K. Meek, *Land Law and Custom in the Colonies* (London; New York: OUP, 1949), p. 11; W. C. Neale, *Change in Rural India: Land Tenure and Reform in Uttar Pradesh, 1800-1955* (New Haven: Yale University Press, 1962); C. M. Hann, 'Introduction: The Embeddedness of Property' in C. M. Hann (ed.) *Property Relations: Renewing Anthropological Traditions* (Cambridge: CUP, 1998), p. 15.

[106] Captain Biscoe to BPRC, 22/04/1776 (BL: *IOR/G/6/8*). The Manbhum Zemindar, dissatisfied with a distant revenue collection location, allegedly stirred the *Chuar*s.

[107] With the benefit of hindsight we can now say that it was not true. The *Chuar*s had been crisscrossing the area since the Company records began and went on doing so until late nineteenth century.

[108] An example of such collusion is a joint request for additional militia in Birbhum made by Nabob Md. Reza Cawn and Becheram Mazumdar (BL: *IOR/G/6/10*). As it was not possible to 'lay hold' of the *Chuar*s who 'in very large Parties' moved 'scattered in all quarters throughout the Jungles', Biscoe suggests that the Council should 'send Ameens to various disgruntled Zemindars and to come to some kind of arrangements to pacify the Chooars'. Captain Biscoe to BPRC, 22/04/1776 (BL: *IOR/G/6/8*).

because it saw them merely as proxies in a wider conflict between traditional rulers and the Company government. It denied agency to that population.[109]

In tune with the Company officials' discourse, colonial historians have interpreted the outcome of the early iron manufacturing attempts in Birbhum in terms of confrontation between politico-economic imperatives of the Rajah's durbar and speculators' commercial interests. Thus, Heatly cited the Company government's ambivalent attitude to land proprietorship and its produce as a key reason why the conflict between Farquhar and the Rajah's office escalated. Indeed, since the rights of the both of these parties were seen to derive from the Company government – former by the Settlement and latter by a commercial contract – it is difficult to conclude otherwise. The problem, according to these accounts, is not that the practices of the colonial state were inhibitory to the success of large scale iron manufacture, as a recent colonialism-centric perspective put it, but that it did not play more active role. The development of mineral resources, according to Heatly, was delayed due to the incompetence and apathy of the colonial officials.[110]

A palpable tension between Farquhar and the local Zemindary no doubt existed. The Rajah openly flouted the Government's grant of exclusive rights to Farquhar by establishing new iron marts. He also pursued a series of offensives against Farquhar's ironworks. According to Heatly, '[Farquhar's] people were molested, fuel obstructed, miners bribed away, and *perwanna*s for private furnaces issued'.[111] Indeed, the Rajah attempted to reclaim the iron-estates in 1784 by including them in his annual *Jumma*. The Committee of Revenue in Calcutta rejected his plea saying that the iron estates 'must remain in [Farquhar's] possession according to the terms of the grant, as he has hitherto held it'. In 1786, the Zemindar again put Farquhar as his debtor in his statement of revenue balance that year.[112] However, contrary to Heatly's suggestion, the Government's military and financial support for Farquhar remained

---

One of the earliest military expeditions in the *Chuar*s' area was under Captain James Crawfurd in 1775. James Crawfurd to BPRC, 11/06/1775 (BL: *IOR/G/6/4*). The military expeditions against the *Chuar*s became more frequent and ruthless in the early nineteenth century as in the case of Major Gilbert's operations in Singhbhum in 1824-25 and Captain T. Wilkinson's excursions against the Coles (BL: *IOR/F/4/925/25921*).

[109] My meaning of the term agency, following von Mises' usage, is simply 'a capacity for purposeful actions'. See Ludwig von Mises, *Human Action: A Treatise on Economics* (San Francisco: Fox & Wilkes, 1996 [1949]).

[110] Heatly, 'Contributions'. For comparison, on Indranarayan's fate, see Gupta, *Economic Life*, pp. 199-200. On Faruhar's relationship with the Zemindar, see Gupta, *Economic Life*, p. 202. Parthasarathi's conclusions that the reason for the failure of iron manufactory efforts in India lied much on colonial policies of the state inverses the causes but maintains Heatly's stat-ist orientation of the narrative. See P. Parthasarathi, 'Iron Smelting in the Indian Subcontinent', a paper presented in *XIV International Economic History Congress, Helsinki 2006, Session 38*. Also available on-line at http://www.helsinki.fi /iehc2006/papers1/Partha.pdf. Accessed on 30/06/2008.

[111] Heatly, 'Contributions', p. 560.

[112] Heatly, 'Contributions', p. 561.

steadfast. Possessed with the military and fiscal tools of coercion, the speculator also had better chances to withstand these forms of resistance than Indranarayan.[113] However, Farquhar decided to quit the project himself in 1789. Heatly does not mention why. The *Chuar*s did not exist in the colonial historiography of the early Birbhum iron ventures.

Among the strands of literature which do consider the agency of the *Chuar*s, the most popular interpretation comes from the subaltern historiography. It interprets all sorts of peasant and artisan insurgencies within a dialect of hegemony and resistance.[114] The language of opposition, however, assumes a shared object of contestation. It speculates that because land and other resources mattered to the profit seeking Company officials, local moneylenders and merchants, it must have mattered to the *Chuar*s. It is also implicit in the assumption that the value thus accorded to resources by the parties in conflict should also be mutually comprehensible. This important assumption should be re-considered because different societies have developed different ways to negotiate natural constraints. Accordingly, they have also evolved a variety of ways to manage their resources, principally in the ways they relate and regulate access to the common resources such as land, forests and water. In interpreting the frequent excursions of the *Chuar*s as symbolic manifestation of their resistance to the colonial dominance, the historians have fallen into a kind of universalism which overlooks the myriad ways societies and people define and configure their relationships with natural resources.

Another study, which focuses on the context of colonial appropriation of the forests in Bengal, has interpreted the *Chuar*s' incursions as 'a politics of place' or a part of their territorial struggle.[115] While these movements did have territorial dimensions in that they traversed only those places which were once forests, their politics was more than a conflict about territory *per se* as their distinct relationship with resources reveals. The *Chuars*, as a later anthropologist noted, were neither settlers nor the settled. The notion of private ownership or permanent occupation of natural resources was absent in them.[116] They perceived all the resources including land and forest as communal, not even village-owned, and their use was essentially

[113] Farquhar was given Rs 15000 to start casting the first shots. BBR to BPRC, 6/07/1779 (BL: *IOR/G/6/14*).
[114] Guha, *Elementary Aspects of Peasant Insurgency*. For an illustration to this approach, see James C. Scott, *Domination and Arts of Resistance: Hidden Transcripts* (New Haven: Yale University Press, 1992).
[115] Sivaramakrsihnan, *Modern Forests*, pp. 53-58.
[116] One recurring theme in the documents dealing with these *Chuar*s is about their 'recent' arrival in any given area. It is indicative of their intrinsic mobile lives than of a particular pattern of migration. Similar absence of territorial divisions among the indigenous people has also been noted in the Nilgiri Hills. See N. Bird-David, 'The Nilgiri Tribal Systems: A View from Below', *Modern Asian Studies*, Vol. 28, No. 2 (1994), pp. 339-355.

transitory.[117] A key to understanding the relationship lies in their way of reclaiming a new landscape. They would always 'go there in a body' and settle under the leadership of the *Mandal* or *Manjhi* chosen by the people to administer the rights, rules, and ceremonies of the community.[118] The *Manjhis*, their community territorial heads, had responsibility to preserve the communal relationship with the land they happened to be at any moment.[119] This relationship was at variance even with prevalent Hindu or Mughal notions of proprietorship. While among the latter, rights of access/use was predicated on exclusive ownership rights, such notions were alien to the *Chuar*s.[120] Thus, if the Zemindars pressed them too hard for rent for occupying or leasing a site, 'they immediately left the place and settled elsewhere'.[121] They paid tax in proportion to their use of resources, but they fought against all forms of government which perceived or used the rental demands to restrict their customary access to the forest resources.

The *Chuar*s had additional reasons to object to the colonial projects. The Zemindars and the local iron-estate holders had always conceded their ownership claims in the past. They had accommodated the *Chuar*s' excursions into iron mines. In that they decided to adopt what Nandita Sahai has called 'appropriate' tradition-dictated measures. The sovereigns opted to behave in the ways their subjects expected them to.[122] The Company's arrival in the province as revenue administrator was, however, a qualitatively different event. The Company officials not only disregarded the customarily assigned 'appropriate' conduct of the rulers, they also ventured to create rules that did not fit into the expectations of the ruled. This infringement to customary relationships made all those living with the norms of that custom

[117] Verrier Elwin says that 'there is no private ownership in the pits [among the *Agaria*s]; there is not even village ownership...Within their clan the *Agaria*s are friendly, cooperative and closely interrelated people'. Elwin, *The Agaria*, p. 176. The sense of communal ownership based on use and not based on possession was widespread. On similar sense among the iron smelters Asurs in the southern Bihar, see S. C. Roy, 'The Birjhia Asur of the Ranchi District in Chota Nagpur', *Journal of the Bengal and Orissa Research Society*, Vol. 12 (1921), pp. 147-163.

[118] L. S. S. O'Malley, *Santal Parganas*, p. 107.

[119] Sen, *The Santhals of Jungle Mahals*, p. 39. 'Tribal land use was typically understood in terms of stewardship and responsibility, rather than ownership. Land was to be used, but not destroyed. Resources could and should be taken from the land, but logic and spiritual necessity dictated that the land had to be left in a sustainable and natural state….Land ownership and tenure was not fixed or unalterable as in surplus-based societies where control over prime real estate or resources could bring enormous personal wealth, prestige and authority'. See Ken S. Coates, *A Global History of Indigenous Peoples: Struggle and Survival* (Hampshire: Palgrave Macmillan, 2004), pp. 50-51.

[120] Hence, Elwin saw *Agaria*s from three villages working a single mine. Elwin, *Agaria*, p. 176.

[121] L. S. S. O'Malley, *West Bengal District Gazetteers*, *Midnapore* (Calcutta: Bengal Secretariat Book Depot, 1911), p. 59.

[122] Nandita Prasad Sahai, *Politics of Patronage and Protest: The State, Society, and Artisans in Early Modern Rajasthan* (New Delhi: OUP, 2006). In her work, Sahai shows how the Rajput royalties in Rajasthan kept well within the roles assigned by tradition and acted in the ways as expected by the artisan groups under their jurisdiction. Whenever any ruler violated such expected roles, the artisan groups rose to rebellion. Soon the royal office would have to retract their actions. The notion of 'appropriateness' governed all traditional social relations.

distrustful to the Company government.[123] The Zemindars and other local elites, who shared mutually comprehensible notions of property with the Company officials, reacted to the colonial interference by resorting to intrigues and 'collusion'. The *Chuar*s, whose relationship with resources was a loose agglomeration of use and rituals, responded to it by intensifying their recursive runs within their territories.

The pivotal role of the *Chuar*s in the story of early iron ventures in Birbhum can be understood by fully appreciating the vulnerability of the Company Government at the frontier. The Government's plans and policies designed in Calcutta and Burdwan met with unexpected twists and turns partly because the Government had to depend on other agencies to execute its programs. There was instead a large room for what C. A. Bayly has called 'Indian agency' at the fringes, which shaped the outcomes of various colonial interventions. The local agency was, however, 'split into many arms'.[124] These many-headed contests created a tense landscape that was susceptible to the tremors of *Chuar*s' movements.

This Chapter has shown that the *Chuar*s retaliated against exogenous attempts to restrict their access to iron resources. The Rajah's officials and itinerant merchants always taxed them on their produce. But the *Chuar*s began protesting when the Rajah 'farmed out' mines, workshops (*saal*s) and marts (*aurung*s) in the 1770s as he turned into a Company Farmer. To the extent these renting practices did not limit the *Chuar*s' access to their traditional resources, nothing happened. But when the subcontracting system came imbued with an implicit notion of monopoly, as clearly expressed in Farquhar's case, the *Chuar*s became restless. In responding to this idea of exclusivity, the *Chuar*s could have either retreated to other mining and smelting areas or resisted these attempts as vigorously as they could. They acted in a customary manner. They moved into these places in great numbers and reclaimed the spaces by literally de-constructing the ironworks and marts. By reacting thus, they undid the narrowing down of their relationship with iron resources into a grid of property and kept it both open and possible.

[123] On the normative value of tradition, see E. Shils, *Tradition* (London: Faber, 1981), pp. 12-33.
[124] C. A. Bayly, *Indigenous and Colonial Origins of Comparative Economic Development: the Case of Colonial India and Africa*, Policy Research Working Paper 4474 (Washington D. C.: The World Bank, 2008), p. 8.

Chapter 3
ORGANISATION
SALT MANUFACTURE IN THE SUNDARBANS, 1765-1780s

Introduction

In the previous chapter, we saw that the Company's Bengal Government encouraged private speculators to 'farm' iron mines and marts. The Government approached the questions about production and trade of salt differently. In this case, it developed an elaborate institutional arrangement to lay exclusive control over the manufacture and inland trade. The Bengal salt policy required all salt to be made *for* the Government and only with its express permission. In practice, this monopoly was enforced in two ways. First, the Government attempted to confine all manufacture to areas closely managed and supervised by its own Agencies. The annual production of over 4 million Maunds (Mds), or one-sixth of the total brine salt produced in Great Britain in 2009, speaks of the extraordinary scale and complexity involved in the attempt.[1] Second, the Government developed a legal and organisational framework to prohibit all private manufacture and trade of salt in the territory. This gave rise to the phenomenon of illicit salt, to which I will return in the next chapter. The topic of this chapter is the rise of the monopoly of salt manufacture itself.

Existing accounts interpret the Bengal Government's salt monopoly in terms of its wider political and economic rationale and effects. Based on their core concerns, these accounts can be classified into two broad groups. The political-economic narrative frames the salt monopoly within a more general theory of colonisation of the Indian economy in the period. In simple terms, the theory suggests that the Company's Governments began controlling the production and distribution of goods and services, and shaping the local financial institutions in order to consolidate their rule and their profits in India. Accordingly, the narrative interprets the monopoly as the Bengal Government's coercive strategy of appropriating the huge margin between the cost of production and the market price of salt. The central occupation of this narrative is politics in the colony.

The economic-historical narrative sets out to explain the colonial economy. It links changes in the output and in social organisation of salt manufacture to changing demand. While not always referring to the Government's monopoly policy, it places the market at the heart of its explanatory scheme. Thus, one version of it takes the

[1] The annual brine salt production of the Great Britain was 1,000,000 metric tonnes. See Brown et al, *World Mineral Production 2005-2009* (Nottingham: British Geological Survey, 2011), p. 84.

emergence of long distance trade and the integration of disparate market places as key driving forces in altering the local salt making scene. The colonial state had no role in the development. In another version, the partisan tariff policy of the colonial state killed indigenous salt production. Both literatures agree that as a Government-managed venture, the nature of Bengal salt manufacture can be explained simply by referring to the Company's profiteering aims. The consensus in the existing understanding is that salt manufacture was an unproblematic and unambiguous case of colonial production in India.

This chapter challenges these views by examining the everyday effects of the Government's monopoly on local salt manufacture in the 1780s Sundarban salt fields. It enquires into the monopoly in terms of how it actually functioned in the salt farms rather than what politico-economic purpose it served the Company Government. I analyse the system of monopoly in terms of its constituent elements: the people involved in the salt manufactories, the contexts that constrained or facilitated their actions, and the day-to-day events that made the world of monopoly. Such an intimate analysis will help me to differentiate group characteristics of the salt makers on the one hand from those of the iron smelters, and on the other, from the agricultural farm workers (*Ryots*). The analysis will reveal with what sorts of capital and institutional investment the Government organised and managed its monopoly. It will show the changes brought by the monopoly to the extant organisations of salt manufacture and to existing socio-economic relations. Lastly, it will also allow me to portray the responses of the salt manufacturers to these socio-economic and political changes.

In the first section, I provide a brief background of how the Government arrived at the Agency System of monopoly manufacture in 1780. This pre-history of the monopoly will reveal the contradiction in the Government's aims to profiteer recklessly and to rule justly. In the second section, I look more closely at the Agency salt fields in Roymangal, one of the early six salt divisions in Bengal in the 1780s. My aim here will be to show how the landscape of manufacture was affected by the Government's contradictory objectives. I show that the inconsistency manifested itself in the clashing and colluding forces among the Government salt officials, its revenue and judicial officers, local landholders, merchants and contractors. Such a dynamic context in the salt fields paved the way for the increasing control over the manufacturers by the Government as it squeezed out numerous intermediaries in the local salt organisation.

The third section will focus on the manufacturers. I show that their occupational characteristics and social capabilities were diverse. The diversity was also reflected in their responses to the new arrangements under the monopoly. I conclude by arguing that the local political geography and socio-economic terrain threw up specific opportunities and constraints. The manufacturers' diverse personal, physical and material capabilities strongly shaped their reactions to this development. The salt monopoly, far from being an unproblematic strategy of the Company, was an ever evolving and tentative set of experiments both for the Government and for the local salt population.

Beginnings of the Salt Monopoly, 1765-1780

Before 1765, the Company's servants in Bengal had commercial interests in many everyday commodities besides salt. The Mughals allowed them to deal with tobacco, betel nut and other commodities solely for overseas trade. The Grant of *Dewany* in 1765 gave the Company's Bengal Council a basis to demand privileges for its inland trade. On the same basis, the Council also claimed monopoly over the inland trade of salt. As I describe briefly in this section, the extant administration of the Nabab in Bengal severely contended the claim.

How the Company men legitimised their claim tells a story of how the colonial government emerged during that period of contest. The new sense of authority also led the Council to conduct a series of trials to stabilise profits from the salt trade. In 1780, the Governor General and Council asserted the monopoly over the manufacture and trade of that article by declaring the Agency System. The System was a new legal and organisational structure of salt making and trading in Bengal. In this section, I discuss the how the System was made and how it dramatically altered the local organisation of salt making.

The southern frontier of the 700-mile long Gangetic and Brahmaputra Delta, from the mouth of the river Hugli in the west to Chittagong in the east, was the landscape of intensive salt manufacture in the eighteenth century. Numerous meandering channels crisscrossed this landscape. These rivers then passed through the extensive, wild marsh woodland of the Sundarban before emptying into the Bay of Bengal.[2] The dense forest cover, high population of tigers and alligators, and the

[2] The Sundarban covers about 10,000 sq. km. today sixty percent of which lies in India, the rest in Bangladesh. See *World Heritage Nomination: IUCN Summary, April 1989*. Available at http://whc.unesco.org/archive/advisory_body_evaluation/452.pdf. Compare with the Dury Wall Map of Bengal and Bihar (1776). For its coverage during extensive and difficult 'colonisation' in the 1870s, see H. Beveridge, *The District of Bákergunj: Its History and Statistics* (London, Trübner & Co., 1876), p. 24; J. C. Jack, *Bengal District Gazetteer: Bakarganj* (Calcutta: Bengal Secretariat Book Depot, 1918), p.

unavailability of fresh water made the Sundarban inhospitable.[3] The people involved in salt production came from the low-lying plain north to the woodland. The plain was filled with trees, rivers and cross-channels (*done*s or *khal*s), and swamps (*bil*s). It was dotted with scattered homesteads and marts.

The entire region was famed for its paddy, betel nut, salt, sugar cane, date palm and timber.[4] However, frequent inundation by the sea and the continuous shifting of river courses forced its inhabitants to change their homes and places of trade on a regular basis.[5] Migration and reclamation of the new alluvial accretion (*chur*s) are thus two recurring social demographical features in the region. The extreme and ever-changing geography exposed the salt farms to the vagaries of weather and contributed to the difficulty in organising labour.[6]

Easy access to the brine and the dense vegetation, however, made the region attractive for salt making. By the 1750s, thousands of men worked in numerous widely dispersed salt concerns.[7] The local salt making technique essentially consisted of trapping the brine and boiling or evaporating it to a supersaturated state.[8] Diverse sets of tools and techniques were in use, but the processes were labour intensive everywhere. The working environment, being hot, humid and close to the wild animals, was unwholesome and dangerous.[9] The salt season varied considerably throughout the region, but usually spanned the winter and ended everywhere with the arrival of the monsoon at the end of May or the beginning of June. The first rains would bring the salt people back from the Sundarban frontiers to the wet farmlands.

As a household culinary article, salt was in high demand everywhere. However, its production took place only in the coasts or in specific salt rock mines. Its manufacture and transportation was a lucrative business. Before 1757, the Mughals did not allow the European merchants to conduct the inland trade of any commodity. The Company merchants and officials profited by using local merchants as proxies.

164; *J. Westland, District of Jessore: Its Antiquities, Its History and Its Commerce* (Calcutta: Bengal Secretariat Office, 1871), pp. 226-234. In 1930, the Sundarban constituted 6526 sq. miles. See K. V. Saha, *Economics of Rural Bengal* (Calcutta: Chuckervertty, Chatterjee & Co., 1930), p. 14.

[3] Jack, *Bakarganj*, p. 54.

[4] Jack, *Bakarganj*, p. 9.

[5] For instance, the old towns of Noakhali, Meenday and Santasheela are now washed away. See William Schendel (ed.) *Francis Buchanan in Southeast Bengal* (Dhaka: University Press Limited, 1992), pp. 9-10.

[6] Sugata Bose, *Peasant Labour and Colonial Capital: Rural Bengal since 1770* (Cambridge: CUP, 1993), pp. 8-37.

[7] J. K. Nag, 'History of Bengal's Salt Industry', *Modern Review* (Sept., 1939), p. 300.

[8] Radhamadhab Shaha, 'Saltworkers of Nadia, 1785-1795', *Bengal Past & Present*, Vol. 83 (Jan.- Jun., 1964), pp. 25-31; A. M. Serajuddin, The Condition of the Salt manufacturers of Bengal Under the Rule of the East India Company, *Journal of the Asiatic Society of Bangladesh*, Vol. 18, No. 1 (Jun., 1973), pp. 55-71.

[9] Archibald Keir, *Thoughts on the Affairs of Bengal* (London: 1772), pp. 63-64; *Two Reports on the East India Salt Monopoly* (Liverpool: Pr. George Smith, 1838), pp. 7-9.

The military victory at Plassey in 1757 emboldened the Company's European servants. They now claimed a privilege for a duty-free country trade in salt and often resorted to violent means to enforce the demand.

After getting the *Dewany* in 1765, the Company's Council in Calcutta perceived itself as the Government and assumed its exclusive right to the trade. The move 'legalised' the personal ventures of its men and broadened the Company's portfolio.[10] Having already got a foretaste of the salt profit, the Court of Directors in London now stipulated the minimum annual profit of £120000 sterling from the salt trade.[11] The Court seems to have hastily assumed that the *Dewany* made the Bengal Council's claim on the salt trade legitimate.

The Calcutta Council legitimised its claim by arguing that the Mughals had enjoyed such a privilege and the Government now possessed it through right of succession. The Mughal's representative in Bengal, the Nabab, and some of the Company's own senior employees, who had negotiated with the Nabab on the terms of the *Dewany*, disputed the interpretation.[12] Nonetheless, the Council formed a Society of Trade in August 1765. All members of the Council and many influential Company servants were members of the Society. The Council decreed that all producers and merchants must sell salt to the Society at a stipulated rate and at fixed places. It prohibited all persons, natives and Europeans, from dealing in that article.[13]

The Court of Directors in London responded to the Council's move ambiguously. It endorsed the Council's assumption of the trade monopoly, but it strongly disapproved the formation of the exclusive Society. In May 1766, it ordered the abolition of the Society, partly on account of the Nabab's remonstrations and partly because the Directors believed the Society's profiteering scheme was 'illicit', 'too provocative', 'disgraceful', and below 'their dignity'.[14] The Society 'relinquished' its privilege in September 1768.[15] Yet the Council construed the Court's directive only to

---

[10] On pre-1793 history of salt trade, see BL: *IOR/H/205*, pp. 273-313. This is a summary based on two parliamentary reports. See *Fourth Report from the Committee of Secrecy Appointed to Enquire into the State of the East India Company* (London: House of Commons, 1773); *Ninth Report from the Select Committee Appointed to Take into Consideration the State of the Administration of Justice in the provinces of Bengal, Bahar, and Orissa* (London: House of Commons, 1783). For other pre-1793 land revenue histories, see W. W. Hunter, *Bengal Ms. Records: A Selected List of 14,136 Letters in the Board of Revenue Calcutta, 1782-1807*, 4 Vols. (London: W. H. Allen, 1894); A. M. Serajuddin, *The Revenue Administration of the East India Company in Chittagong, 1761-1785* (Chittagong: University of Chittagong, 1971); Manas Kumar Santra, *Land Revenue Administration in Bengal under Early British Rule: A Case Study of Birbhum District, 1765-1820* (Delhi: Sharada Publishing House, 1994).

[11] Governor General's Minute, 24/09/1776 in *Ninth Report*, pp. 305-307.

[12] John Johnstone to Council, 22/08/1762, 2/10/1762; Henry Vansittart and Warren Hastings to Council, 15/12/1762 (BL: *IOR/H/47*). On a legality of the claim, see Rai M. N. Gupta Bahadur, *Analytical Survey of Bengal Regulations* (Calcutta: University of Calcutta, 1943), pp. 359-360.

[13] Extract, *Bengal Select Consultations*, 3/09/1766 in *Fourth Report*, pp. 186-188.

[14] *Fourth Report*, pp. 188-193.

[15] William Bolts, *Considerations on Indian Affairs* (London: 1772), pp. 188-189.

mean that British subjects could no more engage in the salt trade *in a personal capacity*, and that its assumption of inland trade monopoly was not revoked.

The subsequent 'open and free system' allowed native merchants into the business. But they had to pay a duty of 30 Sicca Rupees (SRs) for trading 100 Mds of salt, nearly six times the duty they had paid to the Nabob's administration before 1765. The Government set a limit to the quantities of salt individual merchants could produce and trade. It also fixed the market price of the article. The Company employees continued participating in the trade through their native agents and stewards. They used, in the words of the Company officials, the 'colour of their positions' to influence low-ranking officers who collected the revenue at checkpoints along the road. Since most traffic thus bypassed the customs duty, the Government lost half its salt revenue in two years.[16] The choice between profiteering and governing was fluid in the period.

The loss of revenue prompted the Government to award a five-year contract for salt manufacture to several interested speculators. They were called salt farmers. The farmers deposited guarantee money for three-quarters of the value of their contract amount. At the end of the season, they submitted the produce from salt Farms and their balance was calculated. The salt merchants, on the other hand, committed to buying a given quantity of salt at a prescribed rate. They paid three-quarters of its value in advance to the Government. Thus without having to handle salt, the Government earned the profit that arose from the difference between the farming rate and the buying rate. To ensure the monopoly, farmers were required to sell all their surplus production to the Government.

The salt making organisation before 1780 had many layers of subcontractors. The few resourceful salt merchants, after getting awarded salt supply contracts by the Provincial Councils of Revenue, then let their salt farms to a number of subcontractors by breaking their farms into several zones. The subcontractors in turn let their individual areas to several others. A petty contractor-merchant (*Beparrie*) stood at the bottom of several such tiers of subcontractors. This man managed salt manufacture in a small parcel of land. He organised the salt manufacturers, dispatched

[16] For instance, Richard Barwell's private involvement in the Dhaka salt trade. See Henry Frederick, *The Intrigues of a Nabob (R. Barwell): Or, Bengal the Fittest Soil for the Growth of Lust, Injustice and Dishonesty etc.* (London: Author, 1780); Extract of *BRC* Proceedings, 31/03/1775 in *Ninth Report*, pp. 317-337. For Barwell's own motives, see Cecil Beadon, 'A Review Article on A Pamphlet on the Salt trade of India by D. C. Aylwin (London, 1846)', *Calcutta Review*, Vol. 7 (1847), p. 547 quoted in Balai Balui, *The Salt Industry of Bengal:1757-1800* (Calcutta; New Delhi: K P Bagchi & Company, 1985); 'The Letters of Mr. Richard Barwell-IX', *Bengal Past & Present*, Vol. 12 (Jan.-Jun., 1916), pp. 230-235.

them to the land with necessary provisions on time and ensured the stipulated production.[17]

The Council also sent its own representatives, also called Agents, to the farms to report on activities during the manufacture and to verify the accuracy of the merchants' accounts. Each Agent had native informers and peddler-buyers (*Pykar*s), who fanned out in their respective divisions counting every boiling house and recording its seasonal produce. Such supervision was imperfect as the subcontractors, manufacturers and the informers often collaborated in concealing the output and even reported deficiencies in production.[18] The Government's high wholesale price pushed up the retail price to a level at which the contractors made a profit by selling their salt clandestinely and paying the fine for producing an apparently deficient quantity.[19] This system of 'farming' increased the salt revenue five-fold to £229,192 in 1773-74. Thereafter, due to secret and underhand dealings involving the officials, earnings declined rapidly. In 1775-76, there was a *loss* of £1473.[20] After experimenting with the 'open and free system' again for three years, the Government finally promulgated the Agency System in 1780.

The Agency System formalised the Company's exclusive control of the inland trade and extended its monopoly over salt manufacture. Now *all* salt would be made 'for the immediate account' of the Company and sold at a price determined by it. To implement the plan, the Government developed an elaborate legislative and organisational scheme to control the production and traffic of the article. The entire salt manufacturing region in Bengal was divided into six Agencies. Each Agency was headed by an Agent who superintended manufacture, received salt from the producers and sold it to the merchants, collected duties on sale, seized all contraband salt, and had general charge and management of his Agency. The Agents reported to a Salt Comptroller, the highest official-in-charge of the Government's salt concerns (Chart 1). As the Government's advantage was the difference between the market price and the production costs, an annual commission proportionate to that difference was awarded to the Comptroller and the Agents. In exchange for this bonus, they were

[17] Dakshinshabajpur Agent to Dacca Council, 27/09/1775 (BL: *IOR/G/15/11*).
[18] Ibid.
[19] Selimabad reported 20 percent deficiency while Roymangal reported 37 percent less receipt of the total contract quantity in 1772-73. See *Dacca Council Proceedings* (*DCP*), 14/04/1775 (BL: *IOR/G/15/11*).
[20] For example, Radhacharan Dey unknowingly acted as a proxy for Khvaja Kowarke (or Simon Gavorke) and Michael Sarkiss in 1771. See *DCP*, 12/04/1775 (BL: *IOR/G/15/11*). Similarly, Luckiepur salt farm went through a series of sub-contracting from Balram Sharma to Jaynarrain Ghosal to Soniram Paul, whose securities were Kowarke and Sarkiss. With the latter's help, Chief of Dhaka took its possession. On proxy control of the Bhulluah salt farms, see *DCP*, 13/04/1775 (BL: *IOR/G/15/11*).

barred from engaging in the salt trade directly or indirectly, a prohibition many did not obey in practice.[21]

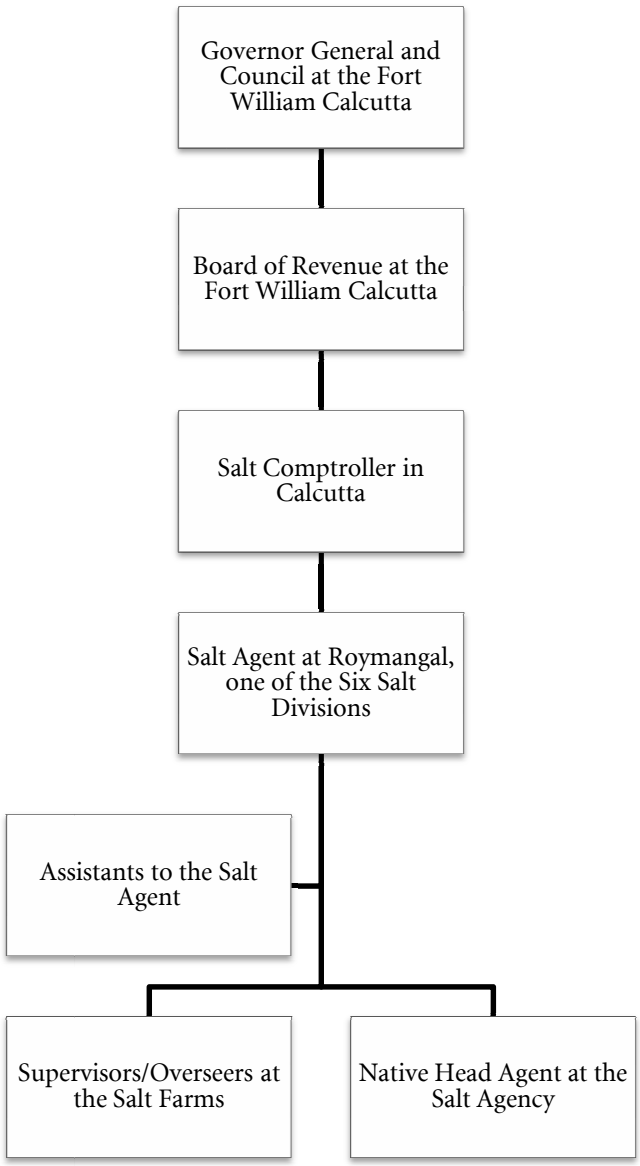


Chart 1 The East India Company's Salt Organisation in Bengal in the 1780s

After 1780, the Salt Agents made contracts directly with the *Beparries*. The contracts prescribed how the merchants should schedule production activities and organise the manufacturers and provisions. The Agents also employed several covenanted servants as Assistant Salt Agents, dozens of non-covenanted European Overseers, an 'unlimited number of servants' and a small armed force attached to the Agency to follow the activities in the salt farms (Chart 2).[22] In order to monopolise manufacture, vigorous control and supervision of the production sites became

[21] Extract of *GGC Revenue Proceedings*, 9/09/1780 in *Ninth Report*, pp. 314-317.
[22] Westland, *Jessore*, p. 84.

necessary. Elaborate measures to prevent and penalise the clandestine production and sale of salt were thus developed. In consequence, the salt officials were now more visible than ever before in the region and their influence on the local working population was more immediate.

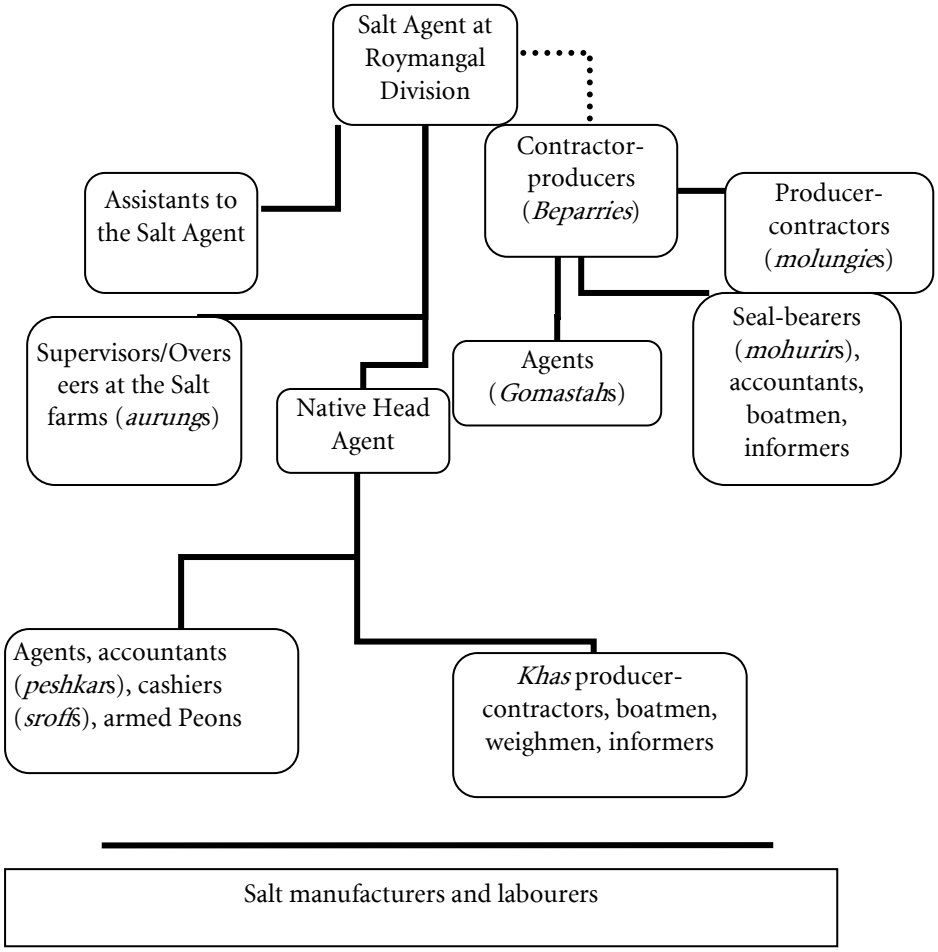


Chart 2 Organisation of the Salt Agency circa 1780s

The Landscape of the Agency Manufacture

The Agency System appeared in the salt Division of Roymangal at the same time as other developments in the land revenue and judicial institutions. The relationships among these offices, together with their interaction with local landholders and salt merchants, created a new context for the working lives of the salt makers. As Chart 2 shows above, the salt manufacturers now had to live and work in a terrain that was peopled by a variety of new actors. Some of these positions had clear designations. Others switched their roles according to circumstances. Such a dynamic context shaped the livelihood options available in the same way topography charts the possible routes for travellers. In this section, I illustrate this point by discussing the dynamics of three key relationships: Government inter-departmental feuds and their resolution;

the intrinsic tension between the Salt Agency and the salt merchant-contractors (*Beparrie*s); and the breaking up of local salt-making organisations.

The feuds among the local salt, revenue and judicial branches of the Bengal Government originated chiefly due to ambivalence about the Company's project in the colony. In the 1780s, the Company was unclear about whether its activities should be limited to making profits from the revenue collection tasks or be diversified to erect a sound government such that the same could be achieved without coercion. Accordingly, the Bengal Government wanted to establish courts and magistracies as well as revenue collection offices and customs check points. The contradiction presented opportunities for some salt manufacturers to air their grievances or to choose new occupations. Other more vulnerable ones experienced these departmental clashes in the form of oppression. This point is illustrated by the arrival and activities of the Judge-Magistrate Tillman Henckell in the Salt Division of Roymangal in 1781.

Henckell's duty was to deliver security and justice to the local population.[23] But his authority was strongly circumscribed in matters related to the Company's commercial establishments. He could not summon anyone working in these establishments without the permission of the Company's local Agent or Resident.[24] His terms of reference show that the Government still prioritised commercial interests over its desire for just rule.

Henckell's judicial and welfare proposals soon led to confrontation with the local Salt Agent, Simon Ewart.[25] After Henckell's arrival, the salt boilers and labourers began complaining about the Agency's forced advances, confinements and physical abuse. He duly sent summonses to the accused men. But Ewart often detained his messengers and helped the accused to abscond. When Henckell complained to the Board of Revenue, it asked the Agent for explanations but did not act. Nevertheless, the local salt-making population increasingly looked up to Henckell as an alternative authority who might deliver them from the Agency's injustice.[26]

---

[23] On Tilman Henckell's career, see BL: *J/1/7 f. 114*; *East India Company's List of Servants* (1782), p. 6 and Westland, *Jessore*, pp. 94-96. Henckell was buried in Calcutta on 20/03/1800 (BL: *N/1/5 f. 351*).

[24] GGC to Henckell, 5/12/1781, 16/04/1782, 26/07/1782 in Westland, *Jessore*, p. 83. Similar injunction applied to the Collectors. See *Modification of the Salt Regulations*, 10/12/1788 in Narendra Krishna Sinha (ed.) *Midnapore Salt Papers: Hijli and Tamluk, 1781-1807* (Calcutta: West Bengal Regional Records Survey Committee, 1954), No. 17, p. 14.

[25] These proposals met various fates. On establishing permanent sepoy stations, see Magistrate to GGC, 2/04/1782; GGC to Magistrate, 29/06/1782 in Westland, *Jessore*, p. 74. On the scheme of 'convicts colonies' in the Sundarban, see BBR to Magistrate, 30/09/1785; Magistrate to BBR, 22/11/1785 in Westland, *Jessore*, p. 82. On the plan to reclaim the Sundarban forests for rice cultivation, Frederick E. Pargiter, *A Revenue History of the Sundarbans, from 1765 to 1870* (Calcutta: Bengal Secretariat Press, 1885).

[26] For a case of flouting, see Jessore Magistrate to BBR, 12/05/1785 and 23/05/1785; BBR to Agent, Roymangal, 26/11/1785 in Westland, *Jessore*, p. 86. For a case of absconding, see Jessore Judge to BBR,

Henckell devised the 'Sundarban Plan' to extend cultivation by reclaiming the Sundarban woodlands.[27] He and the lease holders (*Talookdar*s) of these new agricultural lands (*Talook*s) wanted the labouring population to settle there. Ewart needed the men in the salt fields and often went to the *Talook*s with his armed retinue to 'procure' them. In November 1787, when a *Talookdar*'s manager declined to give the labourers up, Ewart's followers fired at them, killing one and severely wounding another. Henckell portrayed these events as 'crimes', while the Board of Revenue took them as 'confusions'.[28]

Another bone of contention between the salt and revenue departments was the zone of fertile alluvial accretions (*chur*s).[29] Salt officials claimed these formations for growing fuel and for future extensions of their salt fields (*jarra*). The neighbouring landholders lobbied the revenue officers for compensation from the salt office for loss of future earnings and for the investment needed to make the lands cultivable again.[30] Since the *chur*s were also an attractive destination for the migratory population, the outcome of this conflict would determine whether the settlers would be making salt or cultivating paddy.

In the mid-1780s, the Bengal Council asked the Salt Comptroller to suggest measures to resolve these feuds. Understandably, the Comptroller preferred keeping the salt business unimpeded. In his opinion, the Agent could hold back the Magistrate's summonses and ask for an adjournment if carrying out the order hampered salt production.[31] The Council approved the Comptroller's recommendation despite Henckell's protests. Its concern for profits overrode the aspiration for the rule of law.

But Henckell's reports on the Agency's extortion, kidnapping of children and indiscriminate seizure of boats received far more attention after the 'humanist' Lord Cornwallis became the new Governor General in 1786.[32] Encouraged by Cornwallis' appointment, Henckell suggested that the 'inhuman' classes of *Beparrie*s and *Molunghie*s should be removed from the salt organisation. The landholders should be engaged to supply labour in the salt fields. The positions of the revenue (the Collector)

12/10/1784, 29/10/1784, 14/11/1784, 5/03/1785 in Westland, *Jessore*, pp. 85-86. For a case of ignoring, see Jessore Magistrate to BBR, 12/05/1786 in Westland, *Jessore*, p. 86.

[27] In 1785, Henckell issued 150 leases for the new cultivation. See L. S. S. O'Malley *Bengal District Gazetteers*, *24-Parganas* (Calcutta: Bengal Secretariat Book Depot, 1914), p. 47.

[28] Jessore Magistrate to GGC, 20/11/1785, 15/12/1785 in Westland, *Jessore*, p. 87.

[29] Tipperah Collector to BBR, 14/05/1811 in Ratan Lal Chakraborty and Haruo Noma (compilers) *Select Records on Agriculture and Economy of Comilla District, 1782-1867* (Dhaka: JICA, 1989), pp. 93-101.

[30] On the contest for the *chur* lands, see Tipperah Acting Collector to BBR, 23/11/1802 in Chakraborty and Noma, *Comilla District*, pp. 92-93.

[31] Westland, *Jessore*, p. 89.

[32] Jessore Judge to GGC, 4/2/1787, 20/04/1787 in Westland, *Jessore*, p. 89.

and salt administrator (the Salt Agent) should be merged.[33] Contracts should not be forced upon the salt manufacturers and regular courts should be established for hearing their grievances. So inspired was the Governor General that the Council inscribed many of these proposals in its 1788 Rules on the conduct of Salt Agents.[34] The Council also divided the Roymangal Division into two, giving its western half to Henckell to 'execute the humane purposes of the plan'.[35]

The Council's reforms led the *Molungie*s and manufacturers to believe that there were two systems in their Division, and that men living in one half could not interfere in the affairs in the other half.[36] Furthermore, salt workers from the adjacent Agencies began migrating to Henckell's Division. The exodus rendered several manufactories devoid of men. The Salt Comptroller remonstrated that the reforms endangered monopolistic production. The Board of Revenue feared the same.[37] Feeling the pressure, the Council cautioned Henckell to act 'prudently' and to confine his 'humane' reorganisation as a small area experiment.[38] Again, the Council's *resolution* turned out to be vacillating between pure greed and lofty humanity.

The Government's interdepartmental feuds and their resolution shaped the livelihood options of the Roymangal salt makers. In order to safeguard its commercial interests, the Government had to exert perfect control over the labouring population in what became a labour-scarce Division. To uphold notions of justice and order, it had to protect the population from coercive engagements and extortions. Both salt and revenue departments, motivated in part by the promise of commissions, sought to maximise their revenues by extending manufacture and cultivation, respectively. These developments facilitated or impeded the mobility of the manufacturers. In some cases, they shaped their occupational choices. Elsewhere, they determined whether arbitration would be available to the salt workers.

The Agency System brought the salt officials and the merchant-contractors (*Beparrie*s) ever closer. While their quarrels and complicity had their roots in the previous salt-farming decades, a newfound immediacy intensified these relationships. Many of the Agency workings challenged the *Beparrie*s' customary roles and practices.

---

[33] Jessore Collector to BBR, 20/07/1787 in Westland, *Jessore*, pp. 89-90. The merger would later result in creating the so-called Salt-Districts in Hidgellee and Tamluk. Also, see Bhaskar Ghose and Sanat Kumar Bose (eds.) *Midnapore Correspondence of the Salt Districts. Hidgellee Salt Division: Letters Received* (Calcutta: Superintendent Government Printing, 1971).

[34] Regulation XXIX of 1793. On Cornwallis' 'humanism', see H. R. C. Wright, 'Reforms in the Bengal Salt Monopoly, 1786-95', *Studies in Romanticism*, Vol. 1, No. 3 (1962), pp. 129-154.

[35] GGC to BBR, 3/09/1787; BBR to Collector, Jessore, 21/09/1787 in Westland, *Jessore*, p. 90.

[36] Hassarie Molungie's Testimony, 29/10/1787. *Petition RCD*. See *Appendix A* for a list of Petitions used in this chapter.

[37] 24-pergunnahs Agent to Salt Comptroller, 28/01/1788; Salt Comptroller to BBR, 25/1/1788 (BL: *IOR/P/51/16*).

[38] *Revenue Department Resolutions*, 11/2/1788 (BL: *IOR/P/51/16*).

The dynamic relationship between the two presented some salt manufacturers with opportunities, while to others it created accidents and misfortunes. This point requires some elaboration.

The Roymangal *Bepparie*s had three grievances against the new procedures introduced by Ewart's Agency. In 1782, the Agent's Overseers began calculating the weight of freshly made salt by volume. Instead of weighing the salt in a balance, they measured its depth in the oblong cisterns with a Brass hand-rule (*Hautcatty*).[39] The new way of inferring weight without physically handling salt was incomprehensible to the salt makers. Informed by their field officers, the *Beparrie*s alleged that the *Hautcatty* was an instrument to extract more salt from them. This was the *Beparrie*s' first complaint.

Second, the *Beparrie*s alleged that the Agency officials unilaterally prepared the salt production and delivery accounts. Their Molungies and weighmen (*Kyal*s) were not now allowed to cross check and certify (*adul*s) these accounts. If they evaded signing these accounts, the Agent would retaliate by forcing ('stressing') them to sell the salt droppings *Gutcha* and *Juggua* at his rate. The droppings were formerly allowed to the salt manufacturers and workers.

Lastly, Ewart's decision to prolong the salt making season had increased costs. In pre-Agency days, the February to May season permitted workers to return to prepare the paddy fields just before the onset of the monsoon. The new December to June schedule kept the labourers in the Sundarban longer. The longer duration also meant more instances of sickness and death among the salt workers. The new schedule had thus increased their labour costs. The *Bepparie*s accused the Agent of coercing them into contracts on the older, less advantageous, terms, rather than granting concessions for elevated labour costs. One *Beparry* spoke of Ewart's 'machine', which he used to bind and flog the people unless they signed the accounts.[40] In short, according to the *Beparries*, the Agency System brought mistrust, arbitrariness and physical abuse to the process of salt manufacture.

Ewart's response to these allegations reveals how the salt officials perceived the principle, practice and priorities of the salt monopoly. He clarified that the introduction of what an imperial historian would later call 'a scientific and regular system of field administration in the manufacturing zones' was to stop 'many real abuses, much uncertainty and inconveniences' caused by the *Beparrie*s.[41] He

[39] *Instructions* to the Agency's Overseers, Roymangal, 11/12/1786 (BL: *IOR/P/51/24*).
[40] *Petition NDB.*
[41] L. S. S. O'Malley, *Bengal District Gazetteers, Khulna* (Calcutta: Superintendent Government Printing, 1908), p. 44.

considered the heaps of salt in the heart of an inaccessible Jungle as the chief site of fraudulence. His object in constructing the cisterns in the salt lands was to take control of the fresh salt promptly.

The Brass Gauge was used to conceal the output from the manufacturers. He defended the necessity of the tool by arguing that the manufacturers left the woods whenever they 'imagined' they had fulfilled the (contracted) quantity. Ewart denied unilateral book-keeping. Instead, he charged that complainants themselves stayed away from the cistern premises because they were 'shamefully deficient' in their duty and were found to indulge in 'secret manufacture'.[42] As for prolonging the manufacturing season, his decision was based on sound principles. He claimed that the 'mud' collected in January to March was of superior quality and that the manufacturers could be sent to the woods by mid-December without losing 'a blade of Corn' in the country. The necessity of detaining them longer in the salt fields arose 'from their deficiency in manufacture', which sprang from the *Beparrie*s' 'designed neglect'.[43] In other words, the Agent viewed the *Beparrie*s as unreliable and designing people.

The tussle between the Agency and the *Beparries* left physical and emotional marks on the salt manufacturers. The manufacturers loyal to their *Beparries* were severely beaten when they asked for figures on their output and balance.[44] They feared that the new way of measuring weight disadvantaged them. While the Agent's instruction to the Overseers required that the salt was 'well trod down', the officials simply pressed their palm at the four corners even for the 'more exact measurement'.[45] No officials actually had verified the accuracy of the prescribed method. One of them even conceded that there might be discrepancy between the calculated and actual weights of salt. Yet the salt makers were beaten, put in chains, convicted and forced to work free for alleged deficiency.[46] The Overseers believed the violence to be routine and customary. They glossed over the fact that the manufacturers entered into contract with the *Beparrie*s and not with the Agency.[47]

This evidence of conflict between the Agency officials and the *Beparries* should not be construed to mean that the relations between these parties were always

[42] Roymangal Agent to C. Burrowes and T. Brooke, the Commissioners, 13/10/1787 (BL: IOR/P/51/24). The Agency officials by forging documents claimed that the *Beparrie*s had consented to the use of *Hautcatty*. Roymangal Agent to Commissioners, 13/10/1787 (BL: *IOR/P/51/24*). On forging, see Deposition of Nundkishore Beparrie, *Petition SHM*.
[43] Roymangal Agent to Commissioners, 30/10/1788 (BL: *IOR/P/51/24*).
[44] Deposition of Santoshram, *Petition RDB*; Deposition of Ram Rutton Dauss, *Petition RDB*.
[45] Deposition of a Mr. Fanbent, *Petition RDB*.
[46] *Petition SHM.*
[47] Compare, Deposition of Andrew Starkey and Deposition of Kishore Mahomed, *his witness*, *Petition SHM.*

oppositional. Many *Beparries* were also intermediate tenants, others were landholders and some were moneylenders.[48] These men gambled their resources in the risky but highly rewarding salt business. They also used their relationship with the Agency officials and other merchant-contractors to further their gain.[49] Some paid an annual tribute (*nazarana*) of 1 Re for every salt boiling house (*Tuffaul*s) to the Overseers.[50] Others gave commission to the Agent's native representatives (*Gomastah*s) for every claim they made on the salt workers.[51] It was thus no wonder that the *Beparries* influenced the proceedings of the salt courts even when they themselves were the accused.[52] One consequence of such complicity was that despite numerous complaints of forced seizure and the extortion of money, the salt courts rarely troubled the *Beparrie*s. One *Beparrie* openly defended these practices as compensation for the additional costs he bore for the deaths and desertions in the Sundarban.[53]

The relationship between a *Beparrie* and the Agency determined the occupational space of the salt manufacturers. Whether the relationship was mutually sustaining or not, it reinforced the custom of coercion everywhere in the Division. The *Beparrie*s' violent behaviour especially during salt makers' recruitment went unchecked. The manufacturers serving the 'refractory' *Beparrie*s, on the other hand, bore the brunt of the Agency Overseers' anger. The relationship between the salt officials and the *Beparries* therefore interjected dramatic elements in the lives of the salt manufacturers under the Agency System.

The monopoly over manufacture under the Agency System called for direct control over the manufacturers and the manufacturing process. I have already showed that to establish such control, a great many intermediaries had to be eliminated. This change disrupted the conventional network of trust and obligation, and reduced the number of petitioning opportunities for the poor and vulnerable. The complete breakdown of local salt organisation would take several decades, but we can detect the signs quite early on.

In the 1780s, the salt production organisation in Roymangal was a mix of old and new elements. The Salt Agent advanced money to the *Beparries* and ensured that the latter entered into contract and passed on the advances to the *Molungie*s. The *Molungie*s then brought the salt makers together and supervised the salt making

[48] Deposition of Jeetun Molungie and Deposition of Ashoorie Molungie, *Petition SBB*; Deposition of Gocul Chuckerbutty, *Petition MCS.*
[49] Deposition of Gocul Chuckerbutty, *Petition MCS.* On a conflict between two *Beparrie*s, *Petition RDGR.*
[50] Deposition of Mr. Fanbent, *Petition RDG.*
[51] Deposition of Rogonaut Ghose, *Petition SBB.*
[52] Deposition of Guddie Chung, *Petition MBC.*
[53] Deposition of Prawnkissen Goo, *Petition BCC.*

processes. The Agency officials also oversaw the manufacture but they did not directly engage the *Molungie*s and other salt makers. Nonetheless, the Division also had a few *khas Molungie*s, who were employed directly by the Agency.[54] The salt officials increasingly favoured the latter, direct, mode of contracting as it allowed closer policing of salt labour and technique. Indeed, many intermediaries had been squeezed out of the system by 1800. Some of these men had been independent salt producers and holders of *Khallarie* lands. Others had been tenants or sub-tenants (*Etmamdar*s or *Hodahdar*s) of the salt lands, who employed the salt boilers (*Maihandar*s).[55] The monopoly now forced them all into illicit business.[56] The head manufacturers (*Sirdar Molungie*s) had led and protected the salt makers from the coercion of the *Beparrie*s or the Agency in the past. They used to be instrumental in organising group protests such as mass desertions. But under the Agency System, they became considerably weaker.[57]

A brief outline of the *Ajoorah* salt tenure in the Tamluk and Hidgellee Agencies will illustrate the effects of these changes in the local organisation of manufacture. The *Ajoorah*s were salt manufacturers attached to a particular piece of cultivable land.[58] The *Thika*s by contrast were manufacturers by contract and were not bound to any land. About three-quarter of the total salt in these Agencies was produced by the *Ajoorah*s.[59] An *Ajoorah* paid his rent to the landholder a part in salt and a part in cash or in other cashable produce. In return, he enjoyed free access to fuel wood anywhere in the landholder's estate.[60] He also tilled the land so his 'salt farm' rent was nominal compared to that demanded from a *Thika* manufacturer.[61] These landed relations meant that the *Ajoorah*s' were aligned with their landholders. In many instances, the relationship was hereditary.

The Agency and revenue officials found the *Ajoorah*s' loyalty refractory. Everything about the *Ajoorah* tenure appeared to them 'presumptive' and 'traditional'.[62] Their frequent complaints led the Bengal Government to abolish the

---

[54] Justifying an ill treatment of one *molungie*, an Overseer said: 'I was mistaken in that I thought Hazarry was a Cordan or Kaus Molungie and had signed a contract himself [with the Company]'. Deposition of Andrew Starkey, *Petition SHM*.
[55] Sinha, *Midnapore Salt Papers,* pp. 18-20.
[56] Balai Barui, *The Salt Industry of Bengal 1757-1800: A Study in the Interaction of British Monopoly Control and Indigenous Enterprise* (Calcutta: K. P. Bagchi & Co., 1985), pp. 97-100.
[57] Barui, *Salt Industry of Bengal*, pp. 50 -51.
[58] Hidgellee Agent to BBR, 29/09/1793 in Sinha, *Midnapore Salt Papers*, No. 12, p. 58.
[59] In Tamluk-Mahisadal area, the *Ajoorah* salt production was three-fourth, while in the Hidgellee, it was even higher. See Sinha, *Midnapore Salt Papers*, p. 14.
[60] Hidgellee Agent to Bengal Board of Trade (BBT), 27/06/1793 in Sinha, *Midnapore Salt Papers*, No. 11, pp. 55-56.
[61] In Hidgellee, 7556 *ajoorah*s *molungie*s paid Rupees 812-14-15 while 2333 *thika molungie*s paid 4485-9-2.
[62] Sinha, *Midnapore Salt Papers*, p. 16.

'offensive' system in 1790. The aim was to 'alleviate' the *Ajoorah*s' conditions. It proposed equal advances to the *Ajoorah*s and the *Thika*s. It hoped that an enhanced salt contract rate would 'free' the *Ajoorah*s from their bonds to the land. But its real intention was to eliminate the influence of salt landholders.

Yet the *Ajoorah*s refused to be liberated. The Salt Comptroller found their objection 'extremely mysterious'.[63] Their discontent sprang from the damage the Government's announcement would do to their social resources. The *Ajoorah* tenure had been the 'usual mode' of salt making in the Agencies and had become fine-tuned to local conditions. The terms of the tenure reflected the different resource capabilities of the salt makers. Those having bullock paid more than those without. In contrast, the Government fixed the rent solely based on possible salt output. As salt was only one part of an *Ajoorah*s' rent, they decided the size of salt land based on the means available to them. Furthermore, they had free access to fuel, water and landholders' protection, which the salt officials found impossible to quantify.[64] The *Ajoorah*s could see that the small increase in the contract rate did not fully compensate them for their losses. Their protests against the measure soon became so widespread that the Government had to suspend its order.[65] However, the politics of the monopoly sat uneasily with the *Ajoorah*s' loyalty to the landholders. Thus the *Ajoorah* tenure was abolished again in 1794.[66]

These developments in the landscape of salt manufacture exemplify the kind of changes in the salt makers' living and working conditions in the 1780s. Without the arrival of the determined Tillman Henckell, the manufacturers would never have had the possibility of petitioning against the Agency's coercive measures. Without the plan of new settlements, they would not have had the choice of becoming cultivators. Henckell's short-lived experimental Agency offered relatively fair engagement to many manufacturers. But his feud with Ewart also cost the lives of others. The evolving relationship between the Agency and *Beparrie*s, whether they colluded or collided, increased the instances of coercion for the salt manufacturers. Lastly, the Agency System increasingly squeezed out many intermediaries from the salt organisation in its efforts to control local labour directly. The manufacturers lost considerable social capital through the change.

---

[63] Salt Comptroller to Hidgellee Agent, 9/10/1790 in Sinha, *Midnapore Salt Papers*, No. 24, p. 18.
[64] Hidgellee Agent to BBT, 27/06/1793, 29/09/1793 in Sinha, *Midnapore Salt Papers*, No. 11-12, pp. 55-60.
[65] Salt Comptroller to Hidgellee Agent, 22/10/1790 in Sinha, *Midnapore Salt Papers*, No. 27, p. 20.
[66] In 1794, the tenure was finally abolished. Tumlook Agent to BBT, 26/11/1794 in Sinha, *Midnapore Salt Papers*, No. 8, p. 187.

The Salt Manufacturers' Diverse Responses to the Agency System

In order to fully understand the manufacturers' response to the Agency System, I now consider first, what were the membership, roles, priorities and socio-economic circumstances of this occupational group, and second, how the System appeared to the manufacturers in their everyday lives. This intimate and explorative view of monopolistic salt production will reveal situations where Agency officials and local elites constrained manufacturers' choices. It will also show how the manufacturers' individual physical strength, socio-economic background and idiosyncrasies influenced their decisions.

The diverse responses of the salt manufacturers to the new arrangements under the Agency System depended primarily on the extent of their material, familial and communal support. There was considerable variety in this regard. Such heterogeneity becomes apparent when one looks carefully at the occupational group of petty contractor-producers (*Molungie*s). Some historians have referred to them as 'primary producers'; distinct from the brine boilers (*Maihandar*s/*Taffali*s/*Choolia*s) and other labourers (*majoor*s/*coolie*s). Others have included them within the term 'salt labourers', which encompasses all those involved in the salt making processes.[67]

Yet, the implications of their varying physical, social and material capabilities have not been fully explored. Consider the hereditary denomination of *Ajoorah*s. At one extreme, there was the 'Complete' *Ajoorah*. He had a bullock and a family member to assist him. At another extreme, there was the Quarter *Ajoorah*, who was infirm due to age or sickness. The two clearly had different abilities to withstand demands for greater output. The social and financial position of the *Thika*s also varied considerably.[68] Some took contracts for two or three boiling houses (*Tuffail*s). They could recruit and maintain up to sixty salt workers.[69] Their social and religious backgrounds were so diverse that they cannot even be treated as an occupational caste or as a common ethnic stock. This means that their actions cannot be explained merely by evoking their place in the local caste-hierarchy or ethnic background.[70]

---

[67] Barui, *Salt Industry of Bengal*, pp. 34-35; Meena Bhargava, 'Visibility through Resistance: The Malangis and Salt Making in Eighteenth Century Bengal', *Indian History Review*, Vol. 33, No. 1 (Jan., 2006), p. 24.

[68] On diverse types and capabilities of the *Thika*s, see Hidgellee Agent to BBT, 7/10/1795 in Sinha, *Midnapore Salt Papers*, No. 32, pp. 81-83.

[69] For a copy of the contract, see *BBR Consultations*, 24/09/1788 (BL: *IOR/P/51/24*).

[70] The manufacturers' surnames appear in a 1784 petition as Purdhawn, Doss, Mundel, Biyolee, Paik, Peramaunic and Baira. Sinha, *Midnapore Salt Papers*, p. 4. Another petition mentions Paul, Samouth, Mull, Sing (p. 32), and the third one, Dinda, Mayte, Cundoo, Pator, Jana, Sahoo, Guru, Mahana. Bhuma (p. 36). Mahatabdey of Selimabad was a Shaik, Mohammed Jullel, Collah Cawn were Muslims while Ruttun, Sety and Gannesham molunghies were the Hindus. On a common 'ethnic' stock thesis, Bhargava, 'Visibility through Resistance', pp. 24-25.

Even more significantly, the salt manufacturers did not form a single layer in the hierarchy of the salt fields. Some superintended the boiling houses and contracted to supply the requisite salt workers, while others supplied provisions and supervised other manufacturers.[71] Still others worked simply as salt-boilers and were subordinate to these supervisors/contractors. The diverse roles and material and social wealth of the manufacturers depended more on the contingency of the given moment than on any skill specialisation and shaped their reactions to the emerging system of Agency manufacture. In order to explain these reactions, it will be helpful to see the similarities and differences between them and other contemporary labouring populations.

Salt making was seasonal work. However, it was not a subsidiary source of income everywhere. In Midnapore, where landholders encouraged the *Ajoorah*s to settle down on their farms, salt making was the primary cash making activity that paid the rent even for their agricultural land. Paddy, cotton and mustard seed and other produce of farmland contributed only towards subsistence. In other words, there was no sharp division between manufacturers and general farm-workers (*ryot*s): 'all promiscuously blended together'. Yet the former only paid about the half of the land rent paid by the latter and enjoyed free access to the landholder's fuel lands.[72]

This privilege was not available to the Roymangal salt making population. There and in other districts north of the Sundarban, salt making was a crucial source of cash income. This region had always been a major paddy-exporting centre.[73] But 8 to 10 tiers of an increasing number of co-sharers in between the actual cultivator and the proprietor meant the former could not subsist on farm produce alone. They resorted to cash crops such as betel nuts and sugarcane,[74] and to other livelihood options such as fishing, boat making, boat rowing (*dandy*), seasonal farm work and wage labour as embankment project *coolie*s.[75] Working for the Salt Agencies was yet another option.[76] Their access to these other income-generating options is crucial for understanding how an individual manufacturer responded to the Agency System.[77]

---

[71] Such as Mahatabdey of Selimabad, and Gannesham (BL: *IOR/P/51/24*).
[72] Hidgellee Agent to BBR, 29/09/1793 in Sinha, *Midnapore Salt Papers*, No. 12, pp. 57-60.
[73] Jack, *Bakarganj*, p. 81.
[74] Jack, *Bakarganj*, pp, 97-100. Buchanan wrote in 1792, 'in this part of the country (Luckipore, Comilla), there is hardly such thing as a farmer'. See Schendel, *Buchanan in Southeast Bengal*, p. 8.
[75] On the importance of the betel-nuts in Bakargunj economy, see Beveridge, *District of Bákarganj*, p. 285. On the importance of the cash crops in the local economy of Comilla, see Comilla Deputy Collector to Superintendent of Survey, 2nd Division Comilla, 21/07/1865 in Chakraborty and Noma, *Records of Comilla*, p. 14.
[76] Schendel, *Buchanan in Southeast Bengal*, p. 8.
[77] *Petition SCC*. On the comparative wages in Bakarganj, in 1760, the weavers received Re. 1-8, carpenters 0-12. In 1800, the weavers were paid Re. 3, carpenters Re. 1-8. Prisoners received Re. 1-6 and allowed 'their own marketing'. See Jack, *Bakarganj*, p. 74. A salt manufacturer, on the other hand, was paid in 1787 from Re. 1-3 to Re. 0-10. Deposition of Mahatabdy, *Petition SSM*.

But, as I will show shortly, even this argument about the manufacturers' ability to decide in an economically-rational manner should be qualified.

Becoming a salt manufacturer in Roymangal in the 1780s was often more a matter of random fate and a result of arbitrary justice than any systematic pursuit of a distinct profession. The fragments of the manufacturers' lives reported below reveal as much about the coercive workings of the Government monopoly as the influence of an equally stringent non-colonial salt making structure. These details will be useful to appreciate how physical violence determined the outcome of social interactions in the salt fields. [78]

The annual salt making season began with the appearance of the Agent's messenger at the doors of local salt *Beparrie*s. He notified the *Beparries* and their *Molungie*s to attend the Agent's salt court on a specific day. On that day, the *Beparries* signed supply contracts. They stated the number of boiling houses (*Tuffauk*s) at specified sites; commited the prescribed number of manufacturers for each *Tuffauk*; agreed on the quality, quantity and rate of salt; and fixed the departure date and duration of stay in the salt fields. They promised meeting the wages and daily provisions and the costs of transporting salt from the fields to the Company *golah*s. They bound themselves to deliver all surplus salt. On the same day, the Agency officials required the *Beparrie*s to enter into sub-contracts with the *Molungie*s. The latter agreed to all these terms in managing their *Tuffauk*s.[79] The terms of the Agency-supervised contracts were negotiated in such a way that the *Beparries* received marginal profits both on the quantity of salt and on the rates.[80]

Recruitment of manufacturers became urgent as the set departure date approached. The *Molungie*s submitted to the Agency lists (*Huddie*s) of men who had or were rumoured to have worked in salt. Accompanied by the salt office couriers (*Chuprassee*s), the *Molungie*s then tracked down these manufacturers, forced them to accept the wages in advance and brought them to the nearest salt office.[81] On the day of departure, the Agent's Overseers and his subordinates, the *Beparries*' representatives, the *Molungie*s (with their manufacturers and provisions) embarked with magician-priests, woodcutters and labourers on numerous boats heading towards the Sundarban salt fields.

---

[78] For the historical perspective on order and colonial rule, see Ranjan Chakrabarty, *Authority and Violence in Colonial Bengal, 1800-1860* (Calcutta: Bookland, 1997).
[79] Salt Comptroller to Hidgellee Agent, 6/09/1788 in Sinha, *Midnapore Salt Papers*, p. 12.
[80] Compare, the contracts between the Company and *Beparries* and that between the *Beparrie* and the *molungie*s (BL: *IOR/P/51/24*).
[81] Deposition of Mahatabdy Molungie, *Petition SSM*.

By the mid-1780s, it was increasingly difficult to find willing manufacturers. Extreme weather conditions and the proximity of wild animals caused many deaths and desertions in the salt fields. In Sooatty, Selimabad and Buzurgumedpur, out of 4800 men working in 1785, 340 had died or been killed by the tigers and alligators, 1060 had been sent back due to sickness (a large proportion of whom had died within a week or so) and 611 had deserted.[82] Besides natural hazards, procuring firewood and working on the larger *Taffaul*s was extremely laborious. An unprecedented drive to economise salt production also meant lower wages, longer stays and fewer provisions in the salt farms.[83] All these factors contributed to the manufacturers' hesitation.

An acute sense of labour shortage among salt officials and the *Beparrie*s made the practice of *seizure* of the manufacturers an increasingly 'customary' procedure.[84] The petty contractor-producers (*Molungie*s) were the first victims of this chain of coercion as they were ultimately responsible for organising the salt workers. Shaik Mahatabdy, a *Molungie* with a contract for 2 *Tuffaul*s, failed to supply 7 men in 1786. The Agent's representative (*Gomastah*) put him and his assistant under a Peon's restraint until he gave the names of substitutes.[85] Another *Molungie* Rutton, by the order of his *Beparrie* Prawnkissen Goo, confined a salt landholder (*Etmandar*). Through the landholder, Rutton got hold of a cultivator Bessy, and through the latter, his servant Bolly.[86] In 1785, the Agency salt court at Myndie Gunge placed an orderly over a *Molungie* whose four men had fled from the Sundarban taking implements with him. He was set free only after reimbursing the costs of implements and procuring substitute manufacturers.[87]

The fear of coercion left the *Molungie*s desperate. They in turn kidnapped any male. The salt courts, presided over by the Agent, or one of his Overseers and *Darogah*s, usually depended on oral testimonies to determine whether the *Molungie*s' claims were true.[88] If he or any of his relatives had ever worked in the *Tuffaul*s, no matter how many generations ago, then this was seen as justification for sending him again to the Sundarban.[89] If there was no testimony, the courts resorted to 'Ordeals' (*Pureecka*s, or chance-tests). Both the seized man and the *Molungie* would be sent into the water. Whoever emerged first was taken to be wrong. The judges would let

[82] Andrew Starkey's Abstract (BL: *IOR/P/51/24*).
[83] Deposition of Mahatabdy Molungie, *Petition SSM*.
[84] For cases of seizing brother of a salt worker, *Petition FMB*, *Petition MMM*. For a case of seizing a co-habitant, *Petition SMD*.
[85] Deposition of Mahatabdy, *Petition SSM*; Deposition of Rutton Molungie, *Petition MBC*.
[86] Deposition of Rutton Molungie, *Petition MBC*. Goo also put guards over his *molungie* Assorie till he supplied a deficient manufacturer. See Deposition of Assorie Molungie, *Petition SBB*.
[87] Deposition of Mahatabdey, *Petition NDK*.
[88] Deposition of Azeezoollah, *Petition MAJ*.
[89] One Fauzil was again seized as a manufacturer after above 40 years. See Deposition of Dawry Manjie, *Petition FBS*.

them choose two clay lumps one containing gold and the other silver. The one with gold would be declared right. The Agency officials and *Molungie*s manipulated these 'Chance Trials' to ensure no escape for the seized.[90] Becoming a salt manufacturer in the 1780s was therefore a random event in the lives of many.[91] The event *struck* like a lightening on menial servants, *ryot*s, *Beparries* and their agents,[92] local landholders and their boatmen,[93] refractory settlers of the Company's recently reclaimed settlement, farmers (*Talookdar*),[94] carpenters,[95] boat owners,[96] cloth sellers,[97] and even a *Holdar* of a *Cutcherry*.[98]

For many salt making was simply the least terrible of a series of terrible options.[99] Rajah Cawn became a *Molungie* to escape being prosecuted for his father's debt and that too after many creditors surrounded his house.[100] Others faced the profession as if it was a ghost of a decision made years ago. Kurrumoollah and Roop Gauzy had agreed in 1780 to take a *Tuffaul* from a *Beparrie*. They fulfilled the contracts for four years but when they lost their men, they absconded. Two years later, the *Beparrie* caught Kurrumoollah and made him work the *Tuffaul*. That year, tigers and disease decimated 19 of his men yet he was not discharged.[101] Even if the *Beparrie* had set him free, there was no guarantee that he would not be recruited again.[102] Shaik Innayet was released from a *Beparrie* in 1782 after all his men perished in the Sundarban. He became a cultivator. In 1784, two *Beparries* sent orderlies to seize him but failed to find him. They then tied his landholder to a post, forced him to sign a receipt for the wage-advance and bundled him to the Sundarban. On the same pretext,

---

[90] *Petition SBR*; *Petition BCP*. Koosy of Mihespore did not know how to 'dive' and was thus proved to be a salt worker. *Petition KMP*. Shaik Punnawoollah of Chelta Bunnea was 'proved' a manufacturer as his kidnapper arranged an expert diver. See *Petition SPC*. To send Mahomed Tuckie, the trial was not held between him and his kidnapper, but between him and Hisamdy, another kidnapped. See Deposition of Assabdie, *Petition BCP*.

[91] Subbolahat and Soonawoolah were bundled up from their sleep. See *Petition SKS* and *Petition SDS*. Saaduck, Kabir and Nusady were lured into a by-lane in a market town and kidnapped. See *Petition AGS*. Minollah of Rampur was lifted up from the road. See *Petition MRB*.

[92] *Petition RRG*.

[93] Mahomed Etteem complained of extortion as he refused sending his *manjhi* (boatman) servant to the Sundarban. They sent the boatman anyway. See *Petition MEK*.

[94] *Petition DCM*.

[95] Ibid.

[96] *Petition SBS*.

[97] *Petition AGS*.

[98] *Petition SCN*.

[99] 'Those who perform their engagements *in general* attend of themselves the ensuing season'. See Deposition of Mahatabdy, *Petition SSM*.

[100] *Petition RCD*. Amany Cawn of Beharry, Buzurgumedpur also voluntarily entered into a one-quarter partnership of a Tuffaul in 1783, but had to pay more than what he received since then. See *Petition ACB*.

[101] *Petition KRO*.

[102] It was the merchant-contractors' pejorative: 'The custom forbids their entering into the service of another *beparrie* without having got a discharge from the one they last served'. See Deposition of Ram Gopaul Dauss, *Petition SBR*.

many of Shaik's relatives were dispatched to the Sundarban. Shaik could no longer endure this chain of torture. He took the *Tuffaul* contract again.[103]

The fact of having worked before in the salt fields carried severe consequences not generally attached to other labouring activities. As a *Molungie* put it, 'those who have been once employed can never claim an exemption, and the obligation is building in their posterity'.[104] This applied not only to the salt-boilers or other salt-labourers, but also to the salt producer-contractors (*Molungie*s) themselves.[105] The salt manufacturers, marked out by such 'local custom' in this way, were a sort of bonded labourer.

But they were different from other bonded labourers in the sense that their obligation to work in the salt fields did not originate from having inherited or carried over a debt. In their case, the *bond* was based purely on having their ancestors or relatives engaged in salt making and still un-discharged.[106] Any contractor-merchant (*Beparrie*) or petty producer-contractor (*Molungie*) could in principle issue a discharge note.[107] However, the Agencies, with their desire for regular profit, made the custom more stringent and applied it more arbitrarily.[108]

Ways to avoid becoming a salt manufacturer were difficult and costly. Myebullah had to sell his cattle to pay SRs 13 to a *Beparrie* and his *Molungie* to avoid the salt court.[109] Dussurut Chung had to pay SRs 4, the wage for the entire season, to a *Beparrie* to save himself from the Ordeal.[110] Mahdel Chung had to work as a wage-free gardener for a *Beparrie* instead of going to the salt fields.[111] Miheboollah Cawn had migrated to a new cultivation area. Its manager accused him of being a security of an absconding salt manufacturer. The manager, who was also a salt *Beparrie*, then sold Miheboollah's two cows, took SRs 2 and put his family in confinement. They managed to escape from the settlement the following evening.[112]

---

[103] *Petition SIS*.
[104] *Petition SSM*. Also true for *Ajoorah Molungie*s in Tumlook. See Tumlook Agent to BBT, 26/12/1793 in Sinha, *Midnapore Salt Papers*, No. 6, pp. 179-182.
[105] One Mahatabdy Molunghie was asked: Are Molungies of very denominations bound in perpetuity or not. He replied, they all are (BL: *IOR/P/51/24*).
[106] Hussain Molunghie and Soorat Cawn to Shaik Kubeer of Bataggee, Pergunnah Buzurgumedpur, Augun 6, 1194 BS (c. 1786): 'we agree that neither our Companions nor ourselves will ever accuse you as a Salt Labourer and seize you on that account, and should you be ever seized and put to any expense we will indemnify you' (BL: *IOR/P/51/24*).
[107] Merhant-contractors thought such discharge unacceptable (BL: *IOR/P/51/24*). But Hussain and Soorut Molungies did give a discharge note to Shaik Kubeer in 1787. See *Petition SKB*.
[108] Comilla Resident to Chittagong Collector, 1/07/1784, 20/01/1788, 18/01/1788 in Chakraborty and Noma, *Records of Comilla*, pp. 22, 30, 35-36.
[109] Deposition of Mokeem Manjie, *Petition SCC*.
[110] Deposition of Prawnkissen Goo, *Petition DCC*.
[111] Deposition of Gocul Chuckerbutty, *Petition MCS*.
[112] Deposition of Miheboollah Cawn, *Petition MCC*.

In short, the onset of the salt season under the Agency System triggered a set of preparatory activities. Some of these events, such as the Ordeals, were familiar to the local population. They were to some extent inbuilt in the local social and economic relations. The Agency System added some innovative elements: The system of advance wage payment tied the manufacturers' hands. The Overseers closely supervised the collection of workers and provisions. But in the 1780s, the recruitment simply happened to many manufacturers as arbitrarily as in the days of the merchants in the 1770s.

For many, being and becoming a salt manufacturer led to bondage, and was very rarely a matter of choice. To escape this fate was expensive and difficult. Such a peculiar bound-but-free nature of the salt manufacturers also partly explains their close involvement in, and intense desire to free themselves from, the occupation of salt manufacture. The coercive circumstance and marked nature of the profession strongly constrained the salt makers from choosing their livelihood solely based on financial gain.

Once the manufacturers were in the Sundarban salt fields, the unwholesome environment and physical drudgery involved in salt making further tested their limits of endurance. The technique of salt making remained equally laborious under the Agency System, as it had been before. In order to make the output dependable, the officials brought in new arrangements of labour supervision and management. For the salt manufacturers, these arrangements meant harder work, longer working-hours and elongated detention in the salt fields.

In the first few days of the salt making season in the Sundarban, the more experienced *Gomastah*s and *Molungie*s laid out the canals, built salt boiling houses and erected living quarters for the workers. The Agency's Overseers compiled registers of men and quantities of provisions and numbered utensils and boiling pots for each *Taffaul*. They dictated the location, shape and size of the boiling houses,[113] and verified the brine strength in the *Khallarie*s by throwing into it a few grains of boiled rice.[114] They ascertained that the collected firewood was adequate and dry, and the cisterns for storing the fresh salt were large enough. They also selected and built watch posts at the 'best sites'.[115]

[113] 'The length of the Barrows must be 8 Cubits and the breadth 2 Cubits and each Callary to have 14 of the measurement, or else 2 Barrows for each Minedars – the Chulahs or Ovens must be seven Cubits long, and ½ broad and must contain 180 Pots'. See *Instructions to the Overseers* (BL: *IOR/P/51/24*).
[114] The *Instruction*, for example, reads: '[Y]ou must frequently try your brine by throwing into it a few Grains of Boiled Rice or a bit of Rag if they swim your Ruffs will answer otherwise'. See *Instructions* (BL: *IOR/P/51/24*).
[115] *Instructions* (BL: *IOR/P/51/24*).

The salt makers followed a more labour-consuming routine. Led by experienced magician-priests, many ventured deep into the dense forests.[116] Their shoulders turned sore from loading and unloading timber.[117] Those left behind ploughed the land, beat the clumps down and trample lightly on it to prepare a perfect level. Incoming tides produced in a few days a white efflorescence in these well-prepared salt fields. Next, the salt workers treaded on the field to break the efflorescence into a powder. They scraped it off and collected it near the boiling houses. This saline mud was then mixed thoroughly with seawater.

For separating mud from the brine, the workers carried brackish water-filled, large sized red pots (*ghurrah*) on their heads up the side of the mound (often on 'a framework of two bamboos and rope network') and emptied it on the porous basin. The filtered brine was then passed to a reservoir through a reed pipe (*naad*).[118] The bittern was drained off near the *Taffauk*s, in the belief that it greatly increased the yield (Figure 1).

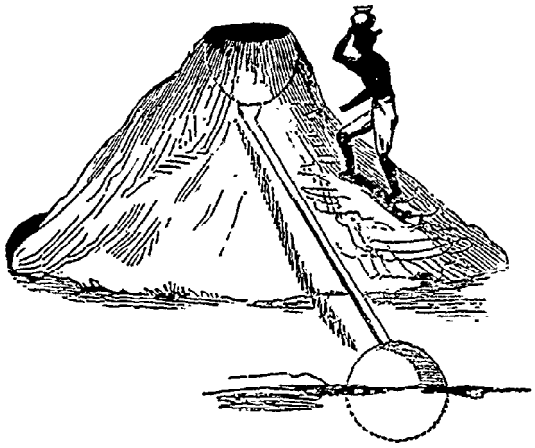


Figure 1 A filtering mound or a *maidah* (Source: *Report of the Commissioner*, 1856, p. 449)

The task of boiling brine was equally tiresome. About 200 to 225 little conical shaped earthen pots were filled with brine. They were arranged on a circular earthen furnace inside the slanted hay-roofed boiling houses 'in circles, rising ... in the shape of a pyramid'. The boiling took up to six hours and required constant attention. One man constantly filled up the pots with a bamboo ladle for the first five hours. Another kept up the fire. When the pots contained three parts of salt, the fire was reduced. A third man would then climb up and down through the stairways, and scoop out the

[116] For the ritual verse to that effect, see *Raimangal*. Also, see Sy Montgomery, *Spell of the Tiger* (White River Junction, Vt.: Chelsea Green Pub., 2008).
[117] On the sore shoulders, see *Petition MBC*.
[118] H. C. Hamilton, *Notes on the Manufacture of Salt in Tumlook Agency* (Calcutta: Calcutta Gazette Office, 1853). Compare, Schendel, *Buchanan in Southeast Bengal*, pp. 10-12.

salt using an iron ladle (Figures 2 and 3). From the heaps nearby, the fresh salt was carried to the closely guarded Agency cisterns. The description shows the work in the salt field was dreary but physically demanding.

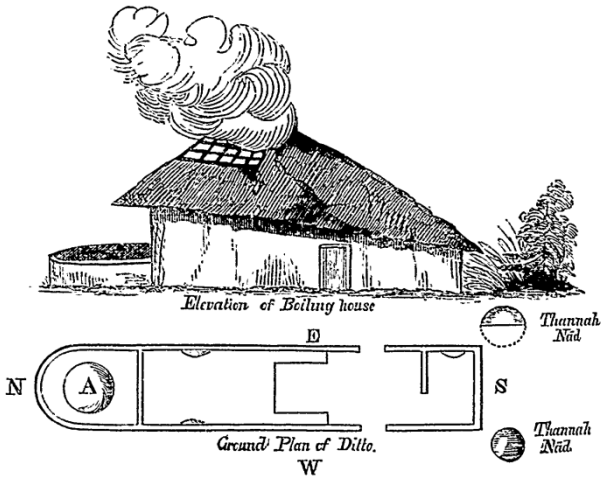


Figure 2 The plan and elevation of a boiling house (Source: *Report of the Commissioner*, 1856, p. 450)

Moreover, the Agency System was altering the organisation and management of manufacture but had not changed the technique of salt making. Hence, when the boiling commenced, the Overseers made estimates of daily supply of brine and the salt output for each *Tuffaul*. They then demanded in writing from the *Beparries*' agents and *Molungie*s a commitment to produce the same output daily for the entire season. They forced the manufacturers to store enough saline mud for a fortnight's supply in case the rains hindered its collection.[119] Their subordinates ensured a speedy disposal of all the produce in the Agency cisterns and kept track of manufacturing activity by drawing a *Tuffaul* 'balance' every fortnight.[120]

Such close monitoring led to tighter controls over the manufacturers' mobility. In the pre-Agency era, they migrated to other areas once they had fulfilled the contracted quantity.[121] Now they had to continue making salt irrespective of their output, until the season ended. They were even robbed of the 'opportunities of complaining', as a manufacturer put it.[122] For many salt workers, the longer confinement meant loss of earnings. Some utilised the prolonged stay to siphon surplus salt into a clandestine trading network. These entrepreneurial manufacturers managed to undermine the objectives of the monopoly even while submitting to the

[119] *Instructions* (BL: *IOR/P/51/24*).
[120] Deposition of S. Fanbent, *Petition RDB*.
[121] A private firm of Messrs. Stibbert and Hare had stopped the salt manufacturing in Dantoon, Midnapore by mid-April, and the manufacturers working there 'had gone, and engaged themselves at the work in the Moratta Districts'. See John Graham to Committee of Trade, 25/04/1766 in 'Bengal Mofussil Records', *Bengal Past & Present*, Vol. 5 (1915), p. 91.
[122] Deposition of Mahatabdy, *Petition SSM*.

Agency's labour control strategies. But one had to be resourceful to belong to the illicit network (see chapter 4).[123]

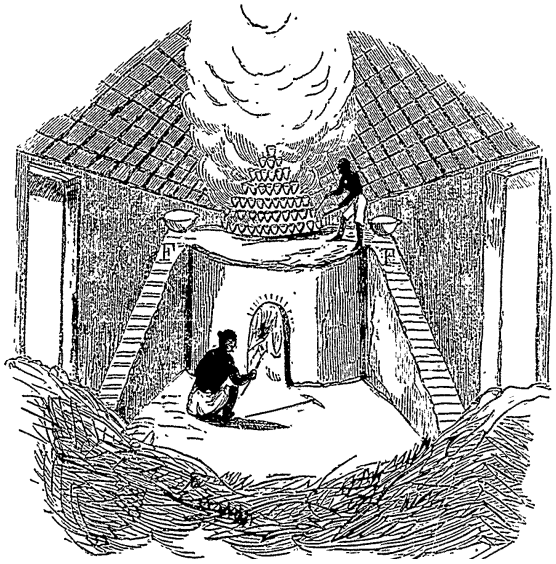


Figure 3 The interior of a boiling house (Source: *Report of the Commissioner*, 1856, p. 451)

Many unwilling manufacturers and labourers found the longer schedule and stricter environment too trying. Those who had refused to receive advances after the Ordeals before the season, felt free to escape from the salt fields on the first available occasion.[124] That option, however, triggered severe repercussions for others who had signed receipts. When Mahomed Ruffick ran away, his father Nuasdy was seized. When the latter also escaped, Ruffick's brother Fyzoollah was taken away. The family had to pay SRs 4 to the *Molungie* to end this chain of kidnapping.[125] When cultivators-turned-manufacturers escaped, people (*Havaladar*s) letting them the land were seized. These men paid compensation but later extracted a far greater sum from the cultivator's family.[126] Even fellow villagers had to produce manufacturers or else they in equal number could be 'seized and compelled to supply the place of the deserters'.[127]

Given these ramifications, many endured the hardships and the dangers of the wild.[128] Some died in the Sundarban or 'disappeared'.[129] A manufacturer's mother

[123] Bhargava, 'Visibility through Resistance', pp. 34-35. On Ewart's dealings with 'smuggled' salt, see *Revenue Department Consultations*, 14/04/1788 (BL: *IOR/P/51/19*); 10/10/1788 (BL: *IOR/P/51/25)*, 10/10/1788 (BL: *IOR/P/51/25)*. Ewart resigned from the post in March 1789. *Revenue Department Consultations*, 1/04/1789 (BL: *IOR/P/51/33*).
[124] *Petition MCH.*
[125] *Petition NDK.*
[126] *Petition SBC.* The larger debt also meant a higher risk of forced recruitment for many male members in the family. See *Petition SIS.*
[127] Deposition of Mahatabdy, *Petition SSM.*
[128] Deposition of Mahatabdy, *Petition SSM.*

complained: '[they] sent my son Kully to the Sundurbunds. When they put him on board the boat, I went home. On the next day they came, and told me that my son was dead...but they would not show him to me'.[130] Others became so ill that they were sent back to die in their villages.[131] Those who survived were not released until mid-July, a month after the salt season ended, as they would be transporting the salt of the season to the Company *Golah*s in Jaynagore, Bakarganj and Mehendiegunj.

The manufacturers' reaction to the Agency System of organising salt works thus took three forms. The majority submitted to the scrutiny of the Agency officials and the *Beparries*, rendering the System viable. Some showed defiance to the organised domination by refusing to work to their full capacity, or disappearing as soon as their contract amounts were delivered. Others could not withstand the hostile weather and physical hardship and fell sick or died. There was also a significant group of people, including the Agency officials, the *Beparries*' agents and the manufacturers, who engaged in the illegal manufacture and trade of salt (discussed in the next chapter).

Salt Monopoly as a Critique of the State- and Market-Centric Narratives

The preceding sections revealed that the Government monopoly of salt manufacture appeared in the salt fields with several new measures such as the Brass Gauge for estimating the produce and the field *Golah*s for taking its possession immediately. As a stakeholder in the enterprise, the salt *Beparrie*s resisted these moves. Agents, in turn, viewed the *Beparrie*s as tricksters. They sought control over the production process in the salt fields. Account keeping became increasingly unilateral and in the Agency's favour. Their staff became more numerous while intermediaries in the extant production organisation were gradually eliminated. The Agency controlled not only where and how the salt manufacturers worked, but also for how long and at what rate.

These changes were subject to conflicts and negotiations among the Company officials, the local contactor-merchants, landholders and the *Molungie*s. The Agencies' influence in the actual day-to-day functioning of salt fields was indeed limited. They intermingled with the local loci of power and adopted conventional coercive ways of labour recruitment. The local elite looked after their own investments in the business. They were keen on tackling perennial issues related to the seasonal nature of salt production but reluctant in accepting the emerging order of the salt monopoly. The

---

[129] *Petition FMB*.
[130] *Petition KMR*. Shaik Saaduck's father died in the Sundarban. Also, see *Petition SSM*.
[131] Shaik Besy's brother Soonawoollah 'went blind, returned sick, and four days after his arrival died'. See *Petition SBO*; *Petition MBC*.

landholders, merchants and tenants in the new cultivation areas therefore sometimes turned against the very administration, which sought to act through them.

Through the Agency System, the Government altered the local salt production organisation bringing salt labour under its direct control. The social organisation of iron making was changing in the period, in contrast, due to changing market structures. In salt, there was a general *demise* of the intermediaries while there was a *rise* of an intermediate group of investors in iron. In both cases, however, the manufacturers were increasingly subordinated.[132] Yet the variegated responses of the salt manufacturers described in this chapter and the actions of the *Chuar*s in the previous chapter show that the process of subordination was not complete.

From the manufacturers' point of view, the landscape of salt manufacture in the 1780s had at least two major fault lines. The first ran through the Company Government's own organisation and the second passed between the Agency and the *Beparrie*s. The dynamics in these fault lines created the everyday context of the salt manufacturers. The salt manufacturers responded to these dynamics by adopting a variety of postures. Some defied the new arrangements, others complied, and still others, kept alternating between these two extremes. The Agencies also reacted to their actions in a number of ways. In some cases, the officials allowed hereditary manufacturers (*Ajoorah*) to become contractual (*Thika*) ones. In other cases, they encouraged the workers to settle down as cultivators in a bid to have a ready access to their labour.

In the salt fields, the manufacturers reacted to a tighter appropriation of their labour by leaving the occupation altogether, paying for a period of respite or running away. All these options required resources. Avoiding recruitment or buying freedom was not cheap. Many managed to escape from the drudgery but the desertion often triggered more tragedies in the lives of their families and more fissures in their relationships with the landholders and employers. Fearing such consequences, they endured the hostile circumstances of the salt fields. In short, the salt manufacturers' response to the Agency System depended chiefly on factors related to personal and social capabilities.

Clearly, their diverse socio-economic, religious and ethnic composition and equally diverse responses do not fit neatly into any story of class struggle, sectarian strife or ethnic dominance/resistance. Yet, the existing literature on commodity

[132] Smritikumar Sarkar, 'Social Organization of Artisan Production in India: Changing Role of the Market, Technology, and Merchant-Creditor: 18th to 20th Centuries' in B. B. Chaudhari (ed.) *Economic History of India from Eighteenth to Twentieth Century* (New Delhi: PHISPC and CSC, 2005). pp. 107-354.

production in colonial India unanimously looks at the salt monopoly as the Company's political economic expression.[133] In this view, the monopoly was the Company's tool to gain financial advantage in the inland salt business by excluding competing local institutions and people. Its Bengal Government implemented the tool through the Agency System of manufacture whereby the Government reaped the profit between the production costs (*Khallary* costs) and the market price of the article. The margin of profit was huge as the Agencies practiced coercion and economy to keep costs down; the monopoly ensured wholesale prices. This narrative fits nicely with the widely held view that the Indian economy was effectively colonised in the period.[134]

The evidence presented in this chapter helps revise this view in several ways. Firstly, I showed that there was a considerable limit on 'colonialist' strategies to maximise salt profit. For instance, the largest component in the production costs was the salt labourers' wages. In order to reduce the investment, the Government placed the burden of labour supply on the *Molunghie*s. But a general scarcity of labour in the manufacturing areas meant that the labour charges could not be cheaper. The Government could not always manipulate the market price for its advantage. Salt was a necessity but as a culinary ingredient, there was a limit to what one could consume. This means oversupply did not drive its price down but simply led to surplus stocks. Neither did lowering of the price always increase consumption. The demand was fixed relative to its market price. In other words, the Government's strategies worked only within a range whatever its motives might have been. Indeed, it conducted profit-maximising trials to identify these limits of effectiveness in the period leading up to 1780. My approach helps explain why its salt policy went through shifts and reversals and did not proceed linearly as anticipated by the existing view.

Secondly, the high level of salt profit in the period 1765 to 1858, which the existing narrative takes as an indicator of the success of the colonial policy, does not imply the effectiveness of Agency *manufacture*. Existing studies, including ones that

---

[133] On current accounts of the salt monopoly, see Romesh Dutt, *Economic History of India under Early British Rule*, Vol. 2 (London: Kegan Paul, Trench and Trübner, 1902), pp. 144-153; A. M. Serajuddin, 'The Salt Monopoly of the East India Company's Government in Bengal', *Journal of the Economic and Social History of the Orient*, Vol. 21, No. 3 (Oct., 1978), pp. 304-322; Sadanand Choudhary, *Economic History of Colonialism: A Study of British Salt Policy in Orissa* (Delhi: Inter-India Publications, 1979); K. V. Jeyaraj, *A History of Salt Monopoly in the Madras Presidency, 1805-1878* (Madurai: Ennes Publications, 1984); Satya Narayan Mishra, *Salt Industry in India* (New Delhi: Mohit, 2005); Barui, *Salt Industry of Bengal*; Indrajit Ray, 'Imperial Policy and the Decline of the Bengal Salt Industry under Colonial Rule: An Episode in the 'De-industrialization' Process', *Indian Economic and Social History Review*, Vol. 38, No. 2 (2001), pp. 181-205; Bhargava, 'Visibility through Resistance'.

[134] On the colonisation of the Indian economy, see Irfan Habib, *Essays in Indian History: towards a Marxist Perception* (New Delhi: Tulika, 1995), particularly the three chapters: Processes of Accumulation in Pre-colonial and Colonial India; Colonisation of Indian Economy, 1757-1900, and Studying a Colonial Economy – Without Perceiving Colonialism.

carefully distinguish commodity producers directly affected by the colonial policy from others, conflate the difference between the two.[135] I mentioned above that the total demand for salt in Bengal was met from various sources. Agency manufacture was the largest supply source. However, about a million Md of salt came in from Madras Presidency (called the *Coastal*/*Kurkutch* salt), from across the Company's western borders and from 1813 onwards, from Britain and from the Gulf. Figure 4 shows the annual salt production in Bengal under the Agency System between 1780 and 1860. It shows that after the 1830s the Agency manufacture in Bengal shrank in absolute terms. Per capita salt consumption remained same. It means that the Government increased the proportions of the Coastal, Foreign and British salts to maintain its salt revenues in the period. Indeed, steady salt profit simply shows that the Company's salt administration, after a period of experimentation, managed to *maintain* the profit margin even as the extent and volume of salt manufacture decreased in Bengal.

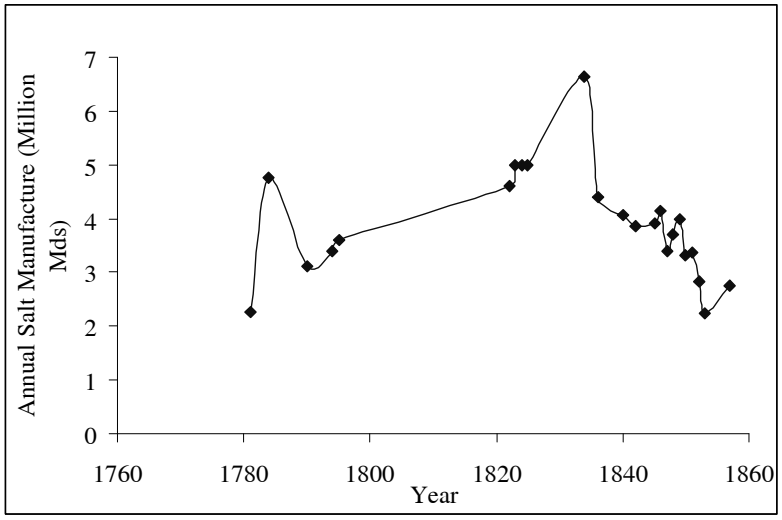


Figure 4 Annual Salt Production of Bengal, 1760-1860[136]

Thirdly, the findings of this chapter help clarify the existing ambiguity in the commonly used phrase 'colonial production'. The salt monopoly was a 'colonial production' venture only in the sense that the Company Government organised capital, human resources and institutions in order to gain what it considered was its *de jure* rights. I showed that the Salt Agencies paid advances to the *Beparrie*s often in long drawn-out instalments. The *Beparrie*s had to invest working capital to meet the costs of manufacture and to maintain their own *Gomastah*s, accountants, seal bearers,

[135] Sarkar, 'Social Organization of Artisan Production'.
[135] Tirthankar Roy, 'Economic History and Modern India: Redefining the Link', *Journal of Economic Perpectives*, Vol. 16 (2002), pp. 109-130.
[136] Ray, 'Imperial Policy and the Decline', p. 184.

boatmen and messengers in the salt fields. They did so by organising their resources or by borrowing from the local market.

In other words, the salt monopoly was a 'colonial production' venture only in the sense that the Company Government organised capital, human resources and institutions in order to gain what it considered was its *de jure* rights. It was never a venture for colonial capital. The first interpretation accords a critical role for local capital and hence for local merchants, moneylenders and other local investors. The second meaning sees the early large-scale manufacturing efforts in colonial India simply as an intervention brought in by the Government in its own governing interests or in the interests of British capital. Again, the existing formulations conflate the two and goes as far as claiming that local capitalists were products of colonialism, both as collaborators in establishing colonial rule and as an effect of such collaboration.[137] The distinction, on the other hand, is crucial to bring out the effects of the interplay between local capital and colonial rule on the commodity manufacturers.

This brings us to the assessment of one more recent approach, which seeks to explain changes in commodity production in the colonial period by evoking changes in the market.[138] However, under the Agency System, the Company's desired margin of profit dictated the wholesale price of the *Pangah*. A class of salt merchants manipulated retail prices to cope with the demand and distribution constraints. There was thus a considerable variation in the salt prices in Bengal markets. Yet, the monopoly organisation left little scope for the salt makers to respond freely to the market price. Instead, they were forced to react to the Agency's terms of contract, which imposed the price for their contract and surplus salt. It does not mean, however, that the market had no effects at all on salt manufacture. My claim here is that the Government monopoly mediated the link between the manufacture and the market to such a degree that any causal explanation relating the two should accommodate the interference of the monopolistic Agency System.

Lastly, my disentangling of the events in the salt fields shows that the notion of 'monopoly' appears concrete only from the Company's viewpoint, or when one looks

[137] On the former, see Paras Nath Singh, *Jagat Seth and the Founding of the English Raj in Bengal* (Prayag, Bharati Bhandar, 1950). In Hindi; B. B. Kling, *Partner in Empire: Dwarkanath Tagore and the Age of Enterprise in Eastern India* (Berkeley: University of California Press, 1976); Sushil Choudhury, 'Familial and Cultural Networks of Entrepreneurs in India during the Middle Years of the 18th Century' in Clara Eugenia Nunez (ed.) *Entrepreneurial Networks and Business Culture* (Sevilla, University de Sevilla, 1998), pp. 93-104. On the latter, Ritu Birla, *Stages of Capital: Law, Culture and Market Governance in late Colonial India* (Durham: Duke University Press, 2009). At other extreme, the merchants are portrayed as pure contestants. See Amar Farooqui, *Smuggling as Subversion: Colonialism, Indian Merchants, and the Politics of Opium* (New Delhi: New Age International, [1998] 2005).

[138] Tirthankar Roy, *Traditional Industry in the Economy of Colonial India* (Cambridge: CUP, 1999).

at the salt fields from Fort William or in the Agency's salt courts. Everyday situations in the salt fields comprised a complex series of interactions between the Government's political economic policies and the local elements of salt manufacture. One can describe these interactions. However, one cannot estimate the strength of either of these constituents solely by the outcomes. In resorting to seemingly neat explanatory notions such as *monopoly*, *colonialism*, *colonial production* or *market*, one inadvertently ignores how the elements actually blended in the salt fields and in the lives of the salt manufacturers.

My approach, by contrast, showed that the Government's monopoly took shape through certain experiments with extant socio-economic relationships and structures in the frontier landscape of the Sundarban. Its moves were tentative and conveyed conflicting interests. I also showed that the manufacturers too experimented with different ways of making a living without knowing what the outcome of their choices would be. Not every salt manufacturer was free to choose. As numerous cases of ill-fated salt workers and labourers demonstrated, one needed to possess a certain level of physical and material capability even to choose. The only option open to the latter group of salt men was either to endure the coercion or to perish.

Chapter 4

ORGANISATION

THE WORLD OF ILLICIT SALT, 1790s-1810s

Introduction

This chapter describes the world of illegal manufacturing of salt in the Government's monopoly territories in Bengal in the period 1790 to 1820. Following the declaration of the monopoly of salt manufacture in 1780, the Bengal Government established an elaborate legal and organisational structure to control the 'illicit' salt works in its territories. It applied the term 'illicit' to all saline substances that were privately made without government license, pilfered from the Agency-run salt farms or traded without the Government's permits and certificates of origin. The Bengal Board of Trade (BBT), the office responsible for managing the salt monopoly in the period, quickly realised that the terrain of illicit salt production, passage and trade was extensive. The office had to monitor salt-related activities in over 30000 square miles. It also had to check clandestine supplies of up to 1 million Mds which amounted to one fourth of the estimated annual salt consumption in Bengal.[1] The chapter discusses how BBT attempted this enormous task, and why the illicit salt making and selling persisted in the period.

This chapter focuses on the occurrences of illicit salt in an area under the Midland Superintendency of Salt Chokies, one of the four offices established by the Government to check illegal salt making and trading in the monopoly territories. The Superintendent of the office headed a huge organisation of the *Chokey* personnel in the salt districts between the rivers of Hooghly and Meghna.[2] In the 1780s, the term *Chokey* meant custom check post only. By the 1810s, it had grown to include mobile land and river patrols, a troop of professional informers, administrative and account officials and their armed retinue, reflecting the increase in scope and complexity of its duties.[3] The enormous expansion of the *Chokey* establishment in the period allows me

[1] Notwithstanding the differences in the terms such as 'underground', 'shadow', 'unofficial' and 'informal', the extent of production activities beyond what was permitted by Governments is an economically 'non-observable' quantity. Consequently, its estimates vary considerably. The figure cited here was reported by a group of salt merchants in 1834. See J. Crawfurd's evidence, *Report from the Select Committee on Salt, British India; Together with the Minutes of Evidence, and Appendix* (Hereafter, *Salt Report 1836*) (London: House of Commons, 1836), p. 200.

[2] The extent of the Superintendency was estimated in 1835 as having 'a breadth, inclined from the verge of the Sunderbunds, varying from 10 to 40 miles'. The estimate gives an approximate area of 17500 square miles. See *Salt Report 1836*, p. 167

[3] The numbers of men employed in the *Chokey* establishment varied considerably year to year. In 1835, every Chokey was staffed by 1 Darogah, 1 Mohurrir, 1 Jemadar, 6 Chuprassies, 2 guard boats, and 100 Chokeydars. See *Salt Report 1836*, p. 167.

to examine here various aspects of illicit salt such as its changing definitions, its diverse sites of production, the identities of the people involved in it and their reasons for such involvement, and the various mechanisms and processes devised by the Government to suppress it, and their effectiveness.

Previous historians of the Company's monopoly commodities (such as salt, opium and saltpetre) in colonial India have treated the illicit manufacturing and trading of these articles in economic and political terms. While the historians have put varying degrees of emphasis on each, their views may be distilled in two distinct forms. One interpretation views the clandestine manufacture and trade as profit driven activities. It suggests that manufacturers pursued these options when legal ways were difficult, loss incurring or less profitable. For the sake of brevity, I call this the profit argument.[4] The other interpretation regards the illegal manufacturing activities as premeditated or spontaneous political actions. It sees those engaged in illegal production and trade as subverting the colonial measures of resource appropriation. As the notion of domination and resistance is central in this perspective, I call this the power argument.[5] In this chapter, I demonstrate the inadequacies of these arguments of power and profit to argue that the notion of *norms* as communal criteria for evaluating political and economic issues is crucial to the story of illicit salt.

The chapter is organised as follows: I begin, in the first section, by demonstrating the entangled relationship between the illicit manufacture and the Government monopoly. In the second section, I show the weak and fragmented natures of the salt establishment and in the third, the diverse reactions of the local groups involved in the illicit manufacture. These two sections will help me to demonstrate that the salt officials' portrayal of the local landscape as inhabited by two or more opposing groups, the core assumption in the power argument, did not correspond with the actual behaviours of the people. The fourth section indicates the

[4] N. P. Singh, *The East India Company's Monopoly Industries in Bihar with Particular Reference to Opium and Saltpetre, 1773-1833* (Muzaffarpur: Sarvodaya Vangmaya, 1980); Roy Moxham, 'Salt Starvation in British India-Consequences of High Salt Taxation in the Bengal Presidency, 1765 to 1878', *Economic and Political Weekly*, Vol. 36, No. 25 (Jun., 2001), pp. 23-29; Alexander Klimberg, 'Some Research Notes on Carl A. Trocki's Publication "Opium, Empire and Global Political Economy"', *Bulletin of the School of Oriental and African Studies*, Vol. 64, No. 2 (2001), pp. 260-267. Also, see Roy Moxham, *The Great Hedge of India: The Search for the Living Barrier that Divided a People* (London: Constable, 2001). For a pure economic interpretation of clandestine production and trade, see Jagdish Bhagwati and Bent Hansen, *A Theoretical Analysis of Smuggling*, Working Paper of the Department of Economics, Massachusetts Institute of Technology, No. 75 (Jun., 1971).

[5] Balaichandra Barui, 'Resistance of the Bengal Zemindars to the East India Company's Salt Monopoly', *Calcutta History Journal*, Vol. 2, No. 2 (Jan.-Jun., 1978), pp. 136-170; Balaichandra Barui, *Smuggling: Rural Resistance in Bengal Presidency, 1757-1833* (Kolkata: Sujit Prakashan, 2001); Carl A. Trocki, *Opium, Empire and Global Political Economy: A Study of the Asian Opium Trade, 1750-1950* (London; New York: Routledge, 1999); Amar Farooqui, *Smuggling as Subversion: Colonialism, Indian Merchants and the Politics of Opium, 1790-1843* (Oxford: Lexington Books, [1998] 2005); Anirudh Deshpande, 'An Historical Overview of Opium Cultivation and Changing State Attitudes Towards the Crop in India, 1878-2000', *Studies in History*, Vol. 25, No. 1 (2009), pp. 109-143.

limits of the salt officials' economic rationalisation of illegal manufacturing activities. It brings to the fore the critical issue of *norms*, the salt makers' own criteria to distinguish appropriate political and economic behaviours from inappropriate ones.

In the concluding section, I claim that the existing arguments of power and profit draw upon the salt officials' political and economic understanding of illicit activities and are inadequate in fully appreciating why the illicit manufacture and trade continued despite their legal and fiscal measures. I argue that many salt manufacturers and traders did not see the Bengal Government's claim to monopoly as natural in the period because they had not yet regarded it as a natural sovereign. Its basic tools of governance were still being fashioned and its officials were still ambivalent about their mercantile and governing interests.[6] These manufacturers and traders thus evaluated the fiscal arrangement of the Government monopoly from the vantage of the customary norms and saw it as an alien legal-organisational complex of profit and tax. Regardless of the Government's distinction of licit/illicit salt, they continued to make and sell *normal* salt and reproduce the plural economic arrangements of the pre-monopoly days. Far from assessing these activities as acts of subversion or dangerous profit making, as previous historians have done, I see them as the positive assertions of what the salt manufacturers and traders perceived as the normal state of economic affairs.

The Emergence of the Notion of Illicit Salt

The notion of illicit salt originated in Bengal in the 1780 plan of the Agency System of salt manufacture. The first clause of the Plan specified that '*all* the salt of the Provinces be manufactured *for* the immediate account of the Honourable Company'.[7] Subsequently, all salt that was not paid for or not sanctioned by the Government was declared as 'illicit' and liable to confiscation. The task of seizing the contraband salt was assigned to the Salt Agents, whose main task was to supervise the manufacturing activities in the Government salt fields in their areas. Besides their monthly salaries, they received an annual commission, proportionate to the amount produced in their Agencies and the amount they confiscated.[8] From the outset, illicit and licit salt manufacture were thus closely intertwined and linked to the salt officials' personal remuneration.

[6] Graeme Gill, *The Nature and Development of the Modern State* (Hampshire: Palgrave Macmillan, 2003), p. 5.
[7] *Ninth Report*, p. 314. Italics added.
[8] Regulation XXIX and XXX of 1793 in *Ninth Report*, p. 314.

In the course of consolidating the monopoly manufacture, the salt officials came across a variety of local saline substances. These substances were derived from different raw materials, and produced by using different techniques. They had both culinary and non-culinary applications. Local manufacturers (*Kurwa*s) in Bihar, for instance, burnt piles of alternating layers of stubble with a crystalline efflorescence (*Rych*) to make *Kharee* salt. This process produced three types of salts. About half of the product was *Phool Kharee*, used 'almost exclusively' for mixing with the Agency's boiled salt (*Pangah*). The remainder comprised of *Bher Kharee* (lit. the salt fed to the sheep) and *Chomar Kharee* (lit. the salt for the tanner). Another salt used for human consumption was the *Puckooah* (lit. cooked salt), which was derived from saltpetre refuse.[9] The unit cost of production for the *Kharee* was one-fifth and for the *Puckooah* one-fourth of the Agency salt. In 1815, the annual production of these local substances in one district of Darbhanga alone was 50000 Mds, nearly one-fifth of the estimated demand in that province.[10]

The same year, the Chittagong Salt Agent reported that another variety of salt called *Noon-chye* was in widespread use in that Agency. According to him, *Noon-chye* had grown from being a 'trifling source' to being 'an immense Traffic' of commerce over the years. It was made by evaporating seawater in large shallow vats (*Thullah*s), which were tended by several hundreds men. The salt was stored in many warehouses (*Golah*s), where numerous retailers (*Chye-beparrie*s) congregated and participated in the periodic auctions. Several hundred boats carried the salt up and down the local rivers. Many landholders considered the manufacture lucrative and had interests in the business.[11] The Agent, to his dismay, learnt that such widespread production and consumption of the *Noon-chye* was hampering the sale of the *Pangah* in that Agency.[12]

The Agent also found other saline specimens in that district. In some areas, the local population made the *Chye* (lit. salt) by burning 'sticks and roots of trees' that had been driven ashore by the tide. In the coastal areas of Nizampore, he described how men 'scraped up the Earth before their doors' (*Choolah ash*), filtered it with brine and boiled the product as and when they needed salt. The poor simply tied up a small portion of the *ash* in a cloth, dipped it in water and pressed out the brine into their

[9] There was no estimate on the Puckooah after the Company's monopoly of saltpetre was terminated in 1813. See John Stephenson, *Treatise on the Manufacture of Saltpetre: Descriptive of the Operations and Proper Plans to be Used for the Manufacture of Culmee and Cooteah* (Calcutta: Military Orphan Press, 1835).
[10] Bengal Board of Trade (BBT) to N. B. Edmonstone, 1/08/1815 in *Bengal Revenue Council (Separate) Salt and Opium Consultations* (hereafter, *BRCSOC*), *7/09/1815* (BL: *IOR/P/100/1*).
[11] Chittagong Agent to N. B. Edmonstone, 2/04/1815 in *BRCSOC*, *25/10/1815* (BL: *IOR/P/100/1*).
[12] J. Irwin to BBT, 6/09/1813 in *BRCSOC*, *28/01/1814* (BL: *IOR/P/99/54*); J. Irwin to BBT, 2/04/1815 in *BRCSOC*, *25/10/1815* (BL: *IOR/P/100/1*).

vegetables. Hardly any manufacture was involved in this case. Nonetheless, the 'best families' in the area purchased the *Choolah ash*, and after converting into regular salt and sold it for 'the great profit which attended the Domestic Manufacture'.[13]

In order to safeguard its monopoly profits, the Government developed legal provisions to prohibit the production of these local varieties of salt. In 1800, it declared heavy penalties for mixing the 'impure' *Kharee noon* in the 'common' or 'alimentary' *Pangah*.[14] It described the practice not only as a 'gross fraud', 'highly injurious to the fair trader', but also as 'a fraud of the most pernicious tendency' on account of the mixture being 'very prejudicial' to the consumers' health. The Government empowered the police and the salt department to confiscate and destroy the 'impure' and adulterated article. It also assigned to the district judges the task of enquiring into the circumstances of the confiscation and upon conviction, of levying the fine.

There was, however, considerable ambiguity regarding the constitution of *Kharee noon*.[15] As a result, the judges frequently referred the 'adulterated' salt to Calcutta for chemical analysis. The referrals delayed the court proceedings. Besides, there was a danger that the examination could betray the dietary fitness of the *Kharee* in which case the very rationale for prohibiting its manufacture and use would be open to doubt. The legal process therefore made the salt officials anxious. Soon, the Government asked the judges to ground their decision upon the report of a sufficient number of 'respectable merchants and dealers, without causing the salt to be examined by a chemical process'.[16] The change in legal provision shows that the Government was keen on protecting its profits and not on justifying its claim that the local salt was 'impure' and a hazard to human health.

There were differences in the opinion within the Government's salt administration regarding the effective way to regulate these salts. In 1815, several Calcutta salt merchants petitioned the Bengal Board of Trade (BBT) stating that demand for the *Pangah* in Bihar had dwindled sharply in the previous years.[17] In response, BBT asked a *Chokey* superintendent to investigate the extent of local salt

[13] Chittagong Agent to N. B. Edmonstone, 2/04/1815 in *BRCSOC, 25/10/1815* (BL: *IOR/P/100/1*).
[14] Regulation IV of 1800. The fine was 10 SRs per Md on possessing the mixture. The nomenclature for legislation in India during the Company rule followed this format: 'The Regulation X of 1800' indicated the tenth piece of legislation promulgated in the year 1800. After 1833, the term 'Regulation' in the title was changed to the term 'Act'.
[15] On the confusion among the administrators regarding the chemical identification of these local salts, see Francis Buchanan, *An Account of the District of Purnea in 1809-1810* (Patna: Bihar and Orissa Research Society, 1928), pp. 553-554.
[16] Regulation XLVII of 1803.
[17] Out of estimated consumption of 8 lakhs Mds in Bihar, their supply had fallen from 653000 Mds in 1810/11 to 239400 Mds in 1814/15. BBT to N. B. Edmonstone, 1/08/1815 in *BRCSOC, 7/09/1815* (BL: *IOR/P/100/1*).

production. He found that the Government's policy of discouraging the use of local salts had not been working. In any case, he thought that a complete ban on their manufacture would not be practical since the manufacturing sites were widely scattered and any attempt to enforce the ban would be very costly. Furthermore, it was not possible to enumerate in law all the distinct substances found in the province in which case the prohibition would not be comprehensive. These arguments did not stop BBT from producing a draft regulation on 'effectual prevention of smuggling of salt in Bihar, suppressing Puckooah salt, for banning adulteration alimentary salt with *kharee noon* etc' in 1816.[18] The Bengal Council, however, refused to promulgate the ban and instead chose to levy a duty of 1 SRe per Md on the Bihar salts. It assumed that the 'inferior' local varieties, now made more expensive because of the duty, could not threaten its *Pangah* salt earnings from Bihar.

The Council's response to local salts depended on its perception of the threat they posed to the monopoly. As I mentioned above, BBT perceived the widespread use of the *Noon-chye* and other varieties of salt in Chittagong to be detrimental to its earnings from that Agency. If unchecked, the production of that salt could eventually grow to replace the monopoly manufacture in that quarter. Prompted by the BBT, the Council therefore swiftly imposed a complete ban on the substances in 1819. At the same time, it subsidised the sale of the *Pangah* in that Agency. The Agency officials hoped that heavy penalties on the proprietors of the *Chye* grounds, threats of confiscation and 'corporal punishment' for anyone possessing these substances would discourage the local population from making the *Chye* and motivate them to buy the subsidised *Pangah*.[19] The twin measures achieved little effect. Thousands of homes along the Chittagong coast continued to have floors made entirely of salt-earth. Their residents went on making and using brine as and when required.[20] The Government tried to outlaw the scraping of such saline mud, but the courts halted the measure.[21]

The cases of *Kharee*, *Puckooah* and *Noon-chye* reveal that the Government became aware of their existence in the course of imposing and consolidating its monopoly organisation in Bengal. These salts were derived from various sources, found in unfamiliar sites, produced by diverse methods and, they had both culinary and non-culinary uses. Instead of distinguishing these substances by analysis, the salt officials preferred to label them indiscriminately as 'illicit' in their zeal to preserve

[18] BBT to N. B. Edmonstone, 1/08/1815 in *BRCSOC, 7/09/1815* (BL: *IOR/P/100/1*).
[19] The Regulation X of 1826 subsequently extended the ban to all saline substances produced in the Company territories in India.
[20] Tarashankar Banarjee, *Internal Market in India, 1834-1900* (Calcutta: Academic Publishers, 1966), p. 217.
[21] *The Constructions of the Regulations and Acts issued by the Court of Sudder Dewanny Adawlut, from 1798 to 1847, with an Index* (Calcutta: Thacker, Spink and Co., 1855), p. 518.

commission. The officials then employed fiscal measures to restrict the production and use of these substances. They used the term 'illicit' as a strategy to incorporate the local salts into the monopoly regime. But these measures proved ineffective in part because their idea of illicitness depended not on what the substances were, but on what the *Pangah* was not.

Indeed, illicit salt and Agency salt appeared mutually exclusive from the Government's perspective. Its officials, especially those sitting in their seat of power at Fort William in Calcutta, routinely characterised the illegal salt manufacture and trade as the work of rebellious landholders, greedy *Beparrie*s and hapless manufacturers. They thought that such activities always took place clandestinely, and that only corrupt native officials were involved.[22] For them, the Government's punitive and incentive-based measures to control illegal manufacture were efforts to make a refractory population submit to its fiscal regime. This view was reflected on their struggles to regulate the economy of an alien population in an unfamiliar territory. Contemporary colonial historians, in their capacity of colonial government officers, shared these difficulties. They too took the phenomenon of illicit salt as a problem of fiscal governance.[23] From the outset, the notion of illicit salt was therefore imbued with political and economic significance.

The Identity of Illicit and Licit Salt

The manner in which the Bengal Government interpreted and incorporated the unknown world of local manufacture into its expanding scope of appropriation might be interpreted to suggest that illicit salt was simply a product of politics of interpretation. Such a political account would, however, require at least two clearly defined opposing groups in the monopoly territories, whose attitudes and practices regarding the illicit salt expressed the power relations between them. This is a problematic requirement in the case of illicit salt because of the considerable overlap between the worlds of illicit and Agency salt.

To begin with, a large quantity of illicit salt actually originated from the Agency administered salt farms and *Golah*s. It was produced by the same manufacturers who made the *Pangah* for the Agencies. This close relationship caused some officials to believe that illicit salt was mainly comprised of salt stolen from the Agency *Khallarie*s. The contraband salt 'can not have any other source than the little salt the molungies every now and then pilfer' from the fields, a salt official wrote in

[22] Bullooah & Chittagong Agent to BBT, 2/04/1815 in *BRCSOC, 25/10/1815* (BL: *IOR/P/100/1*).
[23] F. D. Ascoli, *Early Revenue History of Bengal and the Fifth Report, 1812* (Oxford: Clarendon Press, 1917).

1793.[24] '[N]ow that the boiling has begun, and the strictest Vigilance will be exerted to secure salt from being pilfered… by the Molunghees that they will do their utmost to steal', another wrote in 1815.[25] They estimated that five Mds of salt was pilfered from the salt fields for every Md made for the Agency.[26]

The Government officials generally regarded all lower 'native' officials to be corrupt. Clause XV in the Regulation XXIX of 1793 reflected this view. It explicitly forbade the 'native' officers from 'making salt for themselves, or conniving at any other person making salt on their own private account'. In 1811, the Agent of the 24-Pergunnahs attributed the rapid decline in the Agency's production to the 'improper Degree of confidence' placed in the native *Khallarie* guards (*Amlah*s).[27] The Agents viewed these men as indispensible for policing the salt fields, but precisely because of such dependence, could not help suspecting them.[28]

The officials often spoke of a smuggling network comprising the guards, the manufacturers, peddler merchants (*Paikar*s) and the *Chokey* officials. They saw 'a combination and identity of interests' throughout the native establishment.[29] The *Chokey* superintendents (Salt Darogahs) allegedly entered into an arrangement (*bandobast*) with the *Paikar*s and allowed their illicit packages of salt to pass through the checkpoints.[30] The *Khallarie* guards, meanwhile, were said to collude with the *Golah* keepers in order to embezzle the Government money. In 1812, the guards allegedly collected an unauthorised tax of eight Mds from each of the 800 brine-boiling houses in Hateeah and Surgundee. They then deposited it in the Agency *Golah*s, passing it off as legitimate supplies from some fictitious salt contractors (*Tavildars*). Next, posing themselves as the contractors, they withdrew the money from the Company account and distributed it among themselves.[31]

The Agents directed the rhetoric of concealment against their lower native assistants. In 1814, a tornado struck in Bullooah & Chittagong. The Agent initially reported that it had swept away many thousands of Mds of salt and had destroyed

[24] Sinha, *Midnapore Salt Papers*, p. 55.
[25] Bullooah & Chittagong Agent to BBT, 31/12/1814 in *BRCSOC*, *25/10/1815* (BL: *IOR/P/100/1*).
[26] Balai Barui, *The Salt Industry of Bengal: 1757-1800* (Calcutta; New Delhi: K P Bagchi & Company, 1985), p. 146.
[27] 24-Pergunnahs Agent to BBT, 9/01/1811; BBT to Agent, 29/01/1811 in *BRCSOC*, *3/02/1811* (BL: *IOR/P/99/41*).
[28] Arguing for a revival of the system of policing the salt marshes, an Agent wrote in 1815, '[Y]ou, Gentlemen, must be aware how little dependence is to be placed on' on the 'inferior' officers. See J. Irwin to BBT, 31/12/1814 in *BRCSOC*, *25/11/1815* (BL: *IOR/P/100/1*). Yet five years later, his successor attributed his success in controlling the illicit manufacture to these very officials. See John Drew to BBT, 28/04/1819 in *BRCSOC*, *13/05/1819* (BL: *IOR/P/100/27).*
[29] Balui, *Salt Industry*, p. 144.
[30] 24-Pergunnahs Agent to BBT, 9/01/1811; BBT to Agent, 29/01/1811 in *BRCSO*C, *23/02/1811* (BL: *IOR/P/99/41*).
[31] Bullooah & Chittagong Agent to BBT, 31/03/1812 in *BRCSOC*, *29/05/1812* (BL: *IOR/P/99/41*).

seven *Golah*s. A year later, he 'discovered' that the native officers had falsified the *Golah* accounts to 'embezzle' about 26000 Mds.[32] The Agent explained how during the reweighing of the salt stocks, the *Golah* keepers deliberately entered reduced quantities in the books (*Purtal Account*) in order to siphon off the difference between the actual and reported amounts to the smugglers' network.[33] As I will show below, the practice of falsifying the Government accounts was not limited to the native officials.

For their part, the manufacturers applied the same rhetoric of concealment against the salt officials. They alleged that the Agency officials tampered with standards of weights. The Mynachoura salt officials reckoned a bullock load as two instead of its customary weight of three Mds.[34] The weighmen (*Kyal*s) and the port officials (*Shahbundur*s) used their own measures and, as a result, took up to twice the quantity specified in the supply contract. The officials then fed the extra salt into illegal networks.[35]

The 'native' officials also implicated the British superiors in smuggling. A former head weighman of the Sulkea *Golah*s spoke in 1814 of 'unlawful means practiced by the Collector, Agents, and the inattention of the Board Gentlemen' causing the loss of about 'One Crore of Rupees annually for the Company Bahadoor'. [36] He said that he could prove their collusive arrangements in the Company's Supreme Court, and further claimed that he could supply the entire requirements of the Government monopoly at half the existing Agency disbursements.[37] Many 'native' employees shared this view.[38]

BBT did not deny these allegations nor did it ask for the alleged evidence. It did however reject any suggestion that the natives should supply salt for the Government monopoly.[39] The BBT's response to the charge of systematic personal profiteering within its establishment seemed evasive to the Bengal Council. Fearing

[32] Bullooah & Chittagong Agent to BBT, 12/05/1814 in *BRCSOC*, *23/06/1814* (BL: *IOR/P/99/54*); Bullooah & Chittagong Agent to BBT, 27/06/1815 in *BRCSOC*, *26/07/1815* (BL: *IOR//P/99/59*).
[33] J. Irwin to BBT, 3/06/1815 in *BRCSOC* (BL: *IOR/P/99/59*).
[34] Sinha, *Midnapore Salt Papers*, p. 4.
[35] 'The Kyal took six Maunds of salt for himself and his writer twenty Seers, his Brahmin cook twenty Seers. The Shahbundur's servant takes twenty Seers. In this manner at the breaking of the Pile of every Cullaree they take seven Maunds and a half of salt besides the four rupees Tehreer which distresses us most'. See Petition by Raghoo Dinda and Other Manufacturers, April 1799 in *Midnapore Salt Papers*, p. 35.
[36] Petition of Dyram Doss to Governor General in Council (GGC), 2/01/1814 in *BRCSOC*, *28/01/1814* (BL: *IOR/P/99/54*).
[37] Petition of Dyaram Kyal to GGC, 8/02/1814 in *BRCSOC*, *25/03/1814* (BL: *IOR/P/99/54*).
[38] Petitions by Fakeerchund Kyal, Rajechund Mitter and Juggernauth Doss Kyal in *BRCSOC*, *25/03/1814* (BL: *IOR/P/99/54*).
[39] BBT to GGC, 29/03/1814 in *BRCSOC*, *29/04/1814* (BL: *IOR/P/99/54*).

more revelations, the Council tried to silence the weighman by offering him his former position.[40]

The merits of these competing claims are hard to judge. Nonetheless, they indicate how pervasive illicit salt production was within the monopoly organisation. Everyone thought that everyone else was involved in it. A great number of Agents, *Chokey* officials, native officials and manufacturers – in short the very people who undertook the tasks of defending and perpetuating the monopoly production – were engaged in the illicit production.

There was another way in which the trope of opposition, as implied in the power argument, is unhelpful. First, a brief discussion on the legal provisions for seizing illicit salt will be useful to understand how it was possible for some *Chokey* officials to create illicit salt out of any salt. From 1793, the Government began paying a reward for any information about illicit salt that led to a successful conviction in the courts. As a result, a professional group of informers (*Goindah*s) had come into existence around every *Chokey*.[41] The Government soon realised that the system of reward was not working. Convictions took a long time to secure. The *Chokey* officials also had no incentive to act promptly on the *Goindah*s' information. To rectify the situation, from 1795, the reward began to be distributed as soon as salt was seized. The acting officials were also given twenty-five percent of the value of the seized salt, which doubled when they acted on their own. The informers were provided with rewards-in-advance (*Inaam Peishgee*) to encourage them to bring valuable news about clandestine activities.[42] In 1801, the Government extended this system of reward to any information related to manufactories erected in private lands. Consequently, salt raids became widespread. For many informers and the *Chokey* officials, the provision of reward opened the way for conducting a lucrative business.

In January 1817, the Government set up an Enquiry Commission to investigate John Kinloch's involvement in the manufacture and trade of illicit salt.[43] Kinloch was the Superintendent of Midland Salt Chokies and one of the highest salt officials to face a charge of misusing the Government's reward money.[44] In short, the charge was that he distributed the *Inaam Peishgee* to his subordinate *Chokey* officials. They in turn

[40] GGC to BBT, 16/08/1816 in *BRCSOC, 16/08/1816* (BL: *IOR/P/100/5*).
[41] For the role of, and rewards to, the informers, see sections 3, 8 and 9, Regulation XXX of 1793.
[42] See Section 2, Regulation XL of 1795.
[43] Edward Watson and Charles Bayley headed the Enquiry Commission instituted on 23/05/1817 (BL: *IOR/Z/P/770*).
[44] Kinloch's predecessor Charles Becher, who was the Superintendent from 1803 to 1811, was implicated for abusing his position. See Charles Becher, *Memorial to the Honourable Court of Directors for the Affairs of the East India Company* (1826).

used that money to buy salt, and reported it to him as seized illicit salt. Kinloch then claimed a reward from the Government based on these fabricated seizures.[45]

Ram Tunoo Mitter, a retired Salt Darogah, explained the procedure to the Commission. First, Kinloch collaborated with his head Native officer to appoint a set of favourites as the Salt Darogahs. Each Darogah was given SRs 700 to 2000 to buy salt. The manufacturers and peddlers hid the pre-purchased salt 'under a Tree or in a Jungle' in a tacit agreement with the *Chokey* officials. Then either the Darogah or one of his subordinates took the salt away, fabricated the names of informers and witnesses and reported it as illicit salt to Kinloch. The Superintendent subsequently claimed rewards for the seizures for himself and his officers, personally pocketing up to 35 percent of the proceeds.[46] There was a significant amount of evidence against Kinloch. Two head manufacturers attested that a Darogah offered to buy their salt in Kinloch's presence.[47] Others claimed that the 'plunder' peaked in the season of 1813/1814.[48] Many European and local salt officials also confirmed their knowledge of such arrangement in Kinloch's Superintendency.

Although the Enquiry Commission absolved Kinloch of any direct wrongdoing, it highlighted his 'suspicious' manner of reporting the incidents of illicit salt to BBT. The Commission cited one such instance. In 1814, Kinloch reported to BBT that four salt merchants (*Beparrie*s) were making 'secret' advances of SRs 40-45,000 to the manufacturers of Bellia and Belinda under the 24-Pergunnahs Agency. Then he mentioned that the *Beparrie*s offered him a bribe of 10-12,000 Mds of salt for 'running' 20-25,000 bags of illicit salt from the area. Next, he requested extra *Chokey* personnel to prevent the smuggling. He then gave the news that 35,000 thousand Mds had been captured through the additional stations. When BBT did not approve the cost of his new *Chokey*s, a dispirited Kinloch reiterated the accuracy of his information but did not submit the allegedly seized salt to the Government *Golah*. At the same time, he obstructed the enquiry instituted by the Salt Agent to investigate his claims. When the Agent finally charged a *Chokey* officer of purchasing salt, Kinloch 'misled' BBT by providing false information about the officer and stopped the

[45] Commissioners' Report to Territorial Department Secretary, 6/12/1817 (BL: *IOR/P/100/16*).
[46] Deposition of Ram Tunoo Mitter, 23/06/1817 (BL: *IOR/P/100/P/17*, pp. 225-261); Petition of Ramkishore Sirdar of Joyrampore to BBT (BL: *IOR/P/100/17*, pp. 71-74). Sirdar was an informer and thus, his charge that 'the name of Goindhas which were used in the Reports are all fabricated ones' carries a good deal of weight.
[47] Depositions of Sirdar Molungies Alum Gauzee of Semanpore in Pergunnah Agurpara and Saujun Gauzee at Codla of Pergunnah Baleea (BL: *IOR/P/100/16*).
[48] Petition of Hurrynarrain Roy (BL: *IOR/P/100/16*).

enquiry.[49] Other covenanted salt officers also attested that Kinloch's accounts of smuggling were 'frivolous, unfounded and jumbled together for sinister purposes'. Faced with such universal mistrust, Kinloch resigned from his post in 1818.

The illicit salt in the Kinloch episode differs from the salt pilfered from the Agency salt fields or produced by falsifying the *Golah* books. In this case, the Government's own preventive *Chokey* establishment created its illicitness, using the Government money. The manufacturers did not perceive it as either secret or illegal. Yet it appeared in the Company books as illicit salt. Here, an important branch of the monopoly regime produced both the discourse *and* the substance of illicit manufacture for its own fulfilment. This example therefore points at the limits to the trope of opposition assumed in the power argument.

The Diversity in the Illicit Salt Landscape

The power argument is also problematic because it considers the internal differentiation within the allegedly opposing groups as inconsequential to the story of illicit manufacture. The Bengal salt correspondence, on the other hand, reveals significant fissures within the Government salt establishment that affected its ability to control the activities related to illicit salt.

The salt making Agencies and the salt trade-regulating *Chokey*s, for example, frequently fought over their common privileges and competed for a share of the profits made from illicit manufacture and trade. In the 1780s, the Government established the *Chokey*s along major routes between the salt fields and markets. The *Chokey* officials kept lists of the names of salt farms and manufacturers in their respective areas. These records helped them to verify the origins of the salt packets that passed through their checkpoints. They then issued forwarding passes (*Rowannah*s) and certificates of origin and destination (*Char Chittie*s) for each corroborated consignment. They fined double the value of consignments for all other packets.[50] Many *Chokey* officials had turned the system of corroboration into a profitable task. They readily issued the passes and certificates to any salt packet when traders offered money.[51] However, in 1791, the Government delegated many of these roles and responsibilities to the Agents also.

---

[49] Kinloch to BBT, 3/06/1814; Kinloch to BBT Secretary, 15/06/1814; BBT Secretary to Kinloch, 21/06/1814; Kinloch to BBT Secretary, 20/10/1814 (BL: *IOR/P/100/17*); Report of the Commissioners to Territorial Department Secretary, 6/12/1817 (BL: *IOR/P/100/16*).

[50] Additional Instructions to *Chokey*s from the Asst. Comptroller, 22/06/1789 quoted in Sinha, *Midnapore Salt Papers*, p. 15.

[51] 24-Pergunnahs Agent to BBT, 9/01/1811; BBT to Agent, 29/01/1811 in *BRCSOC*, *23/02/1811* (BL: *IOR/P/99/41*)

Another Regulation that year provided inconsistent directions to the officials in the two branches, creating ambiguities regarding their respective authorities. For example, the Regulation authorised an Agent to have his man involved in the assessment of the salt boats (*coot*) by a *Chokey* official. It also told the latter that he could perform the action even if the Agent's representative was absent.[52] Such overlapping of responsibilities and conflicting areas of authorities led to frequent clashes between the Agency and the *Chokey*.

By the 1810s, the antagonism between these departments had flared up to such an extent that each was accusing the other of protecting the salt smugglers. In 1814, John Kinloch, the Midland Superintendent, reported to the BBT that more than 20000 Mds of salt was stored in the 24-Pergunnahs Agency farms ready to be smuggled. When the BBT permitted Kinloch to enter the manufactories, the Agent felt that his jurisdiction had been infringed. He pointed out at the collusion between the *Chokey* officials and his subordinate officers in pilfering activities, and stressed the need for the Agency and *Chokey* to act jointly. Then Kinloch brought another complaint about the 'actual' existence of 10000 Mds of salt made with private money, and of 30000 Mds of 'illegally manufactured' salt in the same Agency. The Agent now conceded that some British non-covenanted servants might have failed to report on such matters. He still insisted that Kinloch's subordinates, who illegally purchased salt from the manufacturers, were equally culpable for this state of affairs.[53] BBT, however, soon became distrustful of Kinloch's imprecise dispatches and it left the tension between the two branches unresolved.[54]

Similar disputes took place between the *Chokey* officials and the police. In 1814, Kinloch complained that the police in his division unlawfully seized illicit salt. The Regulations required the police to hand over the seized salt to the *Chokey*. Instead, they either demanded the reward for the confiscation or sold it to the corrupt traders. He further alleged that the police refused to assist the *Chokey* officers, stood by when the 'smugglers' beat the officers on duty, and helped the illicit salt manufacturers and traders to escape. Forwarding several petitions by his subordinates to the BBT, he argued that it was impossible to perform his duty, when aided by the

[52] March 1791 Regulations quoted in Sinha, *Midnapore Salt Papers*, pp. 25-26.
[53] Kinloch to BBT Secretary, 15/06/1814; BBT Secretary to Assistant Agent, 21/06/1814; C. R. Lindsay to BBT Secretary, 16/09/1814; BBT Secretary to Acting Agent, 20/09/1814; Kinloch to BBT Secretary, 20/10/1814 (BL: *IOR/P/100/17*). A non-covenanted servant, Mr. Brainbridge, was subsequently charged for falsifying the *Golah* accounts, and of concealing deficiencies. See Lindsay to BBT Secretary, 31/10/1814; BBT to Vice-President in Council, 6/10/1814 (BL: *IOR/P/100/17*)
[54] On Kinloch's 'imprecise' allegation, see BBT Secretary to Kinloch, 1/10/1814 (BL: *IOR/P/100/17*). For a similar but earlier conflict, see W. Farquharson to BBT, 24/10/1804 quoted in Sinha, *Midnapore Salt Papers*, pp. 141-142.

police, the smugglers conveyed salt away in 'armed bands'.[55] The BBT wrote to the Governor General that the 'disinclination' of the police to assist its *Chokey* officers had been a longstanding problem.[56] The Governor General asked the Magistrates, who were in-charge of the police establishment, to rein in the police officers in their districts. But they had little control over the police. As a result, the role of the police in the seizure of illicit salt remained a contentious issue until the 1830s.[57] In short, the structures erected to control illicit salt were weak and fragmented.

Similarly, the sources also show that the salt officials' portrayal of the various social groups involved in the illicit manufacturing activities reflected their own political map of the colony, and not the actual behaviour of the members within the groups. Consider, for example, the diversity existed among the men, whom the salt officials collectively referred to as 'refractory men'. These were defiant Zemindars, moneylenders, artisans, peasants and the forest dwelling mountaineers. These groups of men were integral to the monopoly organisation as holders of salt lands, suppliers of capital, providers of provision and labourers. The salt officials clearly depended on the men in order to manage the regular manufacture of salt. But precisely because of this dependency, the officials perceived any sign of disobedience from them as threatening, and quickly moved to quell their 'refractory' behaviour. Indeed, the official narrative of the salt monopoly is a story of a gradual pacification of these noncompliant men. However, scrutiny of the actions of one of these groups, the landowners, complicates such a portrayal.

The holders of salt lands were directly affected by the arrangements created under the monopoly. The Agencies established new salt fields by acquiring their salt and fuel lands often forcibly. When the Agents did purchase the lands, they set the 'market price' of these lands arbitrarily low. In cases where they took the lands on lease, they gave nominal rent to the landholders. They also extended existing salt manufactories without prior notice or without increasing the rent proportionately.[58] All landholders lamented these measures, but responded differently. Some of them accepted low compensation in the hope of getting favourable land revenue contracts

[55] Petition of Joy Krishen Seit, the Acting Darogah of Poinjolly to Kinloch, 22/03/1814; Petition of Boolchund Purmanick, Goindah of Sankrale in Mozufed Pergunnah to the Superintendent, Western Salt Chokies (WSC), 20/04/1814; Petition of the Mohurir of Khundar Salt Chowkey to the WSC Superintendent, 4/04/1814 and 30/04/1814; Kinloch to BBT, 30/05/1814 in *BRCSOC*, *23/06/1814*; Petition of Ram Gopaul Roy, Darogah of Sulkea to Kinloch, 26/05/1814; all in *BRCSOC*, *23/06/1814* (BL: *IOR/P/99/54*).

[56] BBT to GGC, 19/03/1816 in *BRCSPC*, *5/04/1816*; BBT to GGC, April 2/04/1816 in *BRCSOC*, *26/04/1816* (BL: *IOR/P/100/3*)

[57] Sections III to VIII of Act XXIX of 1838.

[58] Suit of Ramkishen Dutt, Talookdar Kismut Pergunnah Hatteegur Myda and Birjhatty Zilla, 24-Pergunnahs against 24-Pergunnahs Agent; Suit of Gholam Russol Chowdry against 24- Pergunnahs Agent in *BRCSOC*, *25/01/1812* (BL: *IOR/P/99/47*).

elsewhere. Others adopted a more confrontational stance. The disgruntled ones discouraged manufacturers from working for the Agency by obstructing access to the brine or to the fuel lands. In 1811, for example, one landholder in the 24-Pergunnahs shut up the 'Public' waterway that brought brine to the Agency *Khallarie*s. When the Agent's men broke the dam across the creek, the landholder sent his 'armed forces' to rebuild it.[59]

Most landholders, however, oscillated between collusion and resistance. For instance, in 1796, a Salt Darogah seized 117 bullocks with 251 Mds of salt in the frontier hilly Zemindari of Jaggernaut Dhoul. The seized bullocks were a part of a larger convoy then in the Maratha country. The Maratha Zemindar across the border accused the Darogah of capturing the salt from his territory. Accordingly, he sent twenty armed men to 'rescue' the seized salt. The Darogah applied to the district revenue officer for assistance. The latter asked Dhaul to help the *Chokey* superintendent protect the 'illicit' salt from the Maratha men. Dhaul readily complied with the order. At the same time, he employed the local police officers to prove in the court that the salt was actually seized in the Maratha territory, and got the salt released. Subsequently, Dhaul increased armed patrols for his cross border salt trade.[60] Dhaul's complicated behaviour reflected one way the landholders were accommodating the demands of the monopolist Government within their interests.

Such a spectrum of responses did not prominently feature in the salt department reports, which routinely portrayed the landholders as a threat to its monopoly. Its despatches described them either as engaged in the illicit manufacture themselves or as protecting the others who were involved in that activity.[61] One report, for example, portrayed the Chotanagpur Zemindar as prejudiced against the *Pangah* trading merchants. He reportedly stopped the merchants if they did not pay 'great duties', and sent 'Choohaurs to plunder the merchants'.[62] But a closer reading of the report reveals that even here, the landholder took care not to show his antagonism towards the merchants. Regardless of such subtle responses, the department quickly moved to prosecute the landholders on mere suspicion of being involved in illicit salt. One Agent begged the Midnapore Judge to convict certain landholders in spite of, in

[59] The Agent construed the defiance as a mark of disrespect guaranteed to him by the Section XVII of Regulation XXIX of 1793. See 24-Pergunnahs Agent to BBT, 24/01/1811; BBT to GGC, 5/02/1811 in *BRCSOC*, *16/02/1812* (BL: *IOR/P/99/41*).
[60] Petition from the Darogah of Tannah Huldeepookooreeah, Contai, 30/08/1796 to Hidgellee Agent, quoted in Sinha, *Midnapore Salt Papers*, pp. 99-100; An account of the State of the Salt *Chokeys* at Tannah Huldeepookriah Dependent on Dhoulbhoom by Goorooperdhaud Roy, Darogah, Contai, 10/10/1797 in Sinha, *Midnapore Salt Papers*, pp. 106-107.
[61] W. Farquharson to BBT, 31/03/1805 in Sinha, *Midnapore Salt Papers*, pp. 144-150
[62] Petition of Jaggernauth Chtoorjeah, Darogah of Tannah Burlrampore to Hidgellee Agent, 18/07/1796 in Sinha, *Midnapore Salt Papers*, p. 128.

the Agent's words, the 'difficulties…in ascertaining the fact with sufficient exactness to prove the guilt of the parties'.[63] The landholders' ambivalent attitude to illicit manufacture, on the other hand, gave them some benefit of the doubt and the judges frequently acquitted them of any deliberate wrongdoing.[64]

In short, the landholders did not exhibit a distinct and coherent response to illicit salt. They certainly cannot be seen as simply opposing the monopoly. Yet the salt establishment boxed them within a single 'refractory' social group as it sought identifiable collaborators and enemies in the monopoly territories. Its political view of the local salt manufacture landscape did not admit any ambivalence. To imbue the landholders' involvement in illicit salt with a struggle for power, as the political interpretation of illicit manufacture tends to do, would simply perpetuate the monopolist's map of the colony.

Problems in the Profit Argument

Sympathetic salt officials interpreted the persistence of illicit manufacture in economic terms. The Tamluk Agent, for instance, viewed smuggling as 'indispensably necessary' for the poor manufacturers: The Agency contract rates barely covered their production costs; the market price of the article was well beyond their means; the *Khoraki* salt – a customary allowance of one boiling pot salt every fortnight – was not sufficient for family consumption. The Agent concluded that wedged in such a difficult situation, manufacturers had no option but to conceal a part of their daily produce in order to sell it in the market.[65]

Such economic rationalisation also informed the officials' attempts to solve the problem of illicit salt through financial incentives and penalties. One attempted solution was opening Government retail shops in some manufacturing areas. Existing *Pangah* salt retail outlets were concentrated around areas of strong demand such as big cities like Calcutta and Dhaka. The supply network also served well in some salt-

[63] W. Farquharson, for instance, thought 'no mode appears more effectual their than (?) by noting an example of those who have maintained them in violation of the most positive regulation.' See Hidgellee Agent to Midnapore Judge and Magistrate, 6/06/1802 in Sinha, *Midnapore Salt Papers*, p. 130.

[64] In 1815, Sunkree Dossee, the landholder of Pergunnah Hattiaghar, had the benefit of doubt due to her ambivalent reply. See Kinloch to BBT, 24/08/1815; BBT to GGC, 24/10/1815 in *BRCSOC, 25/10/1815* (BL: *IOR/P/100/1*); Translation of a Decree Passed by the Calcutta Provincial Court of Appeal, 28/01/1819 (BL: *IOR/P/100/27*). Oojulmunny, another landholder of the 24-Pergunnahs, could not stop the conviction by displaying such attitude but eventually got her fine halved. See Petition of Oojulmunny, Inhabitants of the Zillah of the 24-Pergunnahs in *BRCSOC, 28/08/1812* (BL: *IOR/P/99/48*); BBT to GGC, 18/01/1814; WSC Superintendent to BBT, 30/10/1813 in *BRCSOC, 25/02/1814* (BL: *IOR/P/99/54*).

[65] Tamluk Agent to BBT, 30/06/1802, quoted in Sinha, *Midnapore Salt Papers*, pp. 191-195. Thus in 1830s, the native Dewan in the Board of Salt also attributed the increase in illicit salt to 'the distressed state of the country', for 'want creates necessity, and necessity obliges man to the commission of crime'. See *Salt Report 1836*, p. 102.

scarce pockets in the interiors where the population was high. Manufacturing areas, by contrast, were typically sparsely populated and had no reliable supplies of the Agency salt. The article was expensive there. The officials thought that because of the scarcity of the *Pangah*, the local residents were forced to turn to illicit salt. They hoped that the licensed retailing of the *Pangah* would reduce the frequent occurrence of illicit production in the areas.

The retail experiment in Bullooah & Chittagong Agency in 1811 boosted the sale of the Agency salt in the first two years. The business 'woefully' fell off thereafter. In a bid to revive demand, the officials reduced the retail price to half that of the average market price elsewhere. This measure also proved ineffective.[66] What the economic solution missed was the fact that salt was not yet a fully commoditised article in the region. As I have mentioned above, most people in that region had access to *Noon-chye* free at their doorsteps, and they simply filtered brine through a piece of cloth. This population had no use for retail shops.

The officials also tried to plug one source of illicit salt by legalising the 'wastage' allowance. The 'wastage' was the estimated loss during the handling of salt as the manufacturers conveyed it from the boiling houses to the *Golah*s. Customs allowed the 'wastage' to the salt makers. But the quantity was not fixed and subject to negotiation between the manufacturers and the Agency officials. The Hidgellee Agent suspected that the manufacturers claimed higher 'wastage' quantities to pilfer a part of it. He argued that instead of tightening the control on the manufacturers' work, a task too difficult and costly for the widely scattered manufactories, it was sensible to formalise the allowance. He then sought estimates of 'wastage' from the 'native' legal writers, the landholders, the weighmen (*Kyah*s) and manufacturers themselves. The manufacturers reported to him the least amount of six Seers per Md of salt produced. He permitted them to keep it.[67]

This measure too proved ineffective. The Agent was puzzled. But if his link between the 'wastage' and pilfering was correct, he should have wondered why the 'pilferers' manufacturers should report the lowest of wastage estimates when higher estimates would have benefited them more. In fact, he should have suspected the writers, landholders and weighmen of pilfering as their overestimates required explanation. The failure of the 'wastage' measure indicates the inaccuracy of his idea that only hapless manufacturers could steal the Agency salt.

The most ambitious fiscal solution to the problem of illicit salt was the Surplus System tried between 1811 and 1814. The Surplus System was a mechanism by which

[66] Bullooah & Chittagong Agent to BBT, 6/10/1813 in *BRCSOC, 28/01/1814* (BL: *IOR/P/99/54*).
[67] Hidgellee Agent to BBT, 28/10/1797, quoted in Sinha, *Midnapore Salt Papers*, pp. 107-108.

the Government Salt Agencies bought all salt made beyond the quantity specified in the manufacturers' contract. The intention was to encourage production but, at the same time, to prevent the surplus from passing into unregulated business networks.

In 1811, the 24-Pergunnahs Agent reported to BBT a fifty percent reduction in the output in his Agency, attributing it to widespread illegal production in the Agency salt fields.[68] Principal salt merchants had privately confessed to him their involvement in the clandestine network. They had apparently told him that since the existing contract price no longer reflected their costs, 'they could not go on' without smuggling. But for every Md of illicit salt they sold, they apparently had to sneak away at least three Mds in order to pay for the 'price of their connivance': bribing the Peons, the salt checkpoint (*Chokeys*) officers and the informers (*Goindah*s). The Agent informed the BBT that the merchants would immediately stop their risky clandestine activity if the Government purchased their surplus salt at SR 1 per Md. This was twice the contract price but was still one-third of the wholesale market price. The Agent argued that by guaranteeing the purchase, the Government would loose some profit, but would acquire *all* of their produce. The measure would dry up supplies to the smugglers and strengthen the monopoly.[69]

The same year, the BBT implemented the Surplus System in the three Pergunnahs of Bellia, Bellinda and Calcutta. It hoped that illicit salt would 'if not totally suppressed, be greatly checked' by the scheme.[70] BBT deemed the plan successful in a year and extended it to Tumlook and Bulloaah & Chittagong Agencies in the season of 1811/12 with some modifications on the buying rate.[71] The Hidgellee Agent, who resisted the System on the basis that it was 'neither necessary nor expedient', had to give in following the demand for it from his contractors and manufacturers.[72] With the inclusion of Hidgellee, the System became the Government's main curative, as opposed to preventive, strategy for checking illicit salt production and trade in the monopoly territory.

Soon, however, the average selling price of the Agency salt began to fall. When more worrying quarterly sales figures followed, BBT rightly inferred that there was an

[68] 24-Pergunnahs Agent to BBT, 31/03/1811 in *BRCSOC*, *23/02/1811* (BL: *IOR/P/99/41*).
[69] John D'Oyly was re-proposing the plan. For an earlier proposal, see 24-Pergunnahs Agent to BBT, 20/06/1798 in *BRCSOC*, *23/02/1811* (BL: *IOR/P/99/41*). Charles Becher claimed the plan as his own. See Becher, *Memorial*.
[70] 24-Pergunnahs Agent to BBT, 9/01/1811; BBT to Agent, 29/01/1811; Agent to BBT, 9/01/1811; BBT to GGC, 23/04/1811 in *BRCSOC*, *23/02/1811* (BL: *IOR/P/99/41*).
[71] The Ballooah & Chittagong Agent suggested an incremental price scheme for the surplus salt to inhibit illegal movement *within* the agency. See BBT to GGC, 11/02/1812 in *BRCSOC*, *29/02/1812* (BL: *IOR/P/99/47*).
[72] The Hidgellee Agent weakened the System by fixing the Surplus price not on the annual basis as was done elsewhere, but based on average profit of production and the yield for the years 1806-1809 inclusive. See BBT to GGC, 7/04/1812 in *BRCSOC*, *24/04/1812* (BL: *IOR/P/99/47*).

overabundance of supplies of illicit salt in the market.[73] The Company's unsold stock of salt had been building up for some years and by 1814 was over one and a half times the amount annually consumed in Bengal.[74] BBT then took measures to restrict supplies in order to reinvigorate the prices. It abolished the Surplus System and informed the Agencies to reduce their contract output.[75]

The abrupt termination of the Surplus System jeopardised the Agency's relationship with the salt contractors and manufacturers.[76] The Hidgellee manufacturers had already gathered fuel at great expense and wanted the Surplus arrangement to continue for at least that season.[77] The salt contractors (*Zilladar*s) in Bullooah & Chittagong complained that by trusting [that] 'the Gentlemen never revoke any Orders', they had invested a huge sum of borrowed money in men, implements and boats.[78] The Cuttuck salt landowners were disenchanted with the Government for rescinding its promise of ever expanding the manufacture.[79] Some Agents too were alarmed by this step fearing it would result in mass 'unemployment' of the salt manufacturers. One Agent, for instance, said that it would 'send alarm to whole body of them, weaken their confidence, [and] make it difficult to increase the provision again'.[80] They suggested an increase in the contract rate as a measure to contain the rising discontent of the manufacturers.[81]

The BBT was not moved by the Agent's rhetoric which invoked thousands of 'helpless individuals [who] must fall a sacrifice for want of their usual and only means

[73] The annual selling prices in SRs/100 Mds from the year 1806 to 1814 were (in round figures) 322, 363, 374, 331, 336, 349, 331, 326 and 322. See BBT to GGC, 21/02/1814 in *BRCSOC*, *25/02/1814*; BBT to GGC, 29/03/1814 in *BRCSOC*, *29/04/1814* (BL: *IOR/P/99/54)*. The average quarterly selling price fell from 335 (1811 May) to 291 (1814 May). See BBT to GGC, 12/05/1812 and 14/07/1812 in *BRCSOC* (BL: *IOR/P/99/41*); BBT to GGC, 15/09/1812 in *BRCSOC* (BL: *IOR/P/99/48*); BBT to GGC, 28/03/1815 in *BRCSOC*, *31/05/1815* (BL: *IOR/P/99/59)*.

[74] The supply sources in 1814 were as follows: stock 1027913 Mds exclusive of surplus salt; manufacture 3572000 Mds; Cuttuck 200000 Mds; Foreign Salt and stock of Cuttuck 1582583 Mds; Foreign Salt imported 608000 Mds. The total supply was therefore 6990496 Mds against the demand of 4527063 Mds.

[75] Alleging non-uniform quality and higher price, the BBT recommended restricting the import of the Coastal Salt to five lacks Mds of 'fine white quality only', less than the half of the usual average quantity. See BBT to GGC, 29/03/1814 in *BRCSOC*, *29/04/1814*; BBT to GGC, 23/12/1813 in *BRCSOC*, *28/01/1814* (BL: *IOR/P/99/54).*

[76] Several Agents expressed this view. See Hidgellee Agent to BBT, 13/10/1813 in *BRCSOC*, *25/02/1814*; Tumlook Agent to BBT, 20/10/1813 in *BRCSOC*, *25/02/1814*; BBT to GGC, 1/02/1814 in *BRCSOC*, *25/02/1814* (BL: *IOR/P/99/54*).

[77] Hidgellee Agent to BBT, 25/03/1814 in *BRCSOC*, *29/04/1814* (BL: *IOR/P/99/54*).

[78] Petition of Sheikh Syefullah, Chuttenarayin, Bullub Chunder, Chutternarain Doss and other Zilladars in *BRCSOC*, *29/04/1814* (BL: *IOR/P/99/54*).

[79] Cuttuck Agent to BBT, 7/03/1814; BBT to GGC, 15/03/1814; GGC to BBT, 29/04/1814 in *BRCSOC*, *29/04/1814* (BL: *IOR/P/99/54*).

[80] Hidgellee Agent to BBT, 13/10/1813 in *BRCSOC*, *25/02/1814* (BL: *IOR/P/99/54*).

[81] The Hidgellee Agent suggested an increase in the contract rate by two As per Md, the Tamluk Agent half that amount. Their assumption was an offer of an increase of one Anna/Md would not materially affect the salt revenues. See Richard Becher to BBT, 20/10/1813 in *BRCSOC*, *25/02/1814* (BL: *IOR/P/99/54*).

of deriving subsistence'.[82] It expected the manufacturers to continue making surplus salt to make up the expenditures and to satisfy their conventional clientele such as the landholders and local royalties.[83] BBT was against the idea of substituting one system of incentive by another. It thus opposed the Agents' proposal for a higher contract rate as a check to the manufacturers' habit of making salt irregularly. Nevertheless, it conceded to an increase of half an Anna per Md (or, about six percent) in the contract rate. It called the increase a 'donation' and not compensation, signalling the temporary nature of the measure.[84]

Within two seasons, these steps produced mixed results. On the one hand, the 'salt disbursements', the Government expenses in the salt farms, was cut by about 40 percent. The stock of salt was also reduced to less than half of that held in 1813. On the other hand, meeting the annual sale of 4400000 Mds proved challenging as illicit manufacture and trade intensified. An indication of the scale of the illegal activities was the increase in the seizures of illicit salt.[85] The quarterly figures showed that the amount seized nearly doubled in a year, and in some areas actually tripled over a period of two years.[86] The *Chokey* officials struggled to check the resulting movement of salt, 'whilst the smugglers …convey it away in armed bands, sometimes composed of more than 100 persons'.[87] The average wholesale prices of the Company's *Pangah* salt, when corrected for the Coastal and Foreign-Confiscated sales figures, also fell from SRs 322 in 1814 to SRs 309 in 1815.[88] All indicated the ineffectiveness of BBT's fiscal attempts to manipulate salt supplies.

The rise in the illicit manufacture and trade in the post-Surplus days could be easily explained in economic terms. The reduction in Agency output made thousands of manufacturers redundant. They had no other option but to carry on making salt to sustain their livelihoods. A huge borrowed investment pushed the contractor-merchants (*Zilladar*s and *Beparrie*s) and producer-contractors (*Molungie*s) continued to produce the surplus yield irrespective of whether the Agencies bought it from them or not.[89] They continued to need buyers for the salt, and the smugglers were willing

[82] Cuttuck Agent to BBT, 7/03/1814 in *BRCSOC*, *29/04/1814* (BL: *IOR/P/99/54*).
[83] Hidgellee Agent to BBT, 20/10/1813 in *BRCSOC*, *25/02/1814* (BL: *IOR/P/99/54*).
[84] The 'donation' was further modified for the Bullaooh & Chittagong where its amount was decided based on the savings resulted from the abolition of surplus system instead of the estimates of surplus as elsewhere. See BBT to GGC, 1/02/1814 in *BRCSOC*, *25/02/1814* (BL: *IOR/P/99/54*).
[85] BBT to Deputy GGC, 3/09/1815 in *BRCSOC*, *25/10/1815* (BL: *IOR/P/100/1*).
[86] Bullooah & Chittagong Agent to BBT, 2/04/1815 in *BRCSOC*, *25/10/1815* (BL: *IOR/P/100/1*); Agent to BBT, 31/03/1814; BBT to GGC, 10/05/1814 in *BRCSOC*, *27/05/1814* (BL: *IOR/P/99/54*).
[87] Western Salt Chokies Superintendent to BBT, 30/05/1814 in *BRCSOC*, *23/06/1814* (BL: *IOR/P/99/54*).
[88] BBT to Deputy GGC, 12/09/1815 in *BRCSOC*, *7/09/1815* (BL: *IOR/P/100/1*).
[89] The pressure is palpable in the Hidgellee Agent's request for one lakh Mds of surplus production in 1816, a year later. See BBT to GGC, 4/04/1816; BBT to GGC, 19/03/1816 in *BRCSOC*, *26/04/1816* (BL: *IOR/P/100/3*).

buyers. The BBT's 'donation' was temporary, and was in any case only one-eighth of what the contractors got from the smugglers. The illicit network therefore expanded because the Government ended the Surplus System.

Such economic rationalisation would appear less convincing if one looks more closely at the actual illicit transactions. Consider the deposition made by Saujan Gauzee, a head salt producer-contractor (*Sirdar Molungie*) in January 1817 in front of the Government's Commission, which was investigating Kinloch's conduct. Saujan claimed that in April 1815 he was taken to Kinloch's house. There a Salt Darogah asked him to sell 200 Mds of salt to Kinloch. I have mentioned above that, this offer was a part of Kinloch's scheme by which he claimed reward for 'seizing' 'illicit' salt. In front of Saujan, Kinloch gave the Darogah the money for the deal and agreed to pay one Re 2 As per Md to which the *Sirdar Molungie* consented. After they agreed on the deal, Saujan and the Darogah went outside and, standing under a mango tree, Saujan asked for the money. Bulram Sircar, the Darogah, told him to collect it two days later. When Saujan returned for the money, Bulram offered him only one Re per Md. Bulram had other *Molungie*s confirm that they were supplying salt to him at that rate, which was still twice the Agency contract rate. However, Saujan made a *Salam* to Bulram, refused the new terms saying, 'If you allow the rate of 1 Re 2 As per Md, I will give salt'. But Bulram did not agree and Saujan went away.[90]

Several points emerge from the discussion in this section so far. To begin with, Saujan's response is not reducible to a simple economic logic. The Darogah's offer to buy salt at double the official contract rate was an attractive offer in itself. The Darogah also clearly indicated that he would take Saujan's refusal as an abnormal stance by having other manufacturers confirm the 'normal' rate. Yet Saujan laid far more importance on sincerity than on the terms of the offer. He put principle ahead of profit. He emphasised the point by saluting the *Darogah* (*Salaam*), the usual gesture of greeting, which now conveyed his sense of inappropriateness in Bulram's behaviour.[91] Next, the salt makers' attitude to Bulram shows that they did not evaluate Kinloch's arrangement in terms of legality/illegality. Judging by the place (Kinloch's house) and openness (in broad daylight and in full public view) in which the deal was included, they all assumed it as a normal offer, which became tainted only when Bulram altered the terms. Unlike during pilfering and falsifying accounts, the *Molungie*s were oblivious to the licit/illicit distinction on this occasion. Third, the

[90] Deposition of Saujun Gauzee, a Sirdar Molungie at Codla, Pergunnah Baleeah (BL: *IOR/P/100/16*). Emphasis added.
[91] On the changing meaning of salutation in colonial India, see David Arnold, 'Salutation and Subversion: Gestural Politics in Nineteenth Century India', *Past & Present*, supplement 4 (2009), pp. 191-211.

Government's economic measures such as huge fines, repeated demolition of their boiling houses, confiscation of all their implements, 'wastage' allowance, and the Surplus System could not solve the 'trait of vagary' of salt manufacturers.[92] This failure suggests that there is a need to look for extra-economic understanding of the manufacturers' engagement with illicit salt. The officials' economic rationalisation of the phenomenon could hardly grasp the subtleties involved in their actions.

The way *Chokeys* officials rationalised the 'refractory' behaviour of the local population also shows how they misunderstood extra-economic factors. In 1814, Kinloch recounted in a letter to the BBT how he had gone to capture illicit salt parcels in the village of Etindha and was nearly murdered by the 'smugglers'. Accompanied by two armed Burkundazes, he had entered the village and 'inadvertently' peeped in through a door of an earthen wall complex. Several people came out and asked what he wanted. He feigned his curiosity and said 'some water'. When they brought it, he drank and then left. Soon after, he continued, 'a great many people Men and Boys' began to follow him. 'Conceiving that curiosity alone was their Motive', he repeatedly shooed them away. As he approached the centre of the village, a crowd had gathered with enough strength to 'make a great noise, hooting and abusing' him in 'a most shameful manner'. Soon, the villagers began assailing him with 'Clods of earth, Brick bats and other missile articles they could lay hold of'. Kinloch fled to his boat while his bodyguards received severe blows, and as he rushed on board, 'the shower of Clods was so great as nearly to sink the Boat'. The crowd seemed so violent to Kinloch that if the villagers had caught his boat, they would have murdered a couple of men.[93]

Kinloch accused several people of 'orchestrating' the event, chief among them was a contractor linked to his former Native head official, whom Kinloch had recently turned away from the service. He interpreted the mass hatred as a collective response of the illicit salt makers to his efforts to capture their illegal trade. While this may have been the case, the villagers' response might equally have sprung from a reaction to his inappropriate way of approaching the interior of a house. By peeping through the entrance, he had violated certain local protocols. In fact, the *Shahi Muslim*, a text most revered by the Sunni Muslims in Bengal, recommends thrusting a stick in the eyes of a

[92] J. Irwin, Agent, Bullooah & Chittagong to BBT, 30/03/1811 in *BRCSOC*, *31/05/1811* (BL: *IOR/P/99/41*). Repeated demolishing the 'illicit' brine catchments areas and boiling houses and the destruction of 'more than 2400 Mds of Salt Earth…collected for the purpose of being used at those illicit Salt Works' in the Agency did not reduce the detection of an additional quantity of 9114 Mds of 'Salt Earth'. See J. Irwin to BBT, 30/09/1811 in *BRCSOC*, *26/12/1811* (BL: *IOR/P/99/45*).

[93] Kinloch to Magistrate, Nuddea Kishnagar District, 24/03/1814 in *BRCSOC*, *29/04/1814* (BL: *IOR/P/99/54*).

person who 'cast a glance in your (house) without permission'.[94] The response to such an intrusion acquired a collective form chiefly because the villagers shared certain ethnic-religious norms.

Instances of such strong affiliation to common ethnic and familial norms are apparent elsewhere as well. The Gomastah of Hatteeah & Surgundee allegedly extorted 6000 Mds of salt from the manufacturers working under him. The local Agent sought to end this, yet much to his chagrin, the Gomastah proved to be hugely 'influential' over the population. When the Salt Darogahs attempted to stop the 'extortion', the very victims of 'extortion' protected him as he shared their kinship.[95] Another Agent found it equally unintelligible that there be 'unlawful risings in support of the smugglers' directed against their officers.[96]

Similarly, it would be inappropriate to infer that all landholders participated in the illicit manufacture of salt solely to make 'extra' earnings. In some cases, the Zemindars encouraged their tenants to make salt illicitly because the income from the salt lands was tied up with charitable works. The Queen of Puttauspore, for instance, wanted 1500 Mds of salt annually from the *Molungie*s as *customary* contributions so that she could feed numerous travellers to and from Jagannath temple.[97] These examples suggest that the economic perspective alone cannot explain the reasons for why many in the colony continued to manufacture salt illicitly.

The salt officials, who looked at illicit manufacture as commercial activity, no doubt found some truth in the Government's characterisation of the 'lower classes' and 'natives' as a mass of men/women moved by the principles of gain and loss. Many of these officials had learnt the ideas of Adam Smith during their training at the East India College at Haileybury and at the Fort William College in Calcutta.[98] For Smith, illicit manufacture and trade must be indispensable activities for the 'poor' manufacturers, who 'would have been, in every respect an excellent citizen, had not the laws of his country made that a crime which nature never meant to be so'.[99] In other words, considerations of profit alone must lie at the heart of any explanation of

---

[94] Book 25, Hadith 5371. On the appropriate way to seek permission to enter into someone's house, see Imam Muslim, *Shahi Muslim* (Tr.) Abdul Hamid Siddiqui, 4 Volumes (Lahore: Muhammad Ashraf, 1972-1975), chapter 9, Hadiths 5366-5371.

[95] Forty-third Quarterly Report, Ballooah & Chittagong Agent to BBT in *BRCSOC*, 2*9/05/1812* (BL: *IOR/P/99/54*).

[96] 24-Pergunnahs Agent to BBT, 31/03/1811 in *BRCSOC*, 6/04/1811 (BL: *IOR/P/99/41*).

[97] W. Farquharson to BBT, 31/03/1805 in Sinha, *Midnapore Salt Papers*, pp. 144-150.

[98] The Connection here is Thomas Robert Malthus, the professor of political economy at the East India College at Haileybury, Hertford. Malthus taught Smith's *Wealth of Nations* as a textbook for the students preparing for the East India Company Service. See Geoffrey M. Hodgson, 'Malthus, Thomas Robert (1766-1834)' in Donald Rutherford (ed.) *Biographical Dictionary of British Economists* (Bristol: Thoemmes Continuum, 2004).

[99] Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations*, 3 Vols. (Dublin: Whitestone, 1776), Book V, p. 520.

the actions of people engaged in illicit manufacture and trade.[100] These contemporary views do not fully appreciate the fact that the notion of economic rationality, far from being a universal attribute of man, was a product of its own time and place.

Illicit Manufacture as a *Normal* Activity

The preceding sections have described how the category of illicit salt developed following the creation of the monopoly of salt manufacture in Bengal in the period c. 1780 to c. 1820. The salt officials encountered various local saline substances in the course of implementing this monopoly in the territory. The officials deployed the label of illicit to define these salts not by virtue of their physical or chemical properties but vis-à-vis the *Pangah*. They imposed a complete ban or a regular duty on the manufacture of these alien substances in order to incorporate the substances into the fiscal regime under the monopoly. The making of the category of illicit salt in this sense reflected the Company Government's tightening grasp on local salt production.

Not all kinds of illicit salt were products of such encounters between the Government's monopoly establishment and the local systems of manufacture, however. I have shown that a large number of people employed by the Government Salt Agencies, including their covenanted and non-covenanted officers, were involved in the illicit salt manufacture and trade. As a result, a significant amount of the Agency produce (in some accounts, up to five times the contract amount) ended up in local markets as illicit salt. Kinloch's scheme was a curious case in that it generated illicit salt with Government money (*Inaam Peishgee*) with a clear intention of submitting it to the Government *Golah*s and not to the clandestine network.

Despite considerable overlapping of the worlds of illicit and licit salt, the Government correspondence regularly portrayed the illicit manufacture as the works of local/'native' 'refractory' men. It believed that they were moved either by their resentment to the monopoly arrangement or by the prospect of profit. The details contained in the same documents, however, present a different picture. They show how the infighting among various branches within the monopoly establishment significantly affected the Government's ability to control illicit manufacture. They further reveal the mixed attitudes of one 'refractory' group of the landholders toward the Government salt monopoly. These findings suggest that the Government's portrayal of the group reflected its own political map of the local landscape more closely than the actual behaviour of the 'refractory' individuals.

[100] In 1834, the Superintendent of Calcutta Salt Chokies wrote, for instance, that the smugglers had 'no other idea than how to make money'. See *Salt Report 1836*, p. 87.

Furthermore, some sympathetic salt officials recognised that illicit manufacture was pursued in response to either financial desperation or greed. Yet their fiscal solutions, such as legalising the handling 'wastage' and purchasing surplus salt at a higher rate, failed to contain the activities. The failure of these initiatives indicates the limits to the officials' economic rationalisation of the behaviour of the local population. The episodes about the *Sirdar Molungie* Saujan Gauzee's rejection of a lucrative salt purchase offer, and the villagers' violent reactions to Kinloch's behaviour at Etindha suggest that these men were driven by considerations other than profit.

Yet existing discussions on the illicit manufacture and trade of salt and other monopoly commodities tend to ignore the complicated details, and use the officials' political and economic frameworks. These accounts portray the Government officials and the local population essentially as two opposing groups.[101] Such a view has led their writers to see illegal manufacturing and trading as political activities aimed against the colonial fiscal policy.[102] A similar perspective also informs one recent work on cross-border smuggling that links the illegal activity to colonial state making in the region. It argues that the imposition of a new boundary line of the colonial state disrupted the customary passages of goods. The local population, which resented the alteration in their conventional commercial routes, expressed their anger by intensifying smuggling activities.[103] Such an interpretation fits neatly with theories of colonial encounter, which explain various developments in the colony as consequences of an unprecedented contact between the aggressive colonisers and resisting local population.[104]

Even accounts that are sensitive to the heterogeneity in local societies tend to perpetuate this framework of opposing forces. These accounts construct a tripartite division (unlike the more usual dialectic of Company versus local population) to emphasise the collaborative role of the local elites. They consistently characterise the relationship between the subordinated section of population and those in power as oppositional.[105] These political interpretations, therefore, place the notion of power at the centre of its analysis and sees illicit manufacture and trade as an articulation of

[101] S. A. M. Adshead, *Salt and Civilization* (Hampshire; London: Macmillan, 1992)
[102] Barui, 'Resistance of the Bengal Zemindars'; Farooqui, *Smuggling as Subversion*; Trocki, *Opium, Empire and Global Political Economy*; Deshpande, 'Historical Overview of Opium'.
[103] Eric Tagliacozzo, *Secret Trades, Porous Borders: Smuggling and States Along a Southeast Asian Frontier, 1865-1915* (New Haven; London: Yale University Press, 2005).
[104] For theories of encounter and its critique, see David Hardiman, *Peasant Resistance in India, 1858-1914* (Delhi: OUP, 1992), pp. 1-13.
[105] Markovits, for instance, disputes the subversive intentionality of the merchants, but concedes the same to the poor producers. See Claude Markovits, 'The Political Economy of Opium Smuggling in Early Nineteenth Century India', *Modern Asian Studies*, Vol. 43, No. 1 (2009), pp. 89-111.

resistance, an idea conveyed by their use of terms such as 'resentment' and 'subversion'.[106] Alternatively, some accounts tend to endorse the sympathetic salt officials' view that sheer desperation or prospects of profit drove the individuals to make and trade salt and other monopolised commodities in colonial India.[107]

The evidence presented in the preceding sections, by contrast, indicates the limitations to these arguments of power and profit. My demonstration of the diverse stances of the several landholders, for example, helps to raise questions about the usefulness of including all of them within a social group that had homogenous political or economic interests and that responded consistently to the changing political economic measures of the Bengal Government. Labels such as 'refractory' and 'Zemindars' themselves were products of specific colonising experiments.[108] To take these terms as analytical categories and to present them as opposing elements in the colonial milieu is to accept the Company officials' political map of the colony uncritically.

A demonstration of the limitations of existing political interpretations does not mean that power relations were not important in illicit salt making and trading. Kinloch could run a profitable business of fake salt seizures because he had the authority to manipulate the Company's resources and the power to dictate the actions of his subordinates. The Agents, *Kyah*s and the port officials could impose their incorrect standards of weight on the manufacturers by virtue of their positions. By stressing the limitations of the political argument, I simply want to highlight cases of illicit manufacture where the political was distinct from the notion of power. The existing political interpretation conflates the two by mapping all political activities along the axis of dominance and resistance. This is a one-dimensional reading of the political. I argue that in order to account for the nuances attested in the evidence, we should accommodate within our notion of politics the dynamics of collaboration, confrontation and ambivalence among the individuals, both in the monopoly organisation and in the local manufacturing scene.

Similarly, the prospect of profit undoubtedly drove some salt manufacturers to make and sell their surplus salt or to steal away some portion of their manufacture. However, the argument of economic necessity cannot adequately account all instances

---

[106] Ranajit Guha, *Elementary Aspects of Peasant Insurgency in Colonial India*, 2e (Durham London: Duke University Press, 1999); James C. Scott's *Weapons of the Weak: Everyday Forms of Peasant Resistance* (New Haven; London: Yale University Press, 1985).
[107] Moxham, 'Salt Starvation in British India'; Singh, *Company's Monopoly Industries*; Klimberg, 'Notes on Carl A. Trocki's Publication'.
[108] Bernard Cohn, 'Note on the History of the Study of Indian Society and Culture', in Milton Singer and Bernard S. Cohn (eds.) *Structure and Change in Indian Society* (Chicago: Aldine Pub. Co., 1968), pp. 3-28.

of illicit salt production. The repeated failures of the Government's fiscal strategies to control illicit salt reveal the inadequacy of officials' understanding of the reasons behind the activity. Indeed, the axioms at the root of the officials' views on economic production seem to be very characteristic of the age of *Homo economicus* or the 'economic man'.[109] This notion itself was formed during the Europeans' colonisation of other people.[110] It had two key ideas: That man is primarily a profit-seeking individual; and that the universal principle of commodity production and exchange is the rational cost benefit analysis. The first idea illuminates the salt officials' general belief that the 'natives' were entirely driven by material self-interests. The second reflected in their attempts to dissuade the salt makers from illicit activities by providing monetary incentives.

While economic theorists have long acknowledged that such a one-dimensional portrayal of the 'economic man' is a caricature of human behaviour, some still defend it as 'uniquely appropriate' model in specific domains such as within market institutions. Others go further, arguing that it is useful in predicting how human beings choose their alternative social rules.[111] Economic anthropologists, on the other hand, criticise the notion by suggesting that it is an empirically devoid concept. They suggest that the dominant principle of commodity production and exchange in many societies with 'gift economies', for instance, is reciprocity and not utility. They argue that economic rationality is only one of several possible modes of rationality, which people employ to evaluate economic transactions.[112] One may debate the precise nature of the principle of exchange the Bengali salt farmers and manufacturers followed in the period. Nevertheless, the episodes such as the violent attack on Kinloch's party by the villagers of Etindha and Saujan Gauzee's refusal to sell his surplus salt to Bulram suggest that much more lay behind the actions of these men than simply a desire to maximise profits.

---

[109] U. Kalpagam, 'Colonial Governmentality and the 'Economy'', *Economy and Society*, Vol. 29, No. 3 (Aug., 2000), pp. 418-438.

[110] John Stuart Mill, a Company employee and son of the Company historian and one of the first political economists James Mill, gave this notion a philosophical garb. See John Stuart Mill, 'On the Definition of Political Economy, and on the Method of Investigation Proper to It', *London and Westminster Review* (October 1836). Collected in *Essays on Some Unsettled Questions of Political Economy*, 2nd ed. (London: Longmans, Green, Reader & Dyer, 1874) Essay 5, paragraphs 38 and 48. On the rootedness of the idea to seventeenth and eighteenth century political economic thoughts, see Edward J. O'Boyle, 'Requiem for *Homo Economicus*', *Journal of Markets and Morality*, Vol. 10, No. 2 (Fall 2007), pp. 321-337. For an accessible critique on how the idea is strongly entrenched in the academic discipline of economy, see Anatole Kaletsky, 'Goodbye, homo economicus', *Real-World Economics Review*, Issue 58 (8 September 2009), pp. 151-156.

[111] Geoffrey Buchanan and James Buchanan, *The Reason of Rules* (Cambridge: CUP, 1985), Chapter 4.

[112] For instance, see Marhsall Sahlins, *Stone Age Economics* (London: Routledge, 2003 [1972]); Karl Polanyi, *The Great Transformation* (London: Beacon Press, 2001 [1942]); Marcel Mauss, *The Gift: The Form and the Reason for Exchange in Archaic Societies* (London: Routledge, 2006 [1924]).

To point to the limits of economic rationality here is not to deny such rationality to the Indian salt manufacturers and merchants.[113] It is to emphasise, again, the distinction between the cases where the criteria of economical rationality is part of the actors' decision domain from other cases where it is simply imposed on the narrative by the historian. Existing economic accounts of the illicit manufacture and trade in colonial India blurs this distinction.[114] The thrust of the argument in this chapter has been that power and profit alone cannot account for all kinds of political and economic behaviour. I here propose the critical role of the norms, the third element in the story of illicit salt.

Norms refer to interpretive frameworks people use to evaluate what is an appropriate way of behaving. The debates about the source of norms are still open. The classical view sees them originating from a voluntary consent by people to abide by the rules emanating from the powerful.[115] Since illicit activities are by definition breaches of the Government's legal provisions, this view would posit an existence of alternative seat of power to which people gave their consent in acting against the rules of the Government. This was the view adopted by the Bengal salt officials, and would lead us to the power argument stated above. On the other hand, recent writers on the subject suggest that norms emerge from the affairs in the immediate social milieu around an individual.[116] This view attaches significance to the socio-economic factors such as ethnicity, religion and occupation in inculcating norms among individuals. In either view, sensitivity to norms allows one to imagine how the people engaged in illicit salt must have assessed the monopoly from a vantage point beyond the Government's view of local polity and economy.

The salt monopoly was a political economic arrangement of the Company's Government. However, in the period 1790 to 1820, the Government was still oscillating between its profit-seeking objectives and territory governing intentions. Law and commerce were therefore intimately connected. The distinction between profit and tax, which the officials employed for rhetorical effects, therefore, must have

---

[113] Jack Goody has shown, for instance, much earlier use of the double entry book keeping in the non-Western world to prove this point. See Jack Goody, *The East in the West* (Cambridge: CUP, 1996), pp. 49-161.

[114] An example of the latter is one recent work, which interprets a Zemindar's protest against a proposed silk filature in his estate as motivated by a need to safeguard his silk business. But the interpretation is solely based on the local Commercial Resident's report, and misses the actual reason of protest was the villagers' objection that the filature obstructed the path of their 'diurnal ablutions'. See Roberto Davini, 'Bengali Raw Silk, the East India Company and the European Global Market, 1770-1833', *Journal of Global History*, Vol. 4 (2009), pp. 57-70.

[115] The classical view is a combined version of the views on norms by 'social contract' as found in the writings of Thomas Hobbes, Immanuel Kant and John Rawls. See Tobor R. Machan, 'Social Contract as a Basis o Norms: A Critique', *Journal of Libertarian Studies*, Vol. 7, No. 1 (Spring, 1983), pp. 141-145.

[116] For an introduction to the debates on the sources of norms, see Christine M. Krisgaard, *The Sources of Normativity* (Cambridge: CUP, 1996).

appeared superfluous to the local population. They must have seen the regulations under the monopoly as a profit-tax complex, as an alien collection of rules about appropriate economic behaviour that had been imposed upon them.[117] This is not to say that profiteering or price regulation had not existed in India before. Nevertheless, the way they appeared closely interwoven under a single establishment, the Bengal Board of Trade (BBT), in the 1810s was unprecedented. Equally unique was the manner in which the BBT tried governing both the manufacture and the market price of salt through its Agencies, Salt Courts and *Chokey*s.

In the unregulated market of the pre-monopoly days, there were many varieties of salt, produced in dispersed sites and in various ways. People were free to carry salt through any passage they thought proper and they traded it in the ways they liked. Such plurality was the norm before the Government began regulating various aspects of manufacture and trade.[118] Although the Bengal Government rigorously attempted to impose the illicit/licit salt distinction through its Regulations and the elaborate policing, for many salt manufacturers and landholders involved in the manufacturing activity, this distinction did not always exist. These manufacturers considered making and selling 'illicit' salt as a *normal* activity as their actions reproduced the plural nature of the pre-monopoly local economy.

To the salt establishment, then, the instances of illicit manufacture demonstrated the failings of its fiscal regime. They saw the landscape of illicit works as a fiscal frontier, an ungoverned territory that was constantly threatening their economic rules. Many within the establishment believed that it was necessary to eliminate illicit salt, regarding it as an essential part of their duty. Hence, many officials sought to formulate innovative methods to incorporate various descriptions of local salts into the monopoly regime and to modify various social relationships around salt manufacture. The establishment, however, was weak and fragmented. The cynical officials used the 'colour of their positions', or the power of being British and in the Company service, to personally benefit from these legal provisions.

As the existing accounts suggest, profits drove many local people to illicit manufacture of salt and many had political reasons to protest against the salt monopoly. However, not every incident of smuggling can be reduced to economic

[117] The colonial economy in Cameroon is said to have 'tax-price complex' in Cameroon. See Janet Roitman, *Fiscal Disobedience: An Anthropology of Economic Regulation in Central Africa* (Princeton, NJ: Princeton University Press, 2005), pp. 48-72.

[118] The development of plural currency system in Bengal before 1765 into a single currency system by the 1830s illustrates the shift. Anirban Biswas, *Money and Markets from Pre-colonial to Colonial India* (Delhi: Aakar Books, 2007). See also, Sudipta Sen, *Conquest of Market Places: Exchange, Authority and Conflict in Early Colonial India*, PhD Thesis, The University of Chicago (1994).

logic. Nor was every protest about power. This chapter has shown how many more acted simply to keep the economic arrangements plural. In these cases, the norms about appropriate ways of conducting manufacture and trade played a crucial role in forming their evaluations of the salt monopoly. Of course, their actions, which were the results of such an evaluative practice, can be interpreted either as resistance or as profit-driven manoeuvrings with the limitations pointed out above. My interpretation in terms of norms, on the other hand, is more consistent with the actors' understanding and activities, and reveals their more positive engagement with the monopoly establishment than does an analysis in terms of resistance and greed.

Chapter 5

EXPERIMENTATION

PORTO NOVO IRON COMPANY, 1820s-1850s

Introduction

This chapter tells the story of an attempt to erect a large-scale iron manufacturing plant at Porto Novo in South India. In 1824, Josiah Marshall Heath, an East India Company civil servant, applied to the Madras Government for the exclusive right to establish the plant on the principles then practiced in Europe. His goal was to supply iron made at Porto Novo to Britain as a cheaper substitute for Swedish and Russian iron. The Government approved his application in 1831 and gave him the monopoly over supplies of iron ore and fuel from all public lands under its entire territories. The Government provided him (and later, his associates) with loans on generous terms and purchase guarantees. In 1849, however, the Government declared the Porto Novo Iron Company a failure because of its persistent poor performance in the previous two decades. Following subsequent attempts to revive the iron works, Heath's company was finally wound up in 1864. In this chapter, I discuss the reasons for of its underperformance and eventual closure.[1]

The Porto Novo Iron Company (hereafter, PNIC) was one among many large-scale iron projects undertaken in India in the nineteenth century. These early iron works were comparable to the largest British and Swedish iron works of that period in terms of ownership, manufacturing principles, production output, sources of capital

[1] The following works discuss Porto Novo Iron Company (PNIC). P. P. Pillai, 'Iron and Steel Production in India', *Economica*, No. 7 (Jan., 1923), pp. 55-66; Sabyasachi Bhattacharya, 'Cultural and Social Constraints on Technological Innovation and Economic Development: Some Case Studies', *Indian Economic and Social History Review*, Vol. 3, No. 3 (Sept., 1966), pp. 240-267; A. Rahman and B. V. Subbarayappa, 'A Note on the Native Method of Bar Iron Production in South India (Salem Region)', *Indian Journal of History of Science*, Vol. 1, No. 2 (1967), pp. 158-161; H. C. Bhardwaj, 'Development of Iron and Steel Technology in India during 18th and 19th Centuries', *Indian Journal of History of Science*, Vol. 17, No. 2 (1982), pp. 223-233; Morris D. Morris, 'The Growth of Large Scale Industry to 1947' in Dharma Kumar (ed.) *The Cambridge Economic History of India, 2: c.1757- c.1970* (Cambridge: CUP, 1983), pp. 583-589; Usha Rani Bansal and B. R. Bansal, 'Industries in India during 18th and 19th Century', *Indian Journal of History of Science,* Vol. 19, No. 3 (1984), pp. 215-223; Daniel R. Headrick, *The Tentacles of Progress: Technology Transfer in the Age of Imperialism, 1850-1940* (New York; Oxford: OUP, 1988); B. R. Tomlinson, *The Economy of Modern India, 1860-1970* (Cambridge: CUP, 1993), pp. 127-128; Arun Kumar Biswas, 'Iron and Steel in Pre-Modern India – A Critical Review', *Indian Journal of History of Science*, Vol. 29, No. 4 (1994), pp. 579-610; Melvyn Eugene Page (ed.) *Colonialism: An International, Social, Cultural, and Political Encyclopaedia* (Santa Barbara: ABC-CLIO, 2003); Jan af Geijerstam, *Landscape of Technology Transfer: Swedish Ironmakers in India, 1860-1864* (Trita Hot: Stockholm Papers in the History and Philosophy of Technology, 2004); Prasannan Parthasarathi, 'Iron Smelting in the Indian Subcontinent', a paper presented in the XIV International Economic History Congress, Helsinki, (2006), pp. 9; and Tirthankar Roy, 'Did Globalisation aid Industrial Development in Colonial India? A Study of Knowledge Transfer in the Iron Industry', *Indian Economic and Social History Review*, Vol. 46, No. 4 (2009), pp. 579-613.

and intended market of their products.[2] The unproductive and often short lives of these diverse Indian ventures have led previous historians to view these early attempts as failures. The erection of the Tata iron plant in 1907 is generally considered the first successful instance of large-scale iron industry in India.[3]

Historians have perceived early Indian attempts at iron manufacture in three ways: as purely capitalist enterprises, as political economic instruments, and as cases of technology transfer. Consequently, they have applied the term 'failure' to these projects with three distinct meanings. One concerns the notion of performance failure, in both profitability and consistencies of production quality. A second use of the term relates to their failure to create a supposedly desired effect, namely industrialisation of the wider Indian economy. Thirdly, historians have argued that these projects failed to introduce a 'European' technology in India.[4] These views in turn have led historians to seek specific causes of these early failures. In fact, the single problem of finding the causes of the failures motivates all these accounts. The existing histories of Indian iron manufacture, with their pervasive sense of disappointment and the relentless search for causes, therefore share a paradigm of failure. In this chapter, I offer an alternative to this paradigm and suggest that current understanding of early iron ventures in nineteenth century India can be significantly enriched by looking at them not as failures but as experiments in technology and colonial governance.

I make two broad moves. Firstly, I will link the unfolding of the Porto Novo story to the changes in the thoughts and actions of the Madras Government officials. Secondly, I will scrutinise the phrase 'European plan', which was used as a distinctive feature of the iron manufactory at Porto Novo. I will do so by comparing what the Government officials and the PNIC promoters meant by it and how it was implemented at Porto Novo. The attention to the technological arrangements used at Porto Novo and to the relationship between the Government and private speculators in the colony will lead me to argue that existing portrayals of PNIC do not fully

[2] I have assessed the following iron works for making the comment: Indranarayan's and John Farquhar's Birbhum iron works, 1774-89 (discussed in Chapter 2); Andrew Duncan' Bigpore Iron Works, 1811-15. See Roy, 'Did Globalization Aid'; James Franklin's Saugar Works, 1822-30. See, Dharampal, *Indian Science and Technology in the Eighteenth Century* (Goa: Other India Press, 2000), chapter XV; J. M. Heath's Porto Novo Iron Company, 1824-64; J. Campbell's works in South India, c. 1842 (this chapter); Messrs. Mackay & Co.'s Barakar Iron Company, 1855-60. See Bansal and Bansal, 'Industries in India'; Kumaon Iron Works, 1855-80; Burwai Iron Works, 1857-84. See Geijerstam, *Landscape of Technology Transfer*. Bengal Iron Company and its successors, 1875-89. See Bansal and Bansal, 'Industries in India'.

[3] Pillai, 'Iron and Steel Production in India'.

[4] For the first meaning, see Roy, 'Did Globalisation aid'. For the second, see Ian Inkster, 'Prometheus Bound: Technology and Industrialization in Japan, China and India prior to 1914-A Political Economy Approach', *Annals of Science*, Vol. 45 (1988), pp.399-426. For the third sense, see Geijerstam, *Landscape of Technology Transfer*.

recognise the experimental nature of these early attempts. I will then demonstrate that what the existing accounts present as causes of the early failures were actually consequences of the tentative nature of contemporary knowledge about charcoal iron making.

In the first section of this chapter, I discuss the principal factors which enabled Heath to win the iron monopoly. They include: the relationship between monopoly and the ideology of free trade in Britain in the 1820s; the relationships among the various Indian Governments; and, crucially, the contemporary understanding of the phrase 'European plan'. In the second section, I will assess how PNIC met its capital requirements and consider its relations with the Government and market. I also present evidence which demonstrates the limitations of casting the PNIC solely as a commercial speculation venture. In the next section, I examine local responses to PNIC, and show how resistance to the iron project in the monopoly districts increased dissatisfaction among the Government revenue officials about the project. That discontent culminated in the Madras Council's decision to discontinue its support to PNIC, and favour the 1844 proposal by J. Campbell, the assistant Surveyor General, for a 'native' plan for large-scale iron manufacture. However, as I will argue in the concluding sections, it was in fact the uncertainties of the technology of charcoal iron making that eventually led to the demise of PNIC. By understanding PNIC and all other early iron-manufacturing efforts in colonial India as *experiments* in technology and colonial governance rather than failures, one can also better appreciate the uncertainties inherent in the technology and colonial affairs.

The Iron Monopoly for the 'European Plan', 1824 - 1831

In January 1831, the Madras Government passed an unusual Regulation, entitled:

> A Resolution for granting to Josiah Marshall Heath, Esq., the exclusive Privilege of erecting and using Iron-works on the *European plan*, within the Presidency of Fort St. George, until the end of the term for which the Possession and Government of the British Territories in India are granted to the East India Company by the Statute of 53 Geo. 3. c. 155.[5]

This Regulation gave Heath the 'exclusive privilege' of 'erecting, setting up, using, or working…mills, furnaces, or iron-works and other buildings, and also all or

[5] Extract Consultations, 21/01/1831. *Porto Novo Iron Company, &c. Return to an order of the Honourable the House of Commons, dated 12 April 1853;--for, copies of all despatches, minutes, and reports received from the Madras government, respecting the origin and transactions of the Porto Novo Iron Company, with the answers of the Court of Directors of the East India Company thereto; and of the correspondence between the Court of Directors, the Board of Control, and the East India Iron Company, relating to the same subject* (hereafter, *HCPP*) (London: House of Commons, 1853), p. 130. Emphasis added.

any machinery, for the purpose of smelting, forging, or manufacturing iron or steel'. The privilege covered an impressive area of 37870 square miles within the Madras Presidency, and allowed him to supply to the profitable British market a type of charcoal iron used exclusively for making high-quality-steel surgical equipment and cutlery. Moreover, it would end, in the Government's opinion, Britain's dependence on the Swedish and Russian sources for the iron.

Heath was an Irishman recruited into the Company's service as a writer in 1806. He had spent several years in the Company's revenue and trade departments before becoming the Deputy Commercial Resident of the iron ore-rich district of Salem in 1812,[6] a position that had required him to explore profitable resources in the district. Equipped with an intimate knowledge of local commerce, he soon began speculating in aquamarine mining and Bourbon cotton cultivation.[7]

Salem was famed for its high-quality manufacture of steel known as *Wootz*, which many British instrument makers acknowledged to be immune to corrosion and thus an excellent material for making high-grade steel articles.[8] Scientific men also showed a great enthusiasm for the material. Many of them were engaged in the experimental analysis of the Salem ores and the charcoal iron made from them.[9] Heath knew its value. He thus expended 'risk, labour and fortune' to acquire information about the local 'hatchets and hands' techniques of making iron and steel.[10] It seems that he began conducting iron- and steel-making trials from the early 1820s.[11]

---

[6] On Heath's career, *Report from the Select Committee on East India Produce; together with the Minutes of Evidence, an Appendix and Index* (London: House of Commons, 1840), pp. 323-333; Charles C. Prinsep's *Records of Services of the Honourable East India Company's Civil Servants in the Madras Presidency from 1741 to 1858* (London: Trübner & Co., 1885), p. 73.

[7] On aquamarine venture, see BL: *IOR/F/4/678/18826*. On the cotton venture, see J. M. Heath, 'On the Cotton Cultivation in India', *Journal of the Royal Asiatic Society of Great Britain and Ireland*, Vol. 5 (1839), pp. 372-378.

[8] Dharampal, *Indian Science and Technology*, pp. 19-25. See also, Sharada Srinivasan, 'Textures of 'Wootz': Techno-cultural Insights on Steel and Ferrous Metals in South Indian Antiquity' in Jeewan S. Kharewal & Shruti (eds.) *History of Science and Technology: a New Perspective* (Princeton: Infinity Foundation, n.d.), pp. 144-160.

[9] George Pearson, 'Experiments and Observations to investigate the Nature of a Kind of Steel, manufactured at Bombay, and there called Wootz: with Remarks on the Properties and Composition of the different States of Iron', *Philosophical Transactions of the Royal Society of London*, Vol.85 (1795), pp. 322-346; David Mushet, *Experiments on Wootz*, *Philosophical Transactions of the Royal Society of London*, Vol. 95 (1805), pp. 163-175.

[10] *HCPP*, p. 130. Heath claimed to have spent about Ps 300000 on the enquiry. See Heath to Dent, Cullen and Walpole, 12/02/1833 (*HCPP*, pp. 162-164); Extract, Consultations, 21/01/1831 (*HCPP*, pp. 130-132); J. M. Heath, 'On Indian Iron and Steel', *Journal of the Royal Asiatic Society of Great Britain and Ireland*, Vol.5 (1839), pp. 390-397. On 'hatchets and hands', see J. Forbes Royle, 'Arts and Manufactures of India', *Lectures on the Results of the Exhibition Delivered before the Society of Arts, Manufactures, and Commerce* (London: David Bogue, 1852), pp. 331-401.

[11] *East India Produce*, p. 323.

In 1824, Heath submitted a proposal to the Madras Government for erecting a large-scale charcoal iron manufactory at his home base of Porto Novo,[12] a small port town in the South Arcot District connected to the iron mines and fuel lands in Salem and Coimbatore via the Vellore and Cauvery rivers.[13] Heath requested an exclusive all-India right to establish iron-works 'similar to those in Europe'. He wanted to find an Indian substitute for the 12000 tons of Swedish and Russian charcoal iron that was imported into Britain annually.

The Madras Government endorsed Heath's proposal on two grounds. The venture would generate revenues in the shape of a royalty on the iron ore and a duty on the iron made. More significantly, its exports to Britain would bring precious metal back to the colony that the Government used for buying British arms and ammunition. Forwarding the proposal for the approval of the Court of Directors in London in 1825, Thomas Munro, the Governor, argued that the 'temporary protection from competition' was essential for attracting private speculators in any new manufacture and trade.[14]

The British ironmasters and iron speculators found Heath's idea of bringing Salem iron to Britain appealing. For precision steel manufacture, they depended on Swedish iron. However, the Dannemora mines, from where it came, were subject to an export quota.[15] During the Napoleonic wars, the French-Swedish embargoes had disrupted its supplies.[16] Furthermore, one firm, Messrs. Sykes in Hull dominated its sale in Britain. These factors had increased anxiety in Britain about the reliable supply of the 'foreign' iron. Addressing their concern, the East India merchants had been advertising *Wootz* as a cheap alternative for some time. In 1823, they convinced the British Government to cut the import duty on Indian iron to £1 a ton, making it vastly cheaper than the 'foreign' iron which was subject to a duty of £6 10s a ton.[17] Heath's argument for having a supply from Britain's colonies instead of depending on Sweden, and his emphasis on a niche market that British-made iron could not fill, deflected a

[12] Edward Stevenson, then master attendant at Porto Novo ironworks, purchased the first property at Porto Novo on 1/06/1820. See Indenture by J. M. Heath, 30/08/1833 (*HCPP*, pp. 183-187).
[13] Porto Novo (now called Parangipettai or Firangipet) is the name given by the Portuguese in the XVI century. The French and the British continued the usage.
[14] Government of Madras to Court of Directors, 21/01/1825 (*HCPP*, pp. 137-138).
[15] Ulf Sundberg, 'Ecological Economics of the Swedish Baltic Empire: An Essay on Energy and Power, 1560-1720', *Ecological Economics*, Vol. 5 (1992), pp. 51-72.
[16] On the British demand of the Swedish iron, see T. S. Ashton, *Iron and Steel in the Industrial Revolution* (Aldershot: Gregg Revivals, 1963), pp. 142-156.
[17] Heath to Governor in Madras Council (GMC), 27/10/1824 (*HCPP*, pp. 138-141).

possible objection that the proposed Indian venture would ruin British iron manufacturers.[18]

His request for a monopoly of manufacture, however, was out of step with economic thinking in the 1820s. After the Napoleonic wars, Britain's food imports and foreign trade were increasing and real wages were on the rise. Workers were turning away from the land to a booming manufacturing sector.[19] The richer and more confident 'middling orders' or 'gentlemanly capitalists' were eagerly searching for lucrative investment opportunities.[20] These men publicly rallied against trade and commercial monopolies. The clamorous 'free trade' ideology influenced the Court of Directors. As a result, the Court declined Heath's request in 1826.

Heath had prematurely secured financial backing from a Calcutta Agency house, Messrs Alexander & Co. for his project, and the Court's decision called the whole investment into question. In early 1826, Heath came to London to again press for a monopoly. Heath also wanted to attract British investor-partners for the Porto Novo venture. As was customary, he published two pamphlet prospectuses on the subject in 1828. In these pamphlets, he presented himself as an indomitable competitive innovator. He downplayed earlier iron-making efforts in Bengal and claimed to be the first to imagine large-scale charcoal iron works in India.[21] He also eschewed all references to his application for the monopoly. On the contrary, he said, his intention was to break the monopoly enjoyed by the 'accredited and exclusive importers' of the Swedish iron in Britain.[22] Heath's discretion paid off when in 1830, the Court of Directors overturned its earlier decision. Approving his application, it now evoked 'the magnitude of the undertaking and…sense of its great value to the mutual interests of England and India'.[23]

The change in the opinion of the Court reveals how monopolistic aspirations flourished in the supposed age of free trade. To understand the apparent

[18] This charge was laid against Andrew Duncan in the 1810s (BL: *IOR/F/4/511/12281*). Many charcoal iron entrepreneurs employed this rhetoric. See Richard Hayman, 'Charcoal Making in Nineteenth Century Shropshire', *Economic History Review*, Vol. 60, No. 1 (2008), pp. 80-98.
[19] Nancy L. Stokey, 'A Quantitative Model of the British Industrial Revolution, 1780-1850', *Carnegie-Rochester Conference Series in Public Policy*, Vol. 55 (2001), pp. 55-109.
[20] P. J. Cain and A. G. Hopkins, 'Gentlemanly Capitalism and British Expansion Overseas I: The Old Colonial System, 1688-1850', *Economic History Review*, *New Series*, Vol. 39, No. 4 (1986), pp. 501-525; Graeme G. Achison, Charles R. Hickson, John D. Turner and Qing Ye, 'Rule Briatannia! British Stock Market Returns, 1825-1870', *Journal of Economic History*, Vol. 69, No. 4 (Dec., 2009), pp. 1107-1137. Also, see Anthony Webster, 'The Strategies and Limits of Gentlemanly Capitalism: the London East India Agency Houses, Provincial Commercial Interests, and the Evolution of British Policy in South and South East Asia, 1800-50', *Economic History Review*, Vol. 59, No. 4 (2006), pp. 743-764.
[21] For his familiarity with Andrew Duncan's Bigpore Iron Works work, see *East India Produce*, p. 323.
[22] Remarks on the Steel-Iron Trade, 12/03/1828 (*HCPP*, pp.143-147); Memorandum for the Right Honourable Sir Frederick Adam, 10/12/1832 (*HCPP*, pp. 147-150)
[23] Extract Public Letter to Madras, 12/04/1826 (*HCPP*, pp. 20-21).

contradiction, one has to appreciate the increasing power of the private East India trade lobby in Britain.

The Company's monopoly over Indian trade had ended in 1813. Subsequently, capitalists in London and other provincial cities formed various East India Agency houses to partake in what by then was a highly lucrative business with India. Their competitor was the original East India Company. From the early 1820s, the Agency houses starting buying the Company's shares through proxies. By 1829, they had garnered so many votes that the majority of the Directors in the Court, including the Chair and the Deputy Chair, were 'put' in their seats by them. Among these Agency houses, Messrs. Alexander & Co., the firm that was financially backing Heath, was the most powerful.[24] The change in the Court's opinion reflected the firm's sway in it.

Indian responses to Heath's monopoly proposal reveal a different picture. In the early nineteenth century, several mutually interacting, but autonomous Governments governed the Company's Indian territories. While each of these Governments was on equal footing in terms of sovereignty, Bengal occupied a special place since it was also the seat of the Governor General, the supreme authority over the Company's affairs in India. Madras was the oldest presidency and was known for its constant displeasure about 'interference' both from London and from Bengal.[25] In its proposal to award Heath the all-India privilege, Madras was reasserting its supremacy.

The move triggered resentment in Bengal. In March 1825, the Bengal Government published Heath's proposal in the *Calcutta Gazette* for public notice. A colliery owner, the grantee of the Birbhum Iron Farm, a leading Calcutta iron merchant and a military captain all complained that the proposed monopoly would harm their interests. The Governor General dismissed these protests as groundless but he strongly objected to the project in principle that the award of a monopoly would discriminate against other entrepreneurs in future. [26] Curiously, the Bombay Government did not express any objections.[27]

---

[24] C. H. Philips, *The East-India Company, 1784-1834* (Manchester: Manchester University Press, 1940), p. 243.

[25] David Washbrook, 'South India 1770-1840: The Colonial Transition', *Modern Asian Studies*, Vol. 38, No. 3 (2004), pp. 479-516. From this point onward, I will use the term Government unqualified for the Madras Government, while I will refer to the other Governments by qualifying them as Bengal, Bombay or British.

[26] T. Betts to Holt Mackenzie, Territorial Department Secretary, 4/04/1825; Mackenzie to Betts, 25/04/1825; Betts to Mackenzie, 2/05/1825 (*HCPP*, pp. 121-122); P. Jeremie to Mackenzie, 20/04/1825 (*HCPP*, p.122); George Jessop to Mackenzie, 31/05/1825 (*HCPP*, p. 123); Ray Radagovind Sing to GGC, undated (*HCPP*, p. 123); Resolution, Government of India (*HCPP*, pp. 123-125).

[27] Officiating Bombay Government Secretary to Madras Government Secretary, 9/02/1825 (*HCPP*, p. 125).

In Madras, Heath enjoyed the strong and unqualified support of the new Madras Governor, Stephan Rumbold Lushington.[28] In fact, Lushington's enthusiasm for the Porto Novo proposal had to be restrained by his Council members, who reminded him that an all-India privilege would not be binding on other Indian Governments. [29] Indeed, the Madras Government could not ignore Bengal's displeasure. Its 1831 Regulation, therefore, limited the scope of Heath's privilege to the area under the Madras Presidency. In that sense, the iron monopoly was an outcome of the conflict between Indian Governments over their respective legal jurisdiction.

Equally contentious was the phrase 'European plan', the substance of Heath's monopoly. The 1831 Regulation defined it as 'the principles or method' then practised in 'any part of Europe'. The Madras revenue and law officers feared that without further clarification, the phrase could allow Heath to pursue other speculators by claiming any large-scale iron-making arrangement to be an imitation of his plan.[30] Nonetheless, they acknowledged that Heath's unusual privilege was essential for mitigating any risk he might endure in applying a novel plan of manufacture. The problem, for historical interpretation, is that they did not spell out exactly what this novelty was. In all likelihood, by 'European plan', Heath meant something distinct from 'local' iron making techniques – and that the novelty lay in its introduction in India. Yet Heath's observations on the techniques and organisation of iron making in Salem have not survived. Near contemporary descriptions can be helpful to indicate what he might have meant.

Wootz, by which the British iron merchants and ironmasters came to know about the South Indian ores, was but a small part of the vibrant charcoal iron manufacture in the districts of Salem and South Arcot.[31] In Salem, the smelters scooped 'black sand' from torrential riverbeds during the rainy season. Elsewhere, they 'grubbed' a variety of ores found scattered on the surface and in shallow pits.[32] After washing or winnowing, they sprinkled ores alternating with charcoal in three- to five-foot high pear-shaped furnaces.[33] Furnaces were erected near the ore sites. Hand-

[28] There is a personal aspect to this favour. In 1830, Heath 'privately' met Lushington before the Council's decision took place. See C. Freshfield to E. Lawford, 19/03/1852 (*HCPP*, pp. 84-87).
[29] President's Minute, 30/12/1824; Minute of H. S. Græme, 10/01/1825; Minute of J. H. D. Ogilvie, 11/01/1825; Minute of J. Cochrane, 12/01/1825 (*HCPP*, pp. 142-143).
[30] Advocate-General to Secretary, 12/08/1830; Secretary to Advocate-General, 14/09/1830 (*HCPP*, p. 126); Advocate-General to Secretary, 22/11/1830 (*HCPP*, pp. 126-127)
[31] For an early survey of the iron ores and manufacture of iron and steel in the Madras Presidency, see Edward Balfour, *On the Iron Ores; the Manufacture of Iron and Steel and the Coals of the Madras Presidency* (Madras: Fort St. George Gazette Press; Military Male Orphan Asylum Press, 1855).
[32] Thomas Holland, 'Preliminary Report on the Iron Ores and Iron Industries of the Salem District', *Records of the Geological Society of India*, Vol. XXV, Pt. 3 (1892), pp. 139-152.
[33] On the variation in the furnace shapes, see Balfour, *Iron Ores*, plate, following p. 202.

operated hide bellows provided the blast. It took six hours of continuous blast to make 24 lbs of bloom from 76 lbs of 'sand' and 3 bushels of charcoal. Pig iron was made malleable by alternative heating and hammering. The state of the ores determined the output but the iron to ore weight ratio ranged from 0.12 to 0.2. Smelting was an itinerant business. Smelters exploited a new outcrop of iron ore and then moved to another site when it became exhausted. The surveying officials found them on the roadside, under the banyan tree, in the forest or on move.[34] Heath differentiated this from the 'European plan'.

It is significant that Heath's perception of 'native' processes underwent several shifts. In the 1820s, he sometimes called them imperfect and costly, and sometimes, astonishing and ingenious.[35] In the 1830s, he perceived unreliability in the local techniques. They lacked 'adequate means to produce the required intensity of heat'.[36] In 1840, he recalled the logic he had employed to place the 'European plan' at the centre of the iron monopoly: If ignorant local smelters were able to make superior quality steel with the ores, he argued, the application of 'European science' and 'European improved methods' would serve to increase the reliability of the craft still further.[37]

By 'European plan', then, it seems that Heath meant those 'means'/'methods' and 'science', which made charcoal iron and steel production reliable. As the Porto Novo Correspondence reveals, Heath wanted to equip the proposed plant with the latest pieces of machinery including a blast furnace, steam engines operating a pinion flywheel, sledgehammers and bellows. Instead of erecting furnaces near the ore sites, as was the local practice, he wanted to centralise the production and increase its scale. But it was reliability that he most sought in these innovations. Later events would demonstrate that his confidence in the 'European plan' was misplaced, and its intrinsic uncertainty eventually proved fatal to his commercial dreams.

Porto Novo Works as a form of Commercial Speculation, 1831-1851

With the Court's approval, Heath arrived in India in 1830 to begin installations at Porto Novo. Meanwhile, the collapse of the indigo trade, and the outbreak of the Burma war in 1824, coupled with careless management and supervision of their

[34] For 'near the village', see Francis Buchanan, *A Journey from Madras through the Countries of Mysore, Canara and Malabar*, 3 Vols. (London: T. Cadell and W. Davies; Black, Parry and Kingsbury, 1807), Vol. 1, p. 29; For 'on the roadside' and 'under the tree', see Benjamin Heyne, *Tracts, Historical and Statistical, of India with Journals of Several Tours through Various Parts of the Peninsula; also an Account of Sumatra in a Series of Letters* (London: Robert Bladwin; Black, Parry, and Co. Booksellers, 1814), p. 189; For migrating smelters, see Holland, 'Preliminary Report', p. 149.
[35] Heath, 'On Indian Iron and Steel', p. 395.
[36] Memorandum of J. M. Heath, 2/01/1832 (*HCPP*, pp. 135-137).
[37] *East India Produce*, p. 324.

investments, had wrecked the agency houses in Calcutta.[38] The unfavourable climate forced Heath's financial backer Messrs Alexander & Co to withdraw its pledge. This initial shock did not stop Heath from eventually erecting what was in the 1830s the largest 'European' iron manufactory in the British colonies. His enthusiasm amidst perpetual capital scarcity had many contemporary and posthumous admirers.[39]

The 'commercial distress' of the 1830s forced Heath to turn to the Madras Governor, Lushington, for help. Lushington first tried to arrange a Government bank loan of Ps 70000. When that attempt failed, the Governor awarded him a 3-year cotton supply contract. The Government had just begun exporting local raw cotton to Britain instead of buying cotton piece goods.[40] The Governor's idea was to rejuvenate the 'infant' iron manufactory with the cotton profit. But the Commercial Department rejected Heath's cotton on the grounds of its poor quality. The failed cotton contract left Heath with a debt of Ps 130000.[41]

Despite this, Heath began acquiring property and assets, gathering charcoal and ores and installing the necessary equipment.[42] From 1829, the iron plant employed 32 English and Welsh ironmasters and 2000-3000 locals.[43] Within two years, the Porto Novo Iron Company (PNIC) had the capacity to produce 2000 tons of bar iron annually. Its stock of iron ore, brought from mines seven miles distant, weighed 2200 tons and was worth Ps 30000.[44]

Not all was well, however. By 1832, debt had mushroomed to Rs 700000. Heath struggled to pay back the loans and to find an additional £8000 investment to complete the installation of steam engines, rolling mills, hammers and castings, and other machinery.[45] Potential British speculators hesitated, concerned that their money might be used to pay off the debt.[46] Indian investors knew about Heath's defaulted cotton contract and refused to engage with him.[47] In an increasingly desperate series of moves, Heath unsuccessfully appealed to the Company's servants to attract their

[38] On Heath's 1829 journey back to India, see BL: *z/0/1/10 No. 7424*; *J/1/21 f. 152*. On the financial crisis of 1830-34, see Anthony Webster, *The Twilight of the East India Company: The Evolution of Anglo-Asian Commerce and Politics 1790-1860* (Woodbridge: Boydell Press, 2009), pp. 84-90.
[39] Maylor, 'Manufacture of Iron and Steel in Southern India'; Pillai, 'Iron and Steel Production in India'.
[40] P. Swarnalatha, *The World of the Weaver in Northern Coromandel* (Hyderabad: Orient Longman, 2005), p. 91.
[41] Memorandum for the Right Honourable Sir Frederick Adam, 7/11/1832 (*HCPP*, pp. 133-134); Heath, 'On the Cultivation of Cotton'. 1 Pagoda (P) equals 3-1/2 Rupees.
[42] On the property acquired during 1830-1832, see Indenture by J. M. Heath, 30/08/1833 (*HCPP*, pp. 183-187).
[43] *East India Produce*, p. 323.
[44] Heath to Dent, Cullen and Walpole, 12/02/1833 (*HCPP*, pp. 162-164). 1 Madras Candy = 500 cwt.
[45] Heath to Dent, Cullen and Walpole, 12/02/1833 (*HCPP*, p. 166)
[46] Messrs Macleod, Cantor and Others to Heath, 26/03/1832 (*HCPP*, pp. 150-152).
[47] Memorandum for the Right Honourable Sir Frederick Adam, 7/11/1832 (*HCPP*, pp. 133-134).

savings.[48] Then he solicited financial assistance and other measures of relief from the Government. He argued that the employment benefits of such 'public' investment would rejuvenate the then faltering Madras economy.[49] In order to attract the Government's attention, Heath shifted the objectives of his project. Instead of substituting for Swedish iron in Britain, he now aimed to supply civil and military articles for the Madras Government: that is, to fulfil an import-substituting, rather than exporting, role.[50] This new arrangement, he argued, would stop the drain on Indian bullion at the time of a huge trade deficit. It would also enable the Government to tightly control production quality and benefit from a shorter delivery time.[51]

Heath then proposed making pigments from chromate of iron (used extensively for dying cloth). He would then invest the dye profit in the faltering iron works.[52] For the latter purpose, he asked for a substantial loan, a further 20-year extension to his monopoly and other favours related to royalty payments and export tariffs. But the word 'monopoly' could still raise controversy in London. He thus requested lease grants (*Pottahs)* for the iron and chromate mines and for fuel lands that were as equally privileging as the 'exclusive right' granted by the 1831 Regulation.[53]

In response to Heath's new proposal, the Madras Government constituted a Committee in 1833 to assess the state and prospects of the PNIC.[54] The Committee was comprised of the Principal Collector of South Arcot, J. Dent, and two Colonels. Its members conducted two iron-making 'experiments on a large scale' and, judging from the iron to ore weight ratio, found the quality of produce excellent and the output satisfactory.[55] They were satisfied with the existing supplies of the ores, fuel wood and transportation facilities. To them, Heath's estimated cost of production was

[48] Memorandum by J. M. Heath, 2/01/1832 (*HCPP*, pp. 135-137).
[49] Memorandum for the Right Honourable Sir Frederick Adam, 10/12/1832 (*HCPP*, pp. 147-150); P. J. Thomas and B. Natarajan, 'Economic Depression in the Madras Presidency (1825-54)', *Economic History Review*, Vol. a7, Issue 1(1936), pp. 67-75.
[50] The reorientation of its objective would develop as a difficulty in the 1840s: the Madras Government would remain its sole consumer, while its promoters would prefer exporting ores to England. See *East India Produce*, p. 325.
[51] Heath cited the case of British cast iron naves (BL: *IOR/F/4/839/22459*). In 1831, Heath's naves were under trial. See Memorandum for the Right Honourable Sir Frederick Adam, 10/12/1832 (*HCPP*, pp. 147-150). The British patent iron wheels were considered unsuitable in India (BL: *IOR/F/4/1357/54159*).
[52] Heath claimed that the chrome factory was *almost* all equipped. See Heath to Dent, Cullen and Walpole, 12/02/1833 (*HCPP*, pp. 162-164). The Dent Committee endorsed the claim. See Dent Committee Report, 15/02/1833 (*HCPP*, pp. 153-157).
[53] Heath to GMC, 3/08/1833 (*HCPP*, pp. 172-173); Minutes, Government in Revenue Department, 14/03/1834 (*HCPP*, pp. 207-209); MBR Secretary to Chief Secretary, 9/01/1834 (*HCPP*, p. 209). On the terms of Heath's proposal, see Memorandum for the Right Honourable Sir Frederick Adam, 10/12/1832 (*HCPP*, pp.147-150); Heath to GMC, 30/05/1833 (*HCPP*, pp. 169-170).
[54] Memorandum for the Right Honourable Sir Frederick Adam, 10/12/1832 (*HCPP*, pp. 147-150); GMC Chief Secretary to Dent, Cullen and Walpole, 23/01/1833 (*HCPP*, p. 153).
[55] Heath to Dent, Cullen and Walpole, 12/02/1833 (*HCPP*, pp. 162-164).

dependable and profits, 'certainly large' but 'not extravagant'. While the Committee did mention the criticality of 'a superintendence of the most vigilant, efficient, and energetic kind' in the success of the undertaking, it concluded that PNIC was 'quite practicable…with every prospect of success, and a very large profit'.[56] The Government duly pledged its support.

As we will see, various future Committees would arrive at similar conclusions. We can see with the benefit of hindsight that in affirming Heath's claim about PNIC's future prospects, the Committees put too little emphasis on the extant problems in technology and on the plant's underperformance. Like Heath, the Committee members thought that money and machines would eventually solve these problems.[57] Each time PNIC sought Government assistance by proposing an expansion of operations, the Government-appointed Committees attested its credibility and the Government, lured by larger future returns, bestowed ever-increasing relief measures.

The personal interests of the Government's top officers played a crucial role in such decisions. Consider the role played by the influential Advocate General of Madras, George Norton. Norton was a popular writer and an impressive orator on political economy. His knowledge about the financial world and legal matters was formidable. He had many admirers among whom the most illustrious in Madras was its new Governor, Frederick Adam.[58]

In 1830, Norton had been alarmed by Heath's extensive privileges and had argued for curtailing them. But from 1833 onwards, he argued in PNIC's favour. Norton had recently become a member of the iron association, which Heath had formed to raise Rs 360000 as a security for the impending Government rescue package. Besides Norton, the association counted among its members two civil servants, a surgeon and the Mint Assay Master. These men were contributing to the fund in the hope of getting a 12 percent return on their investment. Therefore, their interest was intertwined with the success of the iron venture. In effect, Norton persuaded the Governor to use public money to prop up a private enterprise. He suggested binding Heath *personally* for his debts of Rs 511000 with all his assets, the capital contributed by others and the proceeds from the iron works as further

[56] Dent Committee Report, 15/02/1833 (*HCPP*, pp. 153-157). The basis of such prospect was Heath's commitment to send low duty 'steel' to England instead of bar iron. See Heath to Dent, Cullen and Walpole, February 12, 1833 (*HCPP*, pp. 162-164).
[57] Report of the Committee on the Indian Iron Works (IISC) (hereafter, Garrow Committee) to Chief Secretary, 25/12/1837 (*HCPP*, pp. 265-274).
[58] George Norton (1791-1876) was a barrister-at-law and was the Madras Advocate General in the early 1830s and again in the mid-1840s. His books include *Commentaries on the History, Constitution and Chartered Franchises of the City of London* (1829) and *Young Accountant's Guide* (1837). On Adam's respect for Norton, see G. Norton, *Rudimentals: Being a Series of Discourses…Addressed to the Natives of India* (Madras: J. B. Pharoah, 1841).

security.[59] His recommendation appeared to protect public investment but was intended to secure his own stake.

Presented in this light, Norton may look like a greedy opportunist. Yet his own argument for associating himself with a private venture sounds almost altruistic. Since ready capital was unavailable in India, he argued, the Company's covenant officers, like him, should be allowed to put money into the venture. They would be 'dormant shareholders': they would not meddle in day-to-day management. At the same time, their involvement would make the Government's job easier by ensuring 'the capital [was] being faithfully applied and the accounts accurately and fairly kept up'.[60] In other words, his argument was that these officers would help foster private capitalism and, as covenanted servants, assist in policing the 'private' venture in the public interest. As Norton's involvement in PNIC shows, not only was the distinction between private and public blurred in the colony, the relationship between the Government officials and private speculators also took many forms.

In September 1833, Heath entered into several bonds and assignments by way of mortgage with the Company's solicitor, and the Government released him a loan of Rs 360000. Heath was understandably grateful: 'while my life is spared', he wrote, 'no exertion of body or mind shall be omitted which can conduce to the realization' of their [the investors'] expectations.[61]

Yet despite these privileges, favours and investments in hand, Heath still could not deliver. The accounts between August 1833 and September 1837 reveal that PNIC's output remained tiny. Its paltry earnings came solely from some iron sold to the Government's military and civil departments. The total earnings were a mere half percent of the investment in the period.[62] The poor state of the finances prompted Heath in 1835 to avoid specifying a time schedule for the repayment of the Government loan. His answer to the Government's accountant on this occasion is revealing. The expansion of the works was not yet complete, he maintained. He was unable to 'ascertain at what rate marketable produce' could actually be turned out, nor 'what rate of profit' he might expect on sale. Much also depended, he said, on whether 'a profitable vent' could be found in India for his produce, either in the general market

[59] Minute of the Frederick Adam, President in Council, undated (*HCPP*, pp. 170-171); Chief Secretary to Advocate General, 4/06/1833 (*HCPP*, pp. 171-172).
[60] George Norton to Chief Secretary, 15/08/1833 (*HCPP*, pp. 174-180).
[61] Minute of GMC, 27/08/1833 (*HCPP*, pp. 181-182); Minutes, Government in Revenue Department, 14/03/1834 (*HCPP*, pp. 207-209). Subsequently, R. A. Martland, and Henry Peach Keighly were proposed as loan supervisors. See Norton to Chief Secretary, 3/09/1833 (*HCPP*, pp. 189-190); Thames Tweed, EIC's Solicitor to Chief Secretary, 4/09/1833 (*HCPP*, pp. 182-189); Heath to Chief Secretary, 5/09/1833 (*HCPP*, pp. 191-192); Tweed to Chief Secretary, 10/09/1833 (*HCPP*, pp. 193-202); Resolution of Government, undated (*HCPP*, pp. 202-203).
[62] Account Current of the Porto Novo Iron Works, August 1833 to September 1837 (*HCPP*, p. 275).

or for the public service.[63] In other words, the production routine at Porto Novo was not yet regularised, the output was unpredictable and the target market still undecided. At a time when the Madras Government expected returns from their investment, the iron works, with its persistent capital requirements, looked more like a plant under construction.

In 1836, Heath sailed to London to assess the market for PNIC's products. He left Norton in charge of lobbying for Government financial assistance, which by then had become an almost perpetual chore. In 1837, the Government appointed another Committee, headed by Lieutenant William Garrow, to assess and report on the state of the iron plant. The Garrow Committee found an impressive array of machines and infrastructures at Porto Novo: the three furnaces; a forge with two 4-ton hammers and a 25-hp steam engine; five puddling furnaces; eight refineries; two more steam engines of 35-hp and 6-hp power; several model makers; blacksmith shops; warehouses; a full-fledged foundry unit with steam engines, blowing apparatuses and boilers; and, walled enclosures with a variety of residence buildings. These machines were in 'the most complete order, and perfectly efficient for making pig iron, and castings of all kinds'. The Committee estimated that the arrangements at Porto Novo could produce 4000 tons of pig iron annually.[64]

The site was colossal, but the iron output and income too little. In the four years 1833-1837, the plant had made 700 tons of malleable iron and 240 tons of pig iron, both sent to England. Two hundred tons remained in storage at Porto Novo and in search of a buyer. In addition to the iron, the iron works had supplied 90 tons of cast iron rails, chairs and wheels for the Madras Military's Red Hill Railroad project and about 1500 Ploughs to the Bombay Government.[65]

Like its predecessor the Dent Committee, the 1837 Committee did not take the iron association's persistent failure as a sign of mismanagement.[66] Instead, it fully endorsed the association's claims: that the quality of Indian iron was the best; that the processes and resources employed in the plant were fit for purpose; that it could

---

[63] J. G. Turnbull, Accountant General to Chief Secretary, 3/12/1835 (*HCPP*, p. 237); Remarks by Government, undated (*HCPP*, p.236); Chief Secretary to Turnbull, 11/05/1836; Heath to Turnbull, 24/06/1836; Turnbull to Chief Secretary, 11/07/1836 (*HCPP*, pp. 239-240).

[64] Garrow Committee Report to Chief Secretary, 25/12/1837 (*HCPP*, pp. 265-274). On the terms of the Committee, see Accountant General to Chief Secretary, 23/10/1837 (*HCPP*, pp. 256-257); Remarks by Government, undated (*HCPP*, p. 258); IISC Secretary to Chief Secretary, 6/11/1837 (*HCPP*, pp. 263-264).

[65] Heath to Chief Secretary, 4/05/1836 (*HCPP*, p. 236); Resolution of Government, undated (*HCPP*, p. 236); Heath to Chief Secretary, 4/09/1837 (*HCPP*, p. 259); H. Moberly, MMB Secretary to the Secretary, Government in Military Department, 3/10/1837 (*HCPP*, pp. 260-261). On the ploughs, see J. M. Heath, 'On the Introduction of the American Plough in India', *Journal of the Royal Asiatic Society of Great Britain and Ireland*, Vol. VII (1843), pp. 92-97.

[66] Clerk to George Garrow, J. Dent and Captain A. T. Cotton, 25/11/1837 (*HCPP*, pp. 264-265); Clerk to IISC Directors, 25/11/1837 (*HCPP*, p. 265).

undersell the comparable iron on the English market; that its success could have a strong positive impact on 'the welfare of the State'; and that the only constraint was capital. The Committee again recommended that repayments should be postponed 'till the works are really in a prosperous state'. It also proposed a 'very moderate advance' of Rs 8500 per month to double the production capacity of the iron plant. In order to hasten a financial return, the Committee suggested giving up forging or rolling operations while the plant focussed only on producing pig iron.[67]

Another striking feature of the PNIC story is that the Committee, the Government and the iron association all believed that a little more time and a little more investment would make the iron manufacture profitable.[68] In hindsight, it is easy to dismiss these views as self-delusion, but it remained a persistent feature until well into the 1840s. The iron association thus kept on employing various devices to ask for further financial assistance, remissions in duties, royalties and rent payments. Likewise, the Government went on granting loans whenever required. It extended the five-year exemption on rents and royalties for both ore mines and fuel lands. It purchased all pig iron on advance and suspended all demands for principle and interest on its capital.[69] PNIC thus found itself enjoying the use of immense tracts of mines and jungles for fifteen years without paying a single penny.[70]

The story of PNIC from 1845 onwards is chiefly a story of attempts to escape bankruptcy, followed by a final and ignominious institutional collapse in 1851. Meanwhile, Norton's role proved more crucial than ever. He tried to satisfy PNIC's creditors by re-interpreting past deeds, mortgages and agreements. In 1833, for example, two association members, James Walker and B. G. Babington, went to London without paying for their shares in the security fund. In haste, the remaining four associates bound themselves to pay for the two vacant shares if they were not taken in the following 18 months. When one of these associates, T. M. Lane, died in 1844, the Madras Accountant General demanded payment from Lane's share for the unfulfilled bond. Norton quickly made a Madras Agency house confirm that both Walker and Babington had retaken up their shares. It turned out that the deed purported to have been made on behalf of Walker was undated, and that there was no evidence of the payment having been made within the stipulated 18 months. Yet

[67] Garrow Committee Report to Chief Secretary, 25/12/1837 (*HCPP*, pp. 265-274).
[68] Resolution of Government, undated (*HCPP*, p. 282).
[69] Acting Accountant General to Chief Secretary, 9/08/1844 (*HCPP*, p. 390); Resolution of Government, 30/08/1844 (*HCPP*, p. 391).
[70] In fact, whatever was paid in the interim was also given back to them. See MBR Secretary to Acting Chief Secretary, 14/07/1842 (*HCPP*, p. 370); Acting Tanjore Principal Collector to MBR Secretary, 20/06/1842 (*HCPP*, p. 370); IISC Acting Secretary to Acting Tanjore Principal Collector, 11/06/1842 (*HCPP*, pp. 370-371); Grant by the Government, 25/07/1842 (*HCPP*, p. 371).

Norton convinced the Accountant General that the 'spirit, though not the letter, of the penalty bond' had been fulfilled.[71] The episode shows how Norton's twin role, as the Advocate General and as a PNIC associate, helped the project survive the Government's fiscal demands. In fact, thanks to Norton, the association would succeed in both disowning Heath's debts and not paying back Government advances, rents and royalties.

Capital shortage therefore does appear as a chronic element in the PNIC story. The capital constraints forced the iron works to refashion its goals. The demands on debt repayment and interest on loans transformed it from an individually owned project to an association-managed enterprise. Yet, as we have seen, the Madras Government always matched the shortage by necessary capital injections, complemented by generous remissions and time allowances. In fact, PNIC survived for three decades largely on Government advances and purchase orders. In order to understand why PNIC was persistently unable to perform despite the continuous financial assistance, I next investigate specific social and bureaucratic context in which PNIC operated as a technological arrangement.

Responses to the Porto Novo Monopoly

The discussion in this section will focus on the responses of three sets of actors to PNIC: the local iron manufacturing population, the Company's revenue officials, and the members of the Madras Council. The unprecedented scale and scope of PNIC's monopoly made these groups apprehensive, for different reasons.

In order to appreciate the magnitude of change that the PNIC's operations brought in the lives of the people in the iron districts, a brief summary of the existing local relations of iron manufacture will be useful. The districts of Salem, South Arcot and Coimbatore each had a vibrant iron industry. Salem, where Heath drew most of his iron ores, had 'hundreds' of furnaces at work in 1839 that could supply 'any quantity of iron required by the people'.[72] There was a group of people called 'Katti-Pariayans', who specialised in making pig iron. The blacksmiths in the district purchased blooms (the malleable produce) from the smelters. They fashioned various agricultural and household implements such as pots, pans, crowbars, hoes, hinges, axes, hammers, chisels and well baskets. They also made umbrella ribs, hooks, red-hot

[71] Messrs. Arbuthnot & Co. to T. V. Stonhouse, 3/07/1846 (*HCPP*, pp. 429-430); Stonhouse to Messrs. Arbuthnot & Co., 7/07/1846 (*HCPP*, p. 430); Messrs. Arbuthnot & Co. to Stonhouse, 28/07/1846 (*HCPP*, p. 430); Stonhouse to Chief Secretary, 31/07/1846 (*HCPP*, p. 429); Resolution of Government, 5/08/1846 (*HCPP*, p. 431); Stonhouse to Thomas, 19/08/1846 (*HCPP*, pp. 431-432); Remark by Government, 24/08/1846 (*HCPP*, p. 433).
[72] Salem Principal Collector to MBR Secretary, 27/11/1839 (*HCPP*, pp. 339-340).

iron pieces for truth ordeals, teeth for weeding ploughs, iron-capped shoe-lasts, and iron chromate pigments.[73] Men in these districts took knives and swords literally to their graves.[74]

Some smelters and blacksmiths worked on their own, while others employed up to 12 debt-bonded labourers. In some places, workers were hired; elsewhere necessary tools and iron ores were let to the workers in return for one third of their produce.[75] Blacksmiths living in towns were organised as a community led by headmen. They also belonged to a larger endogamous *Panchalaru* group consisting of five artisan castes.[76] In rural areas, blacksmiths received raw materials from the cultivators for making and mending farm implements and lived off a customary share of the agricultural produce in return.[77] Besides the smelters and blacksmiths, thousands of families survived by collecting firewood, making and selling charcoal to iron smiths and potters in the towns.[78] Iron manufacture was thus firmly embedded in local social relations.

Those reliant on the forest for their livelihood, such as smelters and charcoal makers, felt considerable anxiety when the 1831 Regulation, declaring Heath's monopoly, came into force. The Regulation made it easy to prosecute anyone on the mere suspicion of breaching the monopoly. While the Government would act as a claimant on Heath's behalf, the burden of proof lay on the accused. Anyone making a ton of iron and steel in violation of the monopoly could be fined up to Rs 10000.[79] The population found these terms, together with the vague phrase 'European plan', alarming. The clause that the monopoly did not prejudice existing works or future 'native' works did not pacify their fears.

PNIC therefore faced several forms of discontent from the people living in its ore-mining and fuel-collecting areas. On one occasion, the holders of the ore land 'were tempered (sic) with', suggesting there were skirmishes against the landholder in getting access to the mines. On another occasion, the smelters' operations in the ore districts were forestalled, although who or what prevented the iron makers from

[73] F. J. Richards, *Madras District Gazetteer Salem*, Volume 1, Part 1 (Madras: The Superintendent Government Press, 1918), pp. 118, 129, 202, 209, 270.
[74] Richards, *Salem*, Vol. 1, Part 1, pp. 42-44.
[75] Balfour, *Iron Ores*, Appendix, p. 13.
[76] *Panchalaru* consisted of goldsmiths, coppersmiths, masons and carpenters. See Buchanan, *Journey from Madras*, Vol. 1, pp. 250-252.
[77] On blacksmiths' customary share, see Heyne, *Tracts*, pp. 67-73.
[78] Salem Principle Collector to MBR Secretary, 27/11/1839 (*HCPP*, pp. 339-340); Trichonopoly Collector to Acting MBR Secretary, 31/12/1839 (*HCPP*, p. 345); Coimbatore Acting Principle Collector to MBR Secretary, 9/01/1840 (*HCPP*, p. 340); Canara Acting Principle Collector to MBR Secretary, 9/01/1840 (*HCPP*, pp. 341-343); Tanjore Acting Principle Collector to MBR Secretary, 6/12/1839 and 17/01/1840 (*HCPP*, pp. 344-345).
[79] Extract of the Minutes of Consultations, 21/01/1831 (*HCPP*, pp. 130-132).

performing their furnace duties is not clear in the source documents. On yet another occasion, the principal plant manager at Porto Novo, Mr. King, was accused of housebreaking and robbery.[80]

The forest-dependent population contested PNIC's 'exclusive' rights. PNIC reported that these disputants adopted 'a system of molesting' by seizing its fuel stacks, and by employing people in 'mischievously destroying' the jungles. On one occasion, the Collector had to prevent people from cutting wood in a jungle that had been leased to PNIC by the Government.[81] Such friction indicates that the local iron-making and iron-trading population had difficulties coming to terms with the extent of the privileges.

This widespread anxiety affected the views of PNIC held by the Collectors and the Madras Board of Revenue members. Sensitive to the swings in the opinion revenue-yielding populace, these officials could not shrug off the local discontents. The Government's continuous financial incentives to PNIC made the issue more complex. They found it increasingly difficult to dismiss the local complaints by claiming that PNIC was a private enterprise. The officials thus began to sympathise with the locals' concerns. One Collector described the terms in the PNIC leases as 'utterly destructive' and 'the worst thing possible which could happen' to the inhabitants of his district.[82] Another argued that the proposed leases would 'tie up the right hand' of the local iron industry. Some of them were also dissatisfied with PNIC's hold on the Madras Council.[83]

The revenue officials' reports from the districts, which ranged from outright opposition to conditional support, began to shape the attitude of the Madras Board of Revenue towards PNIC. In their comments upon Heath's drafts of the 1833 leases, the Board of Revenue corrected his use of the phrase 'exclusive right' in the draft leases (*Cawle*-s) as 'right to raise [ore]'. Prompted by the district officials, the Board even extended the customary rights of the locals by allowing them to trade ores throughout the Madras Presidency.[84] Whereas Heath had interpreted 'waste lands' to mean all land in the Presidency except the Company-owned parcels, the Board defined it as the property of the *Zemindar*s, *Polygar*s or other landholders. The latter interpretation

[80] Minute by C. M. Lushington, 14/06/1841 (*HCPP*, pp. 322-324).
[81] IISC Directors to Revenue Department Secretary, 18/12/1840 (*HCPP*, p. 319).
[82] Cuddalore Principal Collector to MBR Secretary, 21/11/1839 (*HCPP*, pp. 338-339).
[83] Salem Principal Collector to MBR Secretary, 27/11/1839 (*HCPP*, pp. 339-340). For similar feedback, see Trichinopoly Collector to MBR Acting Secretary, 31/12/1839 (*HCPP*, p. 345); Coimbatore Acting Principal Collector to MBR Secretary, 9/01/1840 (*HCPP*, p. 340); Canara Acting Principal Collector to MBR Secretary, 9/01/1840 (*HCPP*, pp. 341-343); Tanjore Acting Principal Collector to MBR Secretary, 6/12/1839; 17/01/1840 (*HCPP*, pp. 344-345).
[84] South Arcot Principal Collector to Chief Secretary, 20/06/1839 (*HCPP*, p. 294); Salem Principal Collector to MBR Secretary, 27/11/1839 (*HCPP*, pp. 339-340).

meant that PNIC required prior consent from these men for its mining and charcoal making operations in the 'waste lands'. The Board was also reluctant to exempt Heath from the established inland custom duty (*Sayer*) on iron and the tax on the furnace (*Moturpha*).[85] It argued that the Government could not interfere with existing privileges without passing a law to that effect.[86]

PNIC took the Board's protestations as 'prejudiced' in view of the 1831 monopoly. While everyone else was freely exploiting the forests and mines under the rubric of customary rights, PNIC had to pay rent and royalties for the same. In its view, 'exclusive rights' or even 'leases' had no meaning if they were not immune from interference. It complained that in propounding the 'indiscriminate' rights of the public, the Board was simply asking the PNIC to forego its past investments of labour and capital.[87] These claims and counter-claims arose because the legal provisions of the PNIC privileges were not clear to the Board. It was still trying to grasp the nature, extent and consequences of the privileges.

Crucially, the views of the Madras Council about PNIC also evolved over the period. In the 1830s, the Council extended every possible support to its promoters. In 1833, the Council overrode the 'confused' Board's objections to the PNIC privileges to assert its right to govern the territory.[88] During the following decade, however, the Council members began to doubt the validity and value of such encouragement. In the early 1840s, they started to question the propriety of PNIC's seemingly unending series of demands of financial assistance, concessions and privileges, especially in the light of its continuous underperformance and the discontent it had triggered among the local population.

This explains their receptivity to an alternative plan for iron manufacture, put forward in 1844 by J. Campbell. Campbell was the Assistant Surveyor General stationed at Ryacottah in the Madras Presidency. Campbell proposed to make

---

[85] MBR Secretary to Chief Secretary, 30/12/1833 (*HCPP*, pp. 203-204). In 1831/32, the duty and *moturpha* from Salem alone amounted to Ps 5593-12 and Ps 1260-7. See MBR Secretary to Government, 30/12/1833 (*HCPP*, pp. 205-206). Heath, on the other hand, had been willing to pay only the royalty and wanted to be put on 'a more advantageous footing than the native smelters'. See Officiating Government Secretary to Heath, 31/01/1834; Heath to Revenue Department Secretary, 6/02/1834 (*HCPP*, pp. 210-211).

[86] IISC Directors to MBR Secretary, 10/10/1839 (*HCPP*, pp. 346-347); MBR Acting Secretary to Chief Secretary, 2/03/1840 (*HCPP*, pp. 298-300).

[87] IISC Directors to Revenue Department Secretary, 18/12/1840 (*HCPP*, pp. 317-319).

[88] Minutes of Revenue Department, 14/03/1834 (*HCPP*, pp. 207-209). The Government conceded to the Board's demand that the royalty be paid on the basis of iron produced at the furnace. See the drafts of the *Cowle*s or renewable leases (*HCPP*, pp. 212-217). For the final versions of these leases, see *HCPP* (pp. 218-227) and further, *HCPP* (pp. 228-235). Minute by C. M. Lushington, 14/06/1841; Minute by John Bird, 21/06/1841; Minute by President, 5/08/1841 (*HCPP*, pp. 322-326); Extract MBR Proceedings, 24/03/1842 (*HCPP*, pp. 371-376); Grant by Government, undated (*HCPP*, p. 377); MBR Secretary to Acting Chief Secretary, 14/07/1842 (*HCPP*, p. 377); IISC Acting Secretary to Acting Chief Secretary, 19/09/1842 (*HCPP*, p. 367).

excellent bar iron from local iron using only the common tools employed by native smiths. He was convinced that the quality of iron depended solely on the 'management' of the smelting process and not, as Heath believed, on the nature of the ores. For him, there was no match for native smelters. He thought they operated on 'the most scientific principles' as their 'most suitable' produce proved. His notion of 'scientific principles' here contrasts with Heath's in that he seems to link them more to the end result than to the task of explaining the involved processes. Campbell was confident that with a little 'supervision', the local smiths could produce iron suitable for anything from suspension bridges to gun carriages to ship anchors.

Campbell's route to industrialising iron manufacture did not involve establishing works in the 'European' manner, like PNIC. He advocated developing 'the capabilities of too-much-despised inhabitants'. He had no use for any machinery 'nor any method of economising human labour'. Instead, he wanted to erect a 'big workshop' where a large number of small furnaces would be set up and 'the common coolly workmen from the villages' would gain experience in making the articles for the Government. Campbell's project thus ran counter to the Porto Novo plan and purpose, sometimes explicitly.[89]

After initial doubts, both the Madras and Bombay Governments agreed to purchase Campbell's iron for making test objects.[90] Crucially, the junior member of the two-member Madras Council, Henry Chamier, seized on Campbell's proposal and called for an end to Government interests in PNIC. As the Collector of South Arcot in the mid-1820s and as Secretary to the Board of Revenue in the early 1830s, Chamier had witnessed first-hand locals' discontent over Heath's monopoly. Now as the second most powerful officer in the Presidency, he wrote to the Court arguing that had it known of Campbell's 'discoveries', the Court would never have endorsed the Heath scheme. Since Campbell now supplied iron samples 'of a quality just suited to' the Government's requirement and at a reasonable price, he suggested, the Court should abandon PNIC to make the most of its works.[91] The Governor, George Marquess Tweeddale, also viewed the Council's past encouragement to Porto Novo as little more than personal favours. However, Tweeddale was more cautious and wanted to know,

[89] J. Campbell to Bombay Pubic Department Secretary, 4/03/1844 (*HCPP*, pp. 396-397). Campbell's proposal compares interestingly with that of the geologist Thomas H. Holland, who wrote, 'the adoption of large number of small furnaces of an improved type' might lead to success of the large iron manufactories. See Richards, *Salem*, pp. 273-274.

[90] Campbell to General Department Secretary, 14/04/1844 (*HCPP*, p. 392); Campbell to Madras Military Board (MMB) Secretary, 22/05/1843 (*HCPP*, p. 393). The Madras Government first asked Campbell's experience in bar-iron manufacture. See Resolution of Government, 3/05/1844 (*HCPP*, p. 393); Campbell to Public Department Secretary, 10/05/1844 (*HCPP*, p. 395). Bombay Secretary to Madras Secretary, 25/05/1844 (*HCPP*, p. 396); Bombay Secretary to Madras Secretary, 6/06/1844 (*HCPP*, pp. 400-401).

[91] Minute by H. Chamier, 1/07/1844 (*HCPP*, pp. 402-405).

in light of the Government's past commitments to PNIC, the possible legal consequences of encouraging Campbell.[92] Since George Norton, the Madras Advocate General, had personal interests in the issue, the Madras Council sought the advice of the Advocate General of Calcutta.

The Calcutta Officer;s preport port prompted a legal dilemma for the Madras Government. He first suggested that the 1831 monopoly and subsequent leases did not prevent anyone from making iron outside the specified districts and on any private land within the districts. Similarly, the leases could not restrict iron manufacture by methods other than the 'European plan'. The PNIC's privileges thus could not stop the Madras Government from encouraging Campbell. Extending a critique of the legal basis of PNIC's privileges, the Calcutta officer suggested that even the East India Company, as a manager on behalf of the British Crown, could not mine ores either by itself or through others anywhere in the Indian territories. Only the British Parliament could restrict what the 1831 Regulation and leases purported to do. In other words, Madras had granted to PNIC something even the Company could not claim for itself.[93]

Fearing an immediate loss of its privileges, PNIC proposed to supply bar iron to the Government at a cheaper rate. The tactic worked for a while. The Government, at the Court's behest, allowed it 'an experiment for conversion into bar-iron'.[94] Soon, however, other iron speculators began complaining about the continuation of PNIC's exclusive privileges. In their view, PNIC had effectively forfeited the privileges granted by the 1833 lease by not engaging in the production of iron chromate.[95] The district revenue officials in Salem and South Arcot endorsed these opinions.[96] PNIC tried to

[92] Minute by Madras Governor, 5/10/1844 (*HCPP*, pp. 408-410); Note by Government, 21/10/1844 (*HCPP*, p. 421); Norton to Public Department Secretary, 18/12/1844 (*HCPP*, pp. 422-424).
[93] Madras Chief Secretary to Government of India Secretary, 6/03/1845 (*HCPP*, p. 424); Officiating Advocate General, Opinion re: Porto Novo Company, 25/04/1845 (*HCPP*, pp. 425-427); Government of India Secretary to Madras Chief Secretary, 3/05/1845 (*HCPP*, p. 425); Resolution of Government, undated (*HCPP*, p. 427); Madras Chief Secretary to Bombay Secretary, 3/06/1845 (*HCPP*, p. 427).
[94] Chief Secretary to MMB, 29/11/1844 (*HCPP*, p. 427); MMB to GMC, 17/12/1844 (*HCPP*, p. 428); Resolution of Government, 12/03/1845 (*HCPP*, pp. 428-429).
[95] G. F. Fischer to Chief Secretary, 18/02/1841 (*HCPP*, pp. 447-448); Fischer to Chief Secretary, 8/06/1841 (*HCPP*, p. 448); Resolution of Government, 31/08/1841 (*HCPP*, p. 448); Acting Secretary to Fischer, 25/10/1841 (*HCPP*, pp. 448-449); Fischer to Chief Secretary, 10/07/1847 (*HCPP*, pp. 446-447); Resolution of Government, 31/07/1847 (*HCPP*, p. 450); Fischer to Chief Secretary, 17/08/1848 (*HCPP*, pp. 450-451).
[96] MBR Extract Proceedings, 5/10/1848 (*HCPP*, pp. 451-453); Salem Collector to MBR Acting Secretary, 12/11/1847 (*HCPP*, p. 453); MBR Extract Proceedings, 29/11/1847 (*HCPP*, p. 453); PNIC Managing Director to South Arcot Collector, 28/02/1848 (*HCPP*, pp. 454-455); South Arcot Collector to Salem Collector, 6/03/1848 (*HCPP*, p. 454); Salem Collector to MBR Secretary, 29/08/1848 (*HCPP*, pp. 453-454); MBR Secretary to South Arcot Collector, 5/10/1848 (*HCPP*, p. 456); Salem Collector to PNIW Managing Director, 5/10/1848 (*HCPP*, pp. 456-457); South Arcot Collector to Salem Collector, 11/10/1848 (*HCPP*, p. 457), Order of the Government, 31/10/1848 (*HCPP*, p. 455); South Arcot Collector to Salem Collector, 5/12/1848 (*HCPP*, p. 457); Salem Collector to Chief Secretary, 28/05/1849 (*HCPP*, pp. 455-456).

ward off these complaints saying that raising the ore was 'a subordinate consideration' to 'raise ores to be used in iron-works'.[97]

These new grievances, PNIC's persistent failure to perform, legal doubts and, more significantly, the availability of Campbell's alternative scheme, served tp undermine the Madras Council's long-standing support to PNIC. In 1849, the new Governor, Henry Pottinger, reviewed the two decades of its activities and results and, sealing the eventual fate of Porto Novo, called it 'a complete failure'.[98]

No amount of persuasion from the iron association could now sway the Government.[99] The termination of its support meant that PNIC faced the immediate prospect of insolvency. Its promoters could no longer claim that it was a viable commercial enterprise. In 1851, there was another effort to resuscitate the Porto Novo works when a joint limited company in London took its ownership from the iron association. But that too failed, indicating that the Government support was crucial to PNIC's survival.

Unsettled Technology of Charcoal Iron Making

While the responses of the local population, the district and Board of Revenue officials, and the changing opinion of the Madras Council created obstacles to PNIC's operations, they do not explain its persistent underperformance. To understand this issue, it is necessary to analyze the actual contents, as opposed to the intended meanings, of the 'European plan' by examining the production processes at Porto Novo.

Heath and other members of the iron association were anxious about their 'European plan'. Would the imported machinery and equipment, after being broken apart and reassembled during the shipment from London, behave the way it should? Would the PNIC smelters, blacksmiths and engineers know the local ores sufficiently well to predict how they would behave in the furnace heat? Could they regulate the fire and the timing of alternate 'sprinklings' of the ores and charcoal to produce good blooms? Were there alternative ways to achieve the desired result should these novel methods and machines fail? The PNIC promoters pondered some of these questions.

One may gain some insight into the actual processes followed at Porto Novo from the reports on the quality of its produce. The sources frequently cite the variable

[97] IIC to Court, 19/11/1849 (HCPP, pp. 56-57).
[98] Minute by Madras Governor, 15/06/1849 (*HCPP*, p. 459); Minute by Madras Governor, 31/08/1849 (*HCPP*, pp. 461-462); Minute by D. Eliott, 6/09/1849 (*HCPP*, p. 462).
[99] B. T. Norfor, PNIW Agent to Collector, Southern Division of Cuddalore, 1/12/1848 (*HCPP*, pp. 457-458); Collector, Salem to Secretary, MBR, 3/05/1849 (*HCPP*, p. 458); Minute of Madras Governor, 15/06/1849 (*HCPP*, pp. 458-459); IISC to Court, 19/11/1849 (*HCPP*, pp. 56-57); George Norton to PNIW Agent, undated (*HCPP*, pp. 460-461).

quality of the Porto Novo iron as the reason for its poor reception in Britain and India. Sergeant Hancock, 'a regular iron-founder and an intelligent man in his line' from the Government arsenal, reported in 1837 that the iron was 'very inferior and brittle'.[100] The military engineers at the Railroad project rejected the Porto Novo rails because of their uncertain quality.[101] Even Porto Novo's own sales agent in England spoke about the uneven quality of the samples.[102]

Quality was a poorly defined concept in the period. The ironmasters and forge men graded iron as 'common', 'tough', 'best tough', 'best best tough' and 'best 3 tough', indicating that their reference point was iron's malleability rather than its 'chemical' constituents. The grading varied from one ironmaster to another and from one purpose to another. Different responses to Campbell's iron from the Bombay Government mint, gun carriages and navy workshops also illustrate the point.[103] Smelters, men in the forge, ironmasters and merchants agreed the worth of iron by negotiation rather than by any independently verifiable standard.[104] Often, the authority of the judging individual was sufficient proof of quality.[105] People argued about the superiority of Indian iron by citing the opinion of 'eminent public officers'.[106] The conviction about the quality of *Wootz*, for instance, was based on the testimonials of 'eminent instrument makers'.[107]

While reports about irregular quality might have simply reflected the contemporary uncertainty about its measures, one can also link them to the diverse manufacturing processes employed at Porto Novo. William Brunton, the PNIC plant engineer acknowledged in 1837 that Heath had been passing off a mix of iron as the product of a single process, when in fact he often had to make up orders with locally smelted iron. The output was actually a combination of iron made by the locals at

---

[100] Ordnance Department to MMB Secretary, 16/09/1837 (*HCPP*, p. 262).
[101] Heath to Chief Secretary, 4/09/1837 (*HCPP*, p. 259); MMB Assistant Secretary to Messrs. Heath and Ballard, 5/09/1837 (*HCPP*, p. 262); MMB Secretary to Military Department Secretary, 3/10/1837 (*HCPP*, pp. 260-261); Remarks by Government, undated (*HCPP*, p. 262).
[102] Garrow Committee Report to Chief Secretary, 25/12/1837 (*HCPP*, pp. 265-274).
[103] J. T. Smith, Mint Master, Report of an Experiment upon the Quality of a Sample of 1½-inch Bar-iron submitted to Government by Captain J. Campbell, 17/05/1844 (*HCPP*, pp. 395-396); Assistant Superintendent Indian Navy to Secretary, Bombay Military Board (BoMB), 28/03/1844 (*HCPP*, p. 398); Agent for Gun-Carriages to BoMB Secretary, 16/04/1844 (*HCPP*, pp. 398-399); Campbell to Secretary, Government in Public Department, 18/04/1844 (*HCPP*, p. 401); Mint Engineer to BoMB Secretary, 23/04/1844 (*HCPP*, p. 399); Agent for Gun-Carriages to BpMB Secretary, 27/04/1844 (*HCPP*, p.400); BoMB to Governor Bombay Council, 30/04/1844 (*HCPP*, pp. 397-398); Stanton to BoMB Secretary, 9/05/1844 (*HCPP*, pp. 401-402); BoMB to Mint Engineer, 17/05/1844 (*HCPP*, p. 401).
[104] Richard Hayman, *The Shropshire Wrought-Iron Industry: A Study of Technological Change*, PhD Thesis, University of Birmingham (2003), pp. 131-138.
[105] Hyman, *Shropshire Wrought-Iron Industry*; Charles K. Hyde, *Technological Change and the British Iron Industry, 1700-1870* (Princeton, N. J.: Princeton University Press, 1977).
[106] W. P. Andrew, *Tramroads in Northern India, In Connection with the Iron Mines of Gurhwal* (London: Effingham Wilson, 1857), pp. 37-39.
[107] Benjamin Heyne cited one Stodart's letter to prove the importance of *Wootz* for Britain. See Heyne, *Tracts*, pp. 362-364.

Porto Novo; iron made in the smelting furnaces elsewhere but 'consolidated' by Heath; and iron made by removing carbon and silica from the pigs with or without using charcoal fuel.[108] As late as 1843, out of 30 tons supplied by Messrs. Hall, Bainbridge & Co., Heath's partners in London, only 16.8 tons bore the mark of the Porto Novo.[109] This practice indicates that the inconsistent quality of the iron resulted from the variety of production processes adopted in the plant. Heath had to rely on these tricks because his 'European plan' was frequently breaking down and failing to produce the high-quality iron he had advertised.

Unsurprisingly, Heath always cited 'disappointing' circumstances for his dismal performance: expensive forge machinery consumed the whole of the capital; his most useful European workmen had returned to Britain; local smelters and smiths were ignorant of the 'European plan'; he had no means to run more than one blast furnace; or there was no money to purchase and stock fuel.[110] Heath never acknowledged that the 'European plan' was the actual problem. He attributed the reported brittleness in his samples partly to the 'nature of the ore', and partly to the 'unusual' size of the rails.[111] He linked the unfavourable reports from England to those who wanted to discredit his endeavour and uphold the monopoly market for Swedish iron.[112]

Heath's own colleagues in the iron association not only contradicted these explanations but also questioned the worth of his experience. They alleged that his knowledge of the workings of small-scale furnaces was of 'little service' in running the gigantic works at Porto Novo. In their view, the 'peculiarities of atmosphere' in India, and the 'entire novelty' of the raw materials demanded the discovery of new 'means' and 'devices'. Consequently, in attempting to replicate the European experience in India, European workmen did more harm than good. The iron association acknowledged that its European workers were struggling with an entirely new set of unknowns, causing 'embarrassment' for the promoters.[113]

---

[108] W. Brunton, Answers to the Questions Proposed by the Committee Appointed by Government, 22/12/1837 (*HCPP*, pp. 275-281); Account Current of the Porto Novo Iron Works, from August 1833 to September 1837 (*HCPP*, p. 275).

[109] A. Lawe to MMB Secretary, 22/05/1844 (*HCPP*, p. 407); Superintendent of Gun-Carriage Manufactory to MMB Secretary, 14/06/1844 (*HCPP*, pp. 407-408); Artillery Commandant to MMB Secretary, 30/07/1844 (*HCPP*, p. 406); MMB Secretary to Government Secretary in Military Department, 16/08/1844 (*HCPP*, pp. 405-406).

[110] Heath to Chief Secretary, 27/05/1837 (*HCPP*, pp. 241-243).

[111] Heath's explanation is garbled here. See Remarks by Government, undated (*HCPP*, p. 262); Messrs. Heath and Ballard to Government Secretary, 20/10/1837 (*HCPP*, pp. 262-263).

[112] Memorandum for the Right Honourable Sir Frederick Adam, 10/12/1832 (*HCPP*, pp. 147-150).

[113] It is curious to observe that Heath's name still appears here as an applicant. See J. M. Heath, George Norton, William Bannister and Thomas Moore Lane to Chief Secretary, 20/09/1837 (*HCPP*, pp. 245-256).

The Garrow Committee, which was set up by the Madras Government to assess the prospect of the PNIC's plant at Porto Novo in 1837, catalogued a series of 'miscalculations', which were actually provisional arrangements, gone wrong: The 'useless' cattle gins for working the bellows gave an uncertain and unsteady blast. Inaccurate estimates of the blower power led to frequent repairs and reassembly. Fruitless spending on European workmen, inadequate and irregular provision of charcoal, and 'inessential' spending on the rolling mill also caused delays.[114] Crucially, the Committee identified that the time spent on 'experimentation' unavoidably reduced the production rate. For instance, much time and resources were 'wasted' on finding the right amount of blast required for the ore, the right kind of flux, and the right mixture of flux and ore, and on whether a hot or cold blast would work.[115] The Committee deemed it a waste because the PNIC promoters were advertising, and the Madras Government expecting, routinised production.

References to PNIC's experimental state are scattered in the primary sources. In 1826, Heath came to London with 20 tons of the Indian ore. His overall object was to have the ore smelted and the pig iron thus obtained converted into steel iron. He conducted some smelting 'trials' in a small furnace at the Chemical School of the University of London, aided by David Mushet, who was universally acknowledged as an expert on all issues related to iron and steel and as the quintessential man of iron experiments.[116] Heath also conducted a series of experiments in Mushet's Tintern Abbey furnace in Gwent, with the latter at his side, as a 'coadjutor'. Mushet later recollected that the high 'purity' of the Indian ore was a problem rather than an advantage. They had first to learn to prepare an 'artificial matrix' by adding the right amount of 'earthy matter' to the ore. If the quantity was large, it would affect the iron quality and if less, fusion would not take place. In Tintern Abbey, they tried getting the right proportion of 'pure' limestone from Dean Forest and a fusible 'glass' to be mixed with the ore.[117]

Although Mushet subsequently claimed that the experiments were successful, Heath confessed that his early 'experimental' small-scale works 'had never perfectly

[114] Charcoal was made 18 miles away from the river Kaveri and was delivered to the factory by boats. The supply was irregular because of health hazards to the charcoal burners. See Richards, *Salem*, p. 273.
[115] Garrow Committee Report to Chief Secretary, 25/12/1837 (*HCPP*, pp. 265-274). Geologists at the turn of twentieth century attributed this difficulty in preparing ore to its siliceous nature. See Richards, *Salem*, p. 32, fn.1.
[116] *East India Produce*, p. 324; *Case of Heath*, p. vii; Ralph Anstis, *Man of Iron – Man of Steel: Lives of David and Robert Mushet* (Coleford: Albion House, 1997).
[117] David Mushet, *Papers on Iron and Steel: Practical and Experimental* (London: John Weale, 1840), pp. 155-157.

succeeded'.[118] Yet he remained confident that, 'with certain improvements in the process', the best charcoal iron could be produced.[119] Back in India in 1831, he conducted twelve unsuccessful 'trials' of smelting ore in a high-temperature furnace. In 1832, when he was claiming that his accomplishments guaranteed 'perfect success in making iron', his European workmen were finding it 'quite challenging to prepare a correct mixture of ore and the earthy matter ('cinder') for such a wide variety of the local ores'.[120]

The allegedly perfected techniques, when run in front of the Dent Committee (the first Government Committee to assess PNIC's prospect in 1833), proved not to be so. Test runs were interrupted due to a problem in drawing off the fused metal. Subsequent repairs contributed to an 'accident' and the metal had to be taken out by breaking the furnace. On another occasion, the 'rationale' that a gradual increase in the weight of the charge would lead to more effective decarbonisation proved wrong. Efforts to achieve the same result by fashioning '30 lbs. charges of ore into balls with cow dung' choked the furnace and the operation ceased.[121]

The Dent Committee also observed that several 'means' used at the Porto Novo plant were 'imperfect'. Smelting was conducted in a small cupola furnace instead of a large furnace. Puddling was performed in a temporary furnace 'put up for the occasion'. The drawing of the balls or blooms into bars was executed at 'a common native' smith's forge, instead of being subjected to the force of large shingling hammers and rollers. Although the Committee accepted Heath's view that these imperfections would be eliminated once 'proper machinery and proper furnaces' were erected, its findings are revealing of the highly provisional arrangements of manufacturing at Porto Novo.[122]

The tentative state of charcoal iron technology used at Porto Novo can also be gleaned from an episode in Heath's later life. He always claimed that his knowledge about charcoal iron and steel making was perfected during the Porto Novo years. Samuel Smiles, for instance, talked of the 'Heath process' in which 'carburet of manganese' was employed to aid decarbonisation, 'a fact discovered by Mr. Heath while residing in India'.[123] In 1839, Heath managed to get a patent for 'certain

[118] On the Steel-Iron Trade in England, and on the Expediency of Establishing Works in India for the Supply of that Article for the Use of the British Manufactures, 12/03/1828 (*HCPP*, pp. 143-147).
[119] *East India Produce*, p. 324.
[120] Memorandum by J. M. Heath, 2/01/1832 (*HCPP*, pp. 135-137); Memorandum by J. Braddock (*HCPP*, pp. 157-161).
[121] Memorandum by J. Braddock (*HCPP*, pp. 157-161).
[122] Dent Committee Report, 15/02/1833 (*HCPP*, pp. 153-157); Heath to Dent, Cullen and Walpole, 12/02/1833 (*HCPP*, pp. 162-164).
[123] Samuel Smiles, *Industrial Biography: Iron-Workers and Tool-Makers* (Boston: Ticknor and Fields, 1864), p. 146.

improvements in the manufacture of iron and steel'. His key discoveries, as stated in the patent specification, consisted of making a 'pure' cast iron by a gradual increase in the ore-to-fuel ratio in the charge, and of using 1-3% of 'carburet of manganese' in the melting pot to convert British iron into quality cast steel.[124]

However, the specifications were so imprecise that his claim for compensation for infringement of the patent was defeated in the British courts precisely on that account. In 1843, deciding against Heath, the judge at the Trial at Law in the Exchequer stated that the patent was unclear about the supposed roles of the constituent elements. Equally uncertain was whether 'carburet of manganese' was actually formed, as Heath said it would be, when oxide of manganese and carbonaceous matter were heated.[125] Heath challenged the verdict by producing four 'scientific chemists', who vouched for his knowledge about iron and steel in the court.[126] Among the four 'scientific chemists' were Andrew Ure and William Thomas Brande. Ure was well known for his chemical manipulation and philosophy of manufacture.[127] Brande was Professor of Chemistry at the Royal Institution and a successor to Humphrey Davy.[128] Yet the Judge at the Court of Common Pleas could not be persuaded. The majority opinion both in the Chamber of the Exchequer and the House of Lords, was that 'the specification, to be perfect, must be taken to specify impliedly (sic) all the chemical equivalents…known to ordinarily skilled chemists or to the *patentee himself*.'[129] The judges denied such knowledge to Heath. It was decided that his patent specifications were incomplete and hence did not merit subsequent benefits from the 'discovery'.

One cannot simply attribute these problems to Heath's personal ignorance or dishonesty, as many experienced European ironmasters also worked at Porto Novo. Heath was also connected to many distinguished men like Mushet whose knowledge on iron and steel making was universally acclaimed. He moved among the principal 'scientific chemists' of his times. It was Andrew Ure, who drafted Heath's patent. In 1838, Heath became a resident member of the Royal Asiatic Society in London and

---

[124] For the full Letters of patent, see Thomas Webster, *The Case of Josiah Marshall Heath, The Inventor and Introducer of the manufacture of Welding Cast Steel from British Iron* (London: W. Benning & Co., 1856), pp. 1-4. On the renewal of the patent in 1853, see Webster, *Case of Heath*, pp. 35-46.
[125] Heath v. Unwin, Cor. Lord Abinger, C. B. Tr. Vac. 1843 in Webster, *Case of Heath*, pp. 4-5.
[126] Webster, *Case of Heath*, pp. 20-23.
[127] W. V. Farrar, 'Andrew Ure, F. R. S., and the Philosophy of Manufactures', *Notes and Records of the Royal Society of London*, Vol. 27, No. 2 (Feb., 1973), pp. 299-324; Donald Cardwell, 'Ure, Andrew (1778-1857)', *ODBN* (OUP, 2004). Available at http://www.oxforddnb.com/view/article/3258, accessed 28/08/2010.
[128] Frank A. J. L. James, 'Brande, William Thomas (1788–1866)', *ODBN* (OUP, 2004). Also, available at http://www.oxforddnb.com/view/article/3258, accessed 28/08/2010.
[129] Webster, *Case of Heath*, p. 31. Emphasis added.

had the advantage of drawing upon the most recent knowledge on chemical and manufacturing experiments.

Rather, the technological problems encountered at Porto Novo were linked to the fact that large-scale charcoal iron and steel making was unknown territory in the 1830s and 1840s, even in Britain. The production of charcoal iron was traditionally small scale and had been gradually receding in importance since mid-eighteenth century.[130] Although some small furnaces were still using charcoal for making pig iron, larger ones, comparable in scale to the Porto Novo works, had been using coke since the turn of the nineteenth century.[131] The Puddling technique had replaced the conventional method of converting pig to bar iron at forges by the 1780s.[132] The shift from charcoal to coke as a source of fuel in iron making was partial and gradual. Nevertheless, it was irreversible. In 1788, there were 59 coke furnaces, as against 26 charcoal furnaces; in 1806, the coke furnaces numbered 162, and only 11 charcoal furnaces were in operation for making pigs in the whole of Great Britain.[133] Such a rarity suggests that contemporary 'scientific' knowledge about large-scale charcoal iron production was a matter of hearsay rather than of immediate experience.

Where charcoal iron was made, its processes were still a matter of intuition and tradition. Discussions about charcoal iron making abounded with 'physics' and 'nostrums', indicating that the knowledge was more rooted in the older system of medicine than in the emerging discipline of chemistry.[134] Everything depended on 'the regulation of the fire', as one assay master wrote in 1833; which itself depended on 'the appearances of the iron, on sundry practical peculiarities, and on the disposition which the metal evidences of coming round to nature, or assuming malleable properties'.[135]

Equally untried was the practice of making the ore-earthy matter 'matrix', which, as David Mushet observed, had 'never been applied to charcoal-furnaces.'[136] Patent specifications were inexact and irreproducible, pointing at the importance of practice rather than 'true theories'. One patent of 1867, for instance, recommends

---

[130] Philip Riden, *A Gazetteer of Charcoal-fired Blast Furnaces in Great Britain in Use Since 1600* (Cardiff: the Author, 1987), p. 22.
[131] Riden, *Gazetteer of Charcoal-fired Blast Furnaces*.
[132] Alan Birch, *The Economic History of the British Iron and Steel Industry, 1784-1879* (Oxon: Routledge, 2006 [1967]), pp. 22-43.
[133] T. S. Ashton, *Iron and Steel*, p. 99. As for the charcoal forges, 105 forges were producing on average of 3 tons of bar iron weekly in 1788. See Birch, *Economic History of the British Iron*, p. 44.
[134] Henry Marion Howe, *The Metallurgy of Steel* (New York, The Scientific Publishing Company, 1890), Vol. 1, p. 308.
[135] Memorandum by J. Braddock, 12/02/1833 (*HCPP*, pp. 157-161). Prominent ironmasters described the ambiguous relationship between man and furnace in terms of the latter being 'a fickle mistress' and the former as a courting suitor. See Hyde, *Technological Change and the British Iron*, p. 9.
[136] Mushet, *Papers on Iron and Steel*, p. 156.

adding 'for each hundredweight of metal the juice of four white onions' to convert charcoal iron into hardened steel.[137] After twenty years of experimentation in making charcoal iron, Campbell pointed out a total lack of 'any information regarding the true theories' upon which the operation of high blast furnaces depended.[138]

Therefore, the phrase 'European plan' in the Regulations and in the PNIC correspondence should be treated with great caution. Actual technological arrangements at Porto Novo consisted of contingent plans, temporary fixes, and provisional understandings. One might frame the persistence of disappointments, 'miscalculations', 'imperfect means' and the illusive 'right' composition of charge employed in the iron manufactory within the more general problem of local adaptation. But that would imply that charcoal iron production was already a routine process, if not in India then in Britain, and that Heath (as a carrier of that technology) simply had to mould the machines and processes to make them work for the local ores and the local weather.

However, the evidence presented above suggests that the processes employed at Porto Novo were, regardless of the competence of Heath or his men, not yet predictable and could not be routinely conducted. The technology, in other words, was in an experimental state. When Heath and his contemporaries such as Campbell spoke of conducting 'experiments', they were referring precisely to the provisional nature of their undertakings. When they spoke of their successes, they were speaking of having achieved what they perceived as a fair degree of predictability in their operations. Yet at Porto Novo, such routine was strived for but never achieved.

The Porto Novo Story and Historiography of Colonial Manufacture

Several points emerge from the evidence presented in the sections above. First, they show that while bearers of private capital such as Heath and Messrs. Alexander & Co. were instrumental in erecting PNIC, the project was not a simple consequence of the *laissaz faire* principles then in the ascendancy in Britain. The crucial determinants such as personal networks, patronage and self-interest cut across ideologies then, as now. Many factors mediated between 'free trade' Britain and economic affairs in colonial India.

Second, PNIC was not a pure private capital venture, freely responding to the market constraints. I showed that the Madras Government remained PNIC's principle

[137] British Patent No. 2879, F. Prange, 7/11/1867. Cited in Barraclough, *Crucible Steel*, p. 63. This is not an isolated case.
[138] Campbell to Secretary, Government in Public Department, 10/05/1844 (*HCPP*, p. 395); 'On the Manufacture of Bar-iron in India', pp. 301-315.

benefactor throughout the 1830s and 1840s, both as its resourceful creditor and as immediate consumer. Officials like Norton, who had a personal stake in the venture, complicated the relationship between the Government and private enterprise further. All these factors limit the extent to which PNIC could respond to the market. Given the fact that most of its iron was purchased by the Government, and rarely if ever entered the British market, PNIC's failure can hardly be linked to the comparative price advantage of British and 'foreign' iron in Britain or in India.[139]

Third, I showed that the Government's attitude towards PNIC shifted from an excessive enthusiasm in the 1820s to a definite dislike in the 1840s. The change in the views of the Council members, the rise and ebb of Norton's influence over various Government departments, the uncertainties about the legality of the Government's past favours to PNIC, and the rising discontents of the Board and district revenue officials, all played their parts in swaying the Government's opinion. Two events were more significant in triggering the change, however: First, widespread local resistance in the iron and charcoal producing districts and second, Campbell's proposal.

Fourth, my story demonstrated that the usually cited 'causes' for PNIC's failure were simply consequences of the contemporary uncertainties over the charcoal iron making techniques such as the preparation of the right 'artificial matrix'. Such vagueness was not, however, due to personal deficiency or lack of diligent care on the part of the technology 'carriers' like Heath, whose commitment to the 'European plan' was complete. It was a part of contemporary knowledge charcoal iron making. I showed that the charcoal iron production was in an experimental state in Britain in that period. David Mushet's records also revealed that there was considerable ignorance about the most fundamental process of preparing the 'artificial matrix' for the Indian ore. The unsettled issue about the language and measure of quality in the period also support my argument. Indeed, regular large-scale production of charcoal iron of consistent quality was a rare achievement even in Britain.[140] Such a tentative nature of technical content made capital-intensive projects like PNIC vulnerable to repeated breakdowns.

These findings revise the existing accounts of PNIC specifically, and of large-scale iron manufacture in colonial India generally, in the following ways.

---

[139] Roy, 'Did Globalization aid'. Roy's price comparison seems inconsistent with available data. The actual cost of production at Porto Novo in 1833 was as follows: bar iron Ps 66-8-9, blistered steel Ps 86-8-9, cast steel Ps 190 a ton. The estimate delivery prices to England were about £13, £17 and £29 a ton respectively. These were one third of their quoted market prices in England, and about a half of the average price of Swedish iron *in India* in 1833. See Heath to Dent, Cullen and Walpole, 12/02/1833 (*HCPP*, pp. 164-166). The contract price of Swedish iron in Bombay in 1844 was lower (Rs 149-6/ton). See BoMB to Governor, Bombay Council (GMB), 20/04/1844 (*HCPP*, pp. 397-398).

[140] Birch, *Economic History of British Iron*.

As I mentioned in the Introduction above, existing accounts approach the PNIC story as representative of many failures in industrialising iron resources of the colony in the nineteenth century. These accounts share a historiography of failure, in which historians' central problematic is to find the efficient cause of these failures. Indeed, speculation about the causes began immediately after the attempts themselves.[141] The new accounts have been re-discovering and re-organising the causes long given by other accounts.[142]

Every possible reason for its failure has been proposed: Some historians think the role of the Company Governments' tariff policy was central: it made British-made iron cheap in India, but made Indian iron exports costly in Britain. As a result, Porto Novo iron could neither compete in India nor substitute European iron in Britain.[143] Other historians add capital scarcity, charcoal shortages and transportation problems, which -along with lack of technological innovation among the local iron makers - disabled Heath.[144] Others think 'traditional' methods of charcoal smelting and animal driven bellows deprived Porto Novo an economy of scale.[145] These 'obsolescent' and 'pre-industrial' techniques predetermined its fate. 'A seventeenth century technology', one historian remarks rather sweepingly, 'in competition with the large-scale coke-fuelled ironworks of mid-nineteenth century Britain' was bound to fail.[146] Another historian thinks that cultural bias among the Indian users led them to reject the Porto

[141] Valentine Ball conducted the investigation about the failure of the Barakar Iron Company in the 1870s. See V. Ball, *Jungle Life in India: or the Journeys and Journals of an Indian Geologist* (London: Thos. De La Rue, 1880), pp. 346, 224, 345. For a similar attitude in the early US historiography, see Eleanor Louisa Lord, *Industrial Experiments in the British Colonies of North America* (New York: Burt Franklyn, 1898).

[142] Compare, V. Ball, *A Manual of Geology of India, Part III: Economic Geology* (1888), pp. 349-350; and David Arnold (ed.), *Science, Technology and Medicine in Colonial India* (Cambridge: CUP, 2004), p. 100. Morris, Headrick and Grout repeat Maylor's causes. See Morris, 'Growth of Large Scale Industry'; Headrick, *Tentacles of Progress*; Andrew Grout, *Geology and India: 1770-1851: A Study in the Methods and Motivations of a Colonial Science*, PhD Thesis, School of Asian and African Studies, University of London (1995); Willliam Maylor, 'The Manufacture of Iron and Steel in Southern India', *Minutes of the Proceedings of the Institution of Civil Engineers*, Vol. 126 (1896), pp. 383-386. Kent, Ramanujam and Bansal and Bansal base their conclusion on Pillai's work. See Eliza F. Kent and M. P. Ramanujam, 'Fierce Gods and Dense Forest: Sacred Groves in Coramandel', *Indian Folklife*, No. 26 (2007), p. 15; Bansal and Bansal, 'Industries in India'; Pillai, 'Iron and Steel Production in India'.

[143] R. C. Dutt, *The Economic History of India under Early British Rule, from the Rise of the British Power in 1757 to the Accession of Queen Victoria in 1837* (London: K. Paul, Trübner & Co. Ltd., 1908); Parthasarathi, 'Iron Smelting in the Indian Subcontinent', p. 8. For a fuller argument, see his *The Transition to a Colonial Economy: Weavers, Merchants and Kings in South India* (Cambridge: CUP, 2001).

[144] Arnold, *Science, Technology and Medicine in Colonial India*, p. 100. Historians of geology see charcoal supplies as the main constraint. See Grout, *Geology and India*, pp. 45-46.

[145] Tomlinson, *Economy of Modern India,* pp. 127-128.

[146] Headrick, *Tentacles of Progress*, p. 280; Morris, 'Growth of Large Scale Industry', p. 589.

Novo products, and the users' rejection was the main reason for the project's failure.[147]

Crucially, these attempts to locate causes of failures also indicate how historians have chosen to portray PNIC. One recent work has offered factor prices, such as higher charcoal costs and cheap prices of the Swedish and British iron in India, to explain PNIC's failure. It follows a non-colonialist approach, in which the role of the colonial state was insignificant, if not irrelevant, in the way different types of industries unfolded in nineteenth century India. Within this approach, PNIC appears as a simple private capital venture, free to respond to input costs, market prices and transaction costs.[148]

Another work suggests that the local Governments' dependence on London disabled them from channelling foreign capital and technology into the local industries and from protecting the sector from the inflows of cheaper British goods. In this analysis, early manufacturing ventures like PNIC appear as political economic projects of the colonial government through which the government attempted to industrialise the Indian resources.[149]

The general analysis presented by yet another work sees PNIC as a case of technology transfer and links its failure to the disabilities of Heath and the iron association in the colonial setting. According to the work, 'social carriers' of a 'proven' technology became 'unviable' in India two reasons. First, they failed to acquire the skill to 'manage' the technology. Second, the colonial setting, with its 'ambivalent' attitude towards developing Indian resources and its dependence on the political economic ideas of the British elites, proved detrimental to the enterprise of these 'carriers'.[150]

The findings of this chapter demonstrate the limited significance of such portrayals. I have shown that exclusive attention to the cash flows, inputs and outputs, costs and prices has led historians to downplay the PNIC's dependence on the generous support of the Madras Government for its survival. Furthermore, it has led them to gloss over the changing dynamics in the Government-PNIC relationship and

[147] Bhattacharya, 'From Stagnation to Atrophy', p. 256. Bhattacharya's account connects to more recent cultural and institutional approaches to technological change. See Maxine Berg and Kristine Bruland (eds.) *Technological Revolutions in Europe: Historical Perspectives* (Cheltenham: Edward Elgar, 1998).
[148] Tirthankar Roy, 'Did Globalisation aid'; Tirthankar Roy, *Traditional Industry in the Economy of Colonial India* (Cambridge: CUP, 1999); Tirthankar Roy, *Rethinking Economic Change in India: Labour and Livelihood* (London: Routledge, 2005), pp. 23-43.
[149] Ian Inkster, 'Prometheus Bound'. Also, see Ian Inkster, 'Colonial and Neo-colonial Transfers of Technology: Perspectives on India before 1914' in Roy MacLeod and Deepak Kumar (eds.) *Technology and Raj: Western Technology and Technical Transfers to India, 1700-1917* (New Delhi: OUP, 1995), pp. 25-50.
[150] Geijerstam, *Landscape of Technology Transfer*, pp. 362-371.

ignore the crucial role played by many factors, such as Campbell's proposal and discontents of district revenue officials, in ending that relationship.

The critical influence of this relationship on the unfolding of the large-scale commodity manufacture also suggests a need to refine existing political economic assessment of the early manufactories in the colony. The evidence presented here has shown that Madras pressed the Court of Directors in London for PNIC's privileges, nearly risked a confrontation with Bengal on the issue, and throughout 1830s, repeatedly provided PNIC with relief packages. Its decision to support PNIC was motivated more by its own local concerns, such as revenue earnings and consolidation of its rapidly draining bullion reserve, less by the economic policy directives coming from London. It is difficult to match this autonomy observed in the Government's handling of local economic affairs with the notion of 'colonial dependence'.

This view of PNIC as a case of technology transfer places more importance on transfer than on technology in that it uncritically assumes actors' notion of the 'European plan' as a meaningful historical category. While the PNIC sources themselves never elaborate the content of the principle, previous accounts of the iron venture, and indeed of all early large-scale iron manufacturing ventures in colonial India, have assumed the notion as self-evident.

Recent scholarship on the relationship between the nineteenth-century coal and iron making techniques in Britain and contemporary methods in mainland Europe, has qualified some aspects of this assumption.[151] There is still an insufficient critical assessment of what was European about PNIC: Do the ways labour and raw materials were fed into the works at Porto Novo, for instance, have any resemblance to the Sheffield or Carron ironworks? Do imported steam engines and pumps in contrast to the local hide bellows and mud furnaces make it a European manufactory? Was the knowledge of making a charcoal furnace, scheduling the feeding of the charge and ore, or the skill employed in regulating the temperature, imported from Europe? Is the scale and size, the manner in which the manufacturing was centralised, that makes PNIC a 'European' industry?

While the answers to these questions could be illuminating for understanding problems in adapting a 'European plan' in India - a declared goal of the literature on technology transfer - I have argued for paying more attention to its tentative character. My focus on the production processes at PNIC revealed the experimental nature of its

[151] For two critiques, see Maria Ågren (ed.) *Iron-making Societies: Early Industrial Development in Sweden and Russia, 1600-1900* (Providence; Oxford: Berghahn Books, 1998); Chris Evans and Gören Rydén (eds.) *The Industrial Revolution in Iron: The Impact of British Coal Technology in Nineteenth-Century Europe* (Aldershot: Ashgate, 2005).

arrangements. I sowed that they were a hotchpotch of tentative operations, and that their unpredictable nature turned out to be the critical reason for the dismal performance at the Porto Novo plant. It delayed the early fruition of the huge capital investment. As a result, PNIC's debts spiralled and the claim about its ability to produce cheap and high-quality charcoal iron looked increasingly spurious.

Discussions about large-scale iron manufacture in the colonial period therefore need to make allowance for the evolving character of the technology of charcoal iron production. It is not simply a question of adjustments or adaptations of the technology in a new setting. While in some cases, the technology in question might already be stable in terms of performance and construction, in PNIC's case the technology even at its source was shorthand for an accumulation of unspecified processes. The 'transfer' and 'failure' approaches of the existing historiography do not reveal PNIC's unfolding the way my 'experiment' approach does.

The 'experiment' approach is preferable to the failure paradigm for three reasons: First, the term 'experiment' was already an actors' category, not only in the sense of experimenting in iron making processes, but also in the sense of the Government trying to establish large-scale manufactures in India. [152] Second, 'experiment' captures the speculative and provisional nature of these early industrialising ventures in the colony. Third, it helps unravelling the underlying reasons for the complex unfolding of the PNIC narrative. It is obvious that the term 'experiment' cannot capture all activities concerned with making or using artefacts. However, it could be a useful description of the unfolding of some technologies and of a stage of development of all technologies.

[152] In 1852, for instance, Government's principal geologists were touring several iron ore rich districts to assess the 'possibility' of manufacturing Iron in India. See Thomas Oldham, Superintendent of Geological Survey to the Secretary to the Government of Bengal, May 18, 1852 in T. Oldham, *Report of the Examination of Iron Districts &ca* (Calcutta: Military Orphan Press, 1852). In 1875, researchers were reviewing the 'Government Experiments' in India. See W. Ness, 'The Government Experiment in Iron Making in India', *Colliery Guardian*, Vol. 30 (1875), pp. 925-939.

Chapter 6

TECHNOLOGY

GEORGE A. PRINSEP'S SALT EXPERIMENTS, 1828-1839

Introduction

This chapter describes several privately-managed experiments of large-scale salt making by solar evaporation in Bengal. These took place in the years around the renewal of the Company's Charter in 1833. From 1828 to 1839, George A. Prinsep, a private speculator, erected four salt works at various locations in that province. He wanted to establish a plant layout that effectively used the sun as its principal source of energy for converting brine into cheap table salt. His ultimate objective was to replace the Government monopoly of salt manufacture by private production under the system of excise. The Bengal Government encouraged Prinsep by granting him financial assistance and favourable salt supply contracts. It justified the involvement saying Prinsep's plan was the safest way of changing its monopoly profits into excise revenues, a transformation widely anticipated in the aftermath of the 1833 Charter. Yet, the monopoly continued until 1863, well after the Company was dispossessed of its Indian territories in 1858.[1] The chapter discusses reasons for this puzzling continuity.

Previous historians have not discussed Prinsep's experiments in any detail, but they have addressed three broader issues related to his story: the origins and development of private capitalist enterprise in colonial Bengal; commercial interests of the Bengal Government around the 1833 Charter; and, the dynamics of technological change in the colony. Let me briefly introduce these issues.

The 1820s saw an unprecedented increase in the incidence of large-scale commercial speculation in Bengal through several large private Agency houses. Owned by the Company's past and serving employees, and connected to the Government officials in many ways, these houses organized the capital for prospective ventures both in Bengal and in Britain. They were confluences of domestic and expatriate money. One historian has called their emergence a 'subversive intrusion of

[1] For an outline of salt manufacture in colonial India, see Shugan Chand Aggarwal, *The Salt Industry in India*, 2e (Delhi: Manager of Publications, 1956); S. K. Dravid, *Development of Salt Industry in India* (Jaipur: Upma Prakashan, 1972); A. M. Serajuddin, 'The Salt Monopoly of the East India Company's Government in Bengal', *Journal of the Economic and Social History of the Orient*, Vol. 21, No. 3 (Oct., 1978), pp. 304-322; K. V. Jeyaraj, *A History of Salt Monopoly in the Madras Presidency, 1805-1878* (Madurai: Ennes Publications, 1984); S. A. M. Adshead, *Salt and Civilization* (Hampshire and London: Macmillan, 1992). Throughout this chapter, I will use the term Government unqualified for the Bengal Government. Other Governments in India, such as Bombay and Madras, and the British Government will be qualified as such unless the context is obvious.

the capitalist system' in India.[2] Others have argued that had the colonial state not stifled domestic capital in favour of expatriate money, large-scale private manufactories would have emerged earlier in India.[3] However, the previous chapter showed that the determining factor in the Porto Novo industrial venture was the relationship between the Government and private capitalists rather than the nature (private/public) and source (domestic/expatriate) of the capital. Here, I will extend this framework of analysis to the salt making activities occurring in the context of the 1833 Charter.

The 1833 Charter, a statement by the radical proponents of free trade principles, demanded an end to the Company's commercial pursuits in India.[4] It led private speculators in both Britain and India to expect the dismantling of the Bengal Government's half a century-old salt monopoly organization. They anticipated that the Government would allow them to manufacture that lucrative commodity freely in exchange for a moderate duty as excise.[5] Yet historians have paid little attention to whether these effects were achieved. Existing accounts, in agreement with general, economic and business histories, end around 1833, implying that the monopoly evolved naturally thereafter into the excise system in the colony.[6] A recent account even portrays the post-1833 period as the Company's 'twilight' years, suggesting that the shift considerably weakened its commercial interests in India.[7] Yet the longevity of

[2] S. B. Singh, *European Agency Houses in Bengal (1783-1833)* (Calcutta: Firma K.L. Mukhopadhyay, 1966); Blair B. Kling, 'The Origin of the Managing Agency System in India', *Journal of Asian Studies*, Vol. 26, No. 1 (Nov., 1966), pp. 37-47; Anthony Webster, *The Richest East India Merchant: The Life and Business of John Palmer of Calcutta 1767-1836* (Woodbridge: The Boydell Press, 2007), chapters 1-3. For a useful summary of the 'intrusion' view and a critique, see David W. Rudner, *Caste and Capitalism in Colonial India: The Nattukotai Chettiars* (Berkeley, Los Angeles, London: University of California Press, 1994), chapter 2.

[3] Daniel Headrick, *The Tentacles of Progress: Technology Transfer in the Age of Imperialism, 1850-1940* (New York, Oxford: OUP, 1988).

[4] Yukihisa Kumagai, *The Lobbying Activities of Provincial Mercantile and Manufacturing Interests Against the Renewal of the East India Company's Charter, 1812-1813 and 1829-1833*, PhD Thesis, University of Glasgow (2008).

[5] Anonymous, *Indian Monopolies &c. &c.* (1820); George Smith (printer), *Two Reports on the East India Salt Monopoly* (Liverpool: 1838).

[6] Miki Sayako, *Merchants, Markets, and the Monopoly of the East India Company: The Salt Trade in Bengal under Colonial Control, c. 1760-1836*, PhD Thesis, School of Oriental and African Studies, University of London (2005). Histories of the Company's commercial affairs favour the same time. See Amales Tripathi, *Trade and Finance in the Bengal Presidency, 1793-1833, rev. ed.* (Calcutta: OUP, 1979); Anthony Farrington, *Trading Places: the East India Company and Asia, 1600-1834* (London: British Library, 2002); H.V. Bowen, *The Business of Empire: The East India Company and Imperial Britain, 1756-1833* (Cambridge: CUP, 2006); Jean Sutton, *The East India Company's Maritime Service, 1746-1834: Masters of the Eastern Seas* (Woodbridge: Boydell, 2010). Many general histories, especially written from the British historiography perspectives, also end around the Charter. See C. H. Phillips, *The East India Company, 1784-1833* (Manchester: Manchester University Press, 1940); Desiree Marie Baumann, *The English East India Company in British Colonial History, 1599-1833: Trading Company-Territorial Power* (Essen: Die Blau Eule, 2007). An important exception is Asiya Siddiqi (ed.) *Trade and Finance in Colonial India, 1750-1860* (Delhi: OUP, 1995).

[7] Anthony Webster, *The Twilight of the East India Company: The Evolution of Anglo-Asian Commerce and Politics, 1790-1860* (Woodbridge: Boydell & Brewer, 2009). Webster follows Kling's argument. See Blair B. Kling, 'Origin of the Managing Agency System'.

Bengal's Agency System and the consolidation of the Indian salt earnings in the post-1833 period point to a need to reassess this widely held proposition.[8]

Historians have rather more to say on how shifts in the fiscal administration of the state related to changes in technology. They tend to view technology either as an instrument or as an effect of the shift from the monopoly to the excise system. One historian for example thinks that the technology of farmland mapping (cadastres) played a crucial role in the shift in eighteenth century Europe.[9] Another has analyzed the link between the emergence of the excise administration and manufacturing. He shows, for instance, that changes in tax collection procedures triggered developments in manufacturing methods and instruments.[10] Historians of colonialism hold the alternative view that technologies such as cartography, the telegraph and double entry bookkeeping proved instrumental in changing the ways finances in the colony were administered.[11] My account will differ from this existing literature in proposing a different relationship between technology and fiscal administration. I will argue for an enabling role of technology that allowed a colonial government to experiment with its economic sovereignty.

In the first section of this chapter, I look at Prinsep's pre-1833 venture at Ballyaghat as an effort to introduce private investments in the Company's Bengal salt monopoly. The Bengal Government's response to the experiment provides a useful reference for understanding the effects of the 1833 Charter on its attitude towards his future endeavours. Then in the second section, I show how the Government tried to control his Narrainpore salt works both fiscally and administratively by incorporating

[8] For the Indian salt revenues after 1833, see Frederick Hendriks, 'On the Statistics of Indian Revenue and Taxation', *Journal of the Statistical Society of London*, Vol. 21, No. 3 (Sep., 1858), pp. 223-296.

[9] Christine Lebeau, 'Regional Exchanges and Patterns of Taxation in Eighteenth Century Europe: the Case of Italian Cadastres' in Holger Nehring and Florian Schui (eds.) *Global Debates about Taxation* (Basingstoke: Palgrave Macmillan, 2007), pp. 21-35. For the monopoly-excise shift as a historical development, see C. F. Bastable, 'Taxation through Monopoly', *The Economic Journal*, Vol. 1, No. 2 (Jun., 1891), pp. 307-325; George David Smith, *From Monopoly to Competition: the Transformation of Alcoa, 1888-1986* (Cambridge: CUP, 1988); Susan Dean-Smith, *Bureaucrats, Planters and Workers: The Making of Tobacco Monopoly in Bourbon Mexico* (Austin: University of Texas Press, 1992); Paul M. Sweezy, *Monopoly and Competition in the English Coal Trade, 1550-1850* (London: Routledge, 1996); Carl F. Ameringer, *The Health Care Revolution: From Medical Monopoly to Market Competition* (Berkeley; London: University of California Press, 2008).

[10] William J. Ashworth, *Customs and Excise: Trade, Production and Consumption in England, 1640-1845* (Oxford: OUP, 2003), chapters IV and V. Also, see Kitsing Meelis, 'Political Economy and Technology: A Comparative Study of Internet Diffusion in Transition Economies', *Paper presented at the annual meeting of the American Political Science Association, Marriott, Loews Philadelphia, and the Pennsylvania Convention Centre, Philadelphia, PA*, Aug 31, 2006.

[11] For a link between technology and colonial taxation, see Luz Marina Arias, 'A Theory of the Origins of Coercive Enforcement by the State: Insights from Colonial Mexico'. Available at http://iis-db.stanford.edu/evnts/5091/paper.pdf, accessed on: June 11, 2011. Also see, Daniel R. Headrick, *The Tools of Empire: Technology and European Imperialism in Nineteenth Century* (Oxford and New York: OUP, 1981); Roy Macleod and D. Kumar (eds.) *Technology and Raj: Western Technology and Technical Transfers to India: 1700-1945* (Thousand Oaks: Sage Publications, 1995); Deep Kanta Lahiri Chaudhary, *Telegraphic Imperialism* (Basingstoke: Palgrave Macmillan, 2010).

his venture within its monopoly organization. The third section reveals that Prinsep's technological arrangements were the crux of the Government's deliberation on the shift from the monopoly to the excise system. I conclude by arguing that the Bengal Government's strengthening of the monopoly after 1833 can be attributed to its increasing willingness to act independently of the policies framed by the British Parliament and the Court of Directors in London. These stories of salt therefore provide an explanation of how the monopoly outlived the Company's demise in 1858.

Ballyaghaut Experiments, 1828-1833

In 1828, the British speculator George Augustus Prinsep applied to the Bengal Government for a contract to make salt by the technique of solar evaporation. He wanted to improve salt output and quality by regulating the evaporation rate and by glazing the brick surfaces in the salt ponds. He claimed that these changes would free his evaporated salt (*Kurkutch*) from the bitterness then found in the imported Madras variety. They would also enable him to reduce production costs. He proposed to erect two manufactories for the purpose: one in the fifty-Beegah land at Ballyaghaut near Calcutta and the other in Saugar Island. He asked the Government to purchase his salt in advance by way of encouragement.[12]

A son of a wealthy and widely respected Company merchant, Prinsep was involved in cotton speculation and shipping from childhood. In the early 1820s, he arrived in Calcutta as a partner in the Agency house of Messrs. Palmers and Co. He took the management of the Palmers' Saugar Island salt-works, which was running at a loss, and turned it into a profitable venture.[13] His contemporaries noticed his 'mechanical ingenuity' and entrepreneurship.[14] They also knew him as an author of several tracts on the economy, trade and commerce of Bengal, and as a member of an illustrious family.[15] He had numerous siblings and relatives scattered throughout the Company territories. Two of them, the then Secretary of State Henry Thoby Prinsep

[12] G. A. Prinsep to 24-Pergunnahs Salt Agent, 24/06/1828; Agent to Prinsep, 30/06/1828; Prinsep to Agent, 3/07/1828 (BL: *IOR/F/4/1282*). 1 Beegah equals a little more than 3 acres.
[13] On the Palmers and Co., see Webster, *Richest East India Merchant*.
[14] *The Asiatic Journal and Monthly Register for British and Foreign India, China, and Australasia*, Vol. 29, New Series (May-August, 1839), p. 246. The Ballyaghaut proposal was made *before* the firm collapsed in 1830. See BCSO to GGC, 15/07/1828 (BL: *IOR/F/4/1282*). Compare, *The Sydney Gazette and New South Wales Advertiser*, 2/06/1836, p. 2.
[15] G. A. Prinsep, *Remarks on the External Commerce and Exchanges of Bengal* (London: Kingsbury, Parbury, and Allen, 1823); *An Account of Steam Vessels and of Proceedings Connected with Steam Navigation in British India* (Calcutta: Government Gazette Press, 1830); *Sketch of the Proceedings and Present Position of the Saugar Island Society and its Lessees* (Calcutta: Printed Baptist Mission Press, 1831). On Prinsep's ideas about Steam vessels, see Jennifer Tann and John Aitken, 'The diffusion of the stationary steam engine from Britain to India 1790-1830', *Indian Economic and Social History Review*, Vol. 29 (Jun., 1992), pp. 199-214.

(1792-1878) and the Orientalist and Assay Master of the Calcutta Mint, James Prinsep (1799-1840) will feature in the story below.[16]

The Bengal Board of Salt, Custom and Opium (BCSO) reacted positively to Prinsep's application for two reasons. First, for some years, the BCSO had been relying on the private importers of the Madras *Kurkutch* to make up the deficiency in its Agency manufacture. The *Kurkutch* production within Bengal would enable it to relinquish that risky arrangement. Second, any success in the solar evaporation technique at Ballyaghaut would relieve the BCSO from its longstanding anxiety about fuel.

Fuel was the costliest item among the 'implements' needed for the *Pangah* (boiled salt) manufacture.[17] The BCSO paid hefty advances to the salt manufacturers every year to ensure that they procured sufficient quantity of fuel well ahead of the salt boiling season. Yet fuel was always in short supply. Merchants and the Agency officials gathered it for profit. Agents, landholders, revenue officials, timber contractors and the military department commonly disputed the ownership and use of the fuel lands.[18] Widely varying costs of fuel in the salt districts reflected how its availability depended on local factors over which the BCSO had no control.[19] As a result, boiling was frequently interrupted often at the peak of the manufacturing season.[20]

The BCSO had tried to solve this problem through administrative and commercial arrangements: It bought up fuel lands; it made the Zemindars concede free or cheap access to their fuel lands; and it added the cost of fuel to the manufacturers' contract price. The success of these measures depended on the BCSO's

---

[16] A. J. Arbuthnot, 'Prinsep, Henry Thoby (1792-1878)', rev. R. J. Bingle, first published Sept 2004. http://dx.doi.org/10.1093/ref:odnb/22811. On James Prinsep, see J. P. Losty, 'Prinsep, James (1799-1840)', first published Sept 2004. http://dx.doi.org/10.1093/ref:odnb/22812.

[17] In Mundelghaut, Tamluk, fuel cost was 47% of the total production costs and was even higher than the cost of labour. See James Kyd, *Account of the Manufacture of Salt in Bengal by Mr. Kyd of Calcutta with an Appendix by Josiah Parkes*. Institution of Civil Engineers Library Archives: *Original Communications O.C /129*. In 1853, the ratio in Chittagong was 120/297. See *Report of the Commissioner Appointed to Enquire into and Report upon the Manufacture and Sale of, and Tax upon Salt in British India* (Hereafter, *Plowden Report*) (London: Houses of Parliament, 1856), p. 478.

[18] Ernst to Hidgellee Agent, 20/01/1803; Acting Magistrate to Agent, 5/02/1803 in N. K. Sinha (ed.) *Midnapore Salt Papers: Hijli and Tamluk, 1781-1807* (Calcutta: West Bengal Regional Records Survey Committee, 1954), pp. 39-41. On revenue officials' contest for fuel lands, see Tipperah Acting Collector to BBR Acting President, 23/11/1802 in Ratan Lal Chakraborty and Haruo Noma (compilers) *Select Records on Agriculture and Economy of Comilla District, 1782-1867* (Dhaka: JICA, 1989), pp. 92-93. In 1789, the entire fuel supply of the Hidgellee Agency was nearly cut off by one Mr. Dent, a Government timer supply contractor. See Thomas Calvert to Hidgellee Agent, 9/02/1789 in *Midnapore Salt Papers*, p. 15. For the military's competing demand for straw, see BBT to GGC, 14/01/1817 in *Bengal Revenue Consultations Separate (BRC)*, 24/01/1817 (BL: *IOR/P/100/8*).

[19] In 1774-75, 24-Pergunnahs, the ratios of the cost of fuel to that of implements was 1/6 in Maidanmal and 25/28 in Kulberia. In Calcutta Pergunnah alone, the ratio varied from 15/22 to 45/57 in the years 1784 to 1787. See Balai Barui, *The Salt Industry of Bengal 1757-1800: A Study in the Interaction of British Monopoly Control and Indigenous Enterprise* (Calcutta: K. P. Bagchi & Co., 1985), p. 45.

[20] Calcutta Salt Office to Tumlook Agent, 10/02/1795 in Bhaskar Ghose and Sanat Kumar Bose (eds.) *Midnapore Correspondence of the Salt Districts Tamlook Salt Division: Letter Received* (Calcutta: Superintendent Government Printing, 1974), No. 1023, p. 362.

relationship with the local population. That relationship was subject to shifts in local socio-political dynamics. From the BCSO's point of view, the solar evaporation technique liberated it from such vulnerability.

The solar evaporation technique was, however, not a novelty in Bengal.[21] The Hidgellee manufacturers, for example, were familiar with it.[22] The Bengal salt officials knew it as the 'Coast Way', a method widely employed in the coasts of the Madras Presidency.[23] Nor was Prinsep the first to propose it. In 1788, Robert Kyd, the secretary to the Military Board of Inspection and the founder of the Royal Botanical Garden in Calcutta, had conducted *Kurkutch* making experiments in Hidgellee. On Kyd's initiative, local salt makers employed the technique for increasing the concentration of brine. But they found it unsuitable due to the vagaries of the Bengal weather, [24] and so refused to abandon the conventional 'Manufacture of salt by Fire'.[25]

The differences between Kyd and Prinsep are significant for understanding why the dubious technique again received the Government's encouragement. Kyd had argued that cleaner and cheaper salt would enable the poor to do away with unhealthy substitutes and to save money. More labour and wealth would thereby be available for the productive enterprises. The Government's welfare schemes eventually contributed to its revenues. Prinsep, by contrast, believed that profitable ventures would automatically lead to general welfare. The Government should not be bothered about health of population, certainly not for the sake of its earnings. Kyd had promised to solve the fuel problem without 'trenching' or 'relaxing' the salt monopoly. Prinsep advertised his experiments as profitable, market-driven, private speculations designed to end the Government monopoly. The BCSO members were more favourable to Prinsep's *laissez faire* thinking than they had been to Kyd's physiocratic ideals.

Within a week of Prinsep's submission, the BCSO recommended his proposal to the Bengal Council for approval. Within a fortnight, the Council had issued Prinsep a 50000 Mds-a-year salt supply contract for three years. The contract rate was Rs 72/100 Mds, the same as that of the Madras *Kurkutch* importers. This rate was

---

[21] Contemporary promoters such as Robert Kyd (1780s), James Kyd (1820s), G. A. Prinsep (1830s), presented the technique as 'European'. The *Pangah* is presented as the 'unique indigenous technology'. See Indrajit Ray, 'Imperial Policy and the Decline of the Bengal Salt Industry under Colonial Rule: An Episode in the 'De-Industrialisation' Process', *Indian Economic and Social History Review*, Vol. 38, No. 2 (2001), p. 182.

[22] For the familiarity of the technique, see 'Examination of two Molunghees, March 27, 1794' in *Midnapore Salt papers*, No. 15 (b), pp. 64-66.

[23] In fact, Kyd had employed four salt makers from Madapollam as experts on the evaporation technique. See Kyd to Maddapollam Resident, 21/05/1788 in *BRC*, 28/05/1788 (BL: *IOR/P/51/20*).

[24] Kyd to Government Secretary, 11/10/1788 in *BRC*, 15/10/1788; Kyd to Government Secretary, 10/11/1788 in *BRC*, 19/11/1788 (BL: *IOR/P/51/26*).

[25] Kyd to Government Secretary, 15/03/1788 in *BRC*, 9/05/1788; Kyd to Government Secretary, 21/05/1788 in *BRC*, 28/05/1788 (BL: *IOR/P/51/20*).

subsequently reduced to account for Prinsep's low transportation costs. But the new terms still favoured him, as he did not bear the sea-borne risks incurred by the Madras importers.[26] H. T. Prinsep, the Bengal Government Secretary and Prinsep's brother, encouraged the BCSO to sign the contract immediately.[27]

In July 1830, H. T. Prinsep carefully worded the Bengal's dispatch to the Court of Directors in London, highlighting the significance of the Ballyghaut works. That letter reached London when the Whig-controlled British Government was mulling over a plan to strip the Company of its trade and commercial privileges. The Court feared that the Whigs would not react favourably to its approval of the experiments. It thus warned the Bengal Council against getting involved in any commercial ventures. In April 1832, the Court again expressed hope that 'nothing was actually done in prosecution of the experiment'.[28]

However, the Bengal Government had already spent Rs 13520 in Ballyaghaut. Prinsep, meanwhile, had failed to deliver the contract quantity. In fact, when the Court's letters arrived back in Calcutta, the Council was considering ways to recover its investment. The BCSO's recommendations were either to renew Prinsep's license or to acquire the works while still keeping him as the salaried superintendent. Either way his future would be secure. The Council turned down these suggestions but contrary to the Court's directives, chose another, still more generous option. It let Prinsep run the works and offered to purchase half of his produce at the original contract price and to appropriate the other half towards liquidating his balance. The Court had no choice but to retrospectively approve the measures.[29]

The Government also gave additional commissioned work to Prinsep in order to assist him financially. In 1831, flooding damaged about 220000 Mds of salt in the Hidgellee and Tumlook Agencies. The BCSO employed Prinsep to purify this dirty but merchantable salt at Ballyaghaut. Its decision was based on his estimate of profit of about 4 As/Md. However, the figure was clearly overrated as it was based solely on the gain expected in the market price of the salt before and after the purification and did not took the production and purification expenses into account. The BCSO did not allow any one else to participate in the tender.

---

[26] J. Plowden to H. M. Parker, BCSO Secretary, 5/07/1828; BCSO to GGC, 15/07/1828; H. T. Prinsep, Bengal Government Secretary to BCSO, 24/07/1828; G. A. Prinsep to Plowden, 16/08/1828; Plowden to Parker, 18/08/1828; Parker to Plowden, 30/08/1828; BCSO to GGC, 30/08/1828 (BL: *IOR/F/4/1282*).

[27] The day Bengal Government wrote to the Madras Council for the more recent figures on the duty paid by the importers, they asked the Board to go ahead with the signing of the contract. See H. T. Prinsep to Madras Chief Secretary, 4/09/1828; H. T. Prinsep to BCSO, 4/09/1828 (BL: *IOR/F/4/1282*).

[28] Separate Letter from Bengal, 27/07/1830, No. 1, para. 72-76; Extract Separate Letter to Bengal, 27/04/1832, No. 1, para. 34 (BL: *IOR/H/MISC/779*).

[29] Extract Separate Letter from Bengal, 10/04/1832, No. 1. para. 67-68; Extract Separate Letter to Bengal, 12/02/1834, No. 1, para. 20 (BL: *IOR/H/MISC/779*).

Other favours to Prinsep soon followed. The BCSO had initially permitted 5 percent wastage for impurity. It had dispatched 10000 Mds to Ballyaghuat to be 'melted', claiming there would be ample opportunity to adjust the wastage estimates later.[30] Again, Prinsep failed to deliver the contract. The BCSO then allowed 20 percent wastage to him, without reassessing the impurity levels in the damaged salt in the affected *golah*s. Despite this concession, Prinsep managed to purify only 37 percent of 45754 Mds of the damaged salt given to him. A further loss to the Government was incurred when the 'pure' salt fetched only Rs 379/100 Mds on the market, far short of the original estimate of Rs 400.

The Bengal Council reported these 'miscalculations' to the Court in an apologetic manner. Yet it absolved Prinsep of any breach of contract. Evoking 'natural obstacles opposed by the uncertain climate of Bengal to production or reproduction of salt by solar evaporation', it paid him Rs 2400 in addition to the contract amount. It did not take the issue of 'natural obstacles' to the technique seriously.[31] As I show in the next section, it continued financing his experiments at Ballyaghaut and elsewhere. Nor did it question his ability to manage the works.[32]

The Government's promotion of Prinsep went so far as to disfavour other speculators. In November 1837, while it was financing Prinsep's Narrainpore works, one of the new Sundarbans settlement owners J. L. Heatly applied for a license to make 20000 Mds of salt annually 'in the same manner' as Prinsep. Heatly planned to employ the 'sol-pyro evaporation process', which matched Prinsep's hybrid technique at Narrainpore. In stating that his markets were beyond the western borders of Bengal, Heatly carefully avoided being seen as Prinsep's competitor.[33]

The BCSO refused permission to Heatly, saying it was withdrawing licenses from all European land grantees, except where the arrangement might aid them in extending cultivation. Heatly argued that he fell into the exceptional category and that if the Government was supporting Prinsep, it should encourage him too. The Salt Agent of the 24-Pergunnahs refused to recommend his application saying Prinsep's 'old' case, not a year old, could not be taken as a precedent.[34]

When Heatly complained of unfair treatment to the Council, H. T. Prinsep tersely rejected his claims on three contestable grounds. First, the terms in Heatly's

[30] Extract Separate Letter from Bengal, 1/08/1833, No. 1, para. 95-100 (BL: *IOR/H/MISC/779*).
[31] Extract Letter from Bengal, 9/09/1833 (BL: *IOR/H/MISC/779*).
[32] The results of Prinsep's experiments at Ballyaghaut were published to a wider acclaim. See G. A. Prinsep, 'On a remarkable heat observed in masses of Brine kept for some time in large reservoirs', *Journal of the Asiatic Society of Bengal*, Vol. 7 (1838), pp. 207-211; G. A. Prinsep, 'On the spontaneous heating of Brine', *Journal of the Asiatic Society of Bengal*, Vol. 7 (1838), pp. 1014-1017.
[33] Heatly to W. P. Palmer, Agent, 24-Pergunnahs, 14/11/1837 in *BCSOC,* 2/01/1838 (BL: *IOR/P/105/47*).
[34] 24-Pergunnahs Agent to Heatly, 16/11/1837 in *BCSOC,* 2/01/1838 (BL: *IOR/P/105/47*).

Sundarbans grant explicitly forbade salt manufacture. Second, exporting his produce would injure the Government salt revenue in Bengal. Third, the Government did not intend to permit the solar evaporation technique 'as it yields a lower margin of profit'. But not only had the Government cited this technique as a reason to support Prinsep's project, it had also ignored a similar prohibition mentioned in Prinsep's Saugar land grants. Anticipating a charge of nepotism, H. T. Prinsep clarified that Prinsep was given the contract to experiment 'with a view to an eventual change of system' of salt making in Bengal and not for personal gains. In any case, added Prinsep's brother, the Government could not favour someone who simply wanted profits from other's ideas.[35]

There is more to this story than rank favouritism or a genuine search for an effective solution to the fuel problem – although these were important elements. I suggest that within overarching personal and family interests and in the guise of experiments to improve production methods, the Government's continuous support to Prinsep's Ballyaghaut works indicated its desire to manage local affairs independently of London. This interpretation explains why the Council encouraged Prinsep in spite of the Court's repeated injunctions. It also resolves the paradox between Prinsep's public stand against the salt monopoly, which he voiced in the *Calcutta Courier* as its editor, and his deriving exclusive treatment from the monopolist Government.[36] As I will show below, the government's desire for autonomy grew and blossomed in the post-1833 period.

Narrainpore Salt Works, 1835 - 1839

The 1830s saw a rise in public criticism of the Bengal salt monopoly both in London and the colony. In Britain, its chief critics were influential metropolitan and provincial capitalists engaged in the East India trade. They had been trying to increase their exports to India since the Company's monopoly of that trade ended in 1813. They advocated an end to all sorts of exclusive privileges of the Company. The Whigs received these 'free trade' arguments sympathetically and fanned the anti-monopoly sentiments further in the British Parliament. These feelings precipitated the 1833 Charter.[37]

---

[35] Bengal Government Secretary to Heatly, 16/11/1837 in *BCSOC,* 2/01/1838 (BL: *IOR/P/105/47*).
[36] *The Calcutta Courier*, Vol. 1, No. 9, 2/05/1832.
[37] Terence Andrew Jenkins, *The Liberal Ascendancy, 1830-1886* (Basingstoke: Macmillan, 1994). On the role of the Board of Control in shaping the 1833 Charter, see *East India Charter*. On the influence of the East India Agency houses over the Whig Government and the British Parliament, see Anthony Webster, 'The Strategies and Limits of Gentlemanly Capitalism: the London East India agency houses, provincial commercial interests, and the evolution of British economic policy in South and South East Asia 1800-50', *Economic History Review*, Vol. LIX, No. 4 (2006), pp. 743-764. For the ambiguities in radical

The Charter was drafted by two radical liberals, Charles Grant and T. B. Macaulay. Grant was born in India and would later become Governor of Bombay and die there. Macaulay was serving as the Secretary to the Board of Control, which supervised the Company's management of the affairs in India. Grant and Macaulay shared many ideas. Both were convinced that the Company's Court of Directors was unable to run Indian finances profitably. They wanted the Court to focus solely on administrative matters and encourage the participation of private capitalists in the colony's economy and commerce.[38] Accordingly, the Charter terminated the Company's monopoly of the China trade and required it to close its commercial dealings and assets in India.[39]

Following the Charter, the private East India trade lobby expected the Bengal Government to end its monopoly over the salt production and trade. These private capitalists argued that the Government should raise its salt revenues not from the profit between production and sale of the article but from the duty levied on it. They wanted access to the supply, distribution and sale of salt, free from the Government's interference. The advocates of the Charter hoped that the shift from the monopoly to the excise system would trigger free and fair competition among the capitalists.[40]

While discussing the Charter in the British Parliament, some members expressed anxiety over the fiscal consequences of terminating the salt monopoly. In 1832, they argued that the monopoly profits were 'too large to be given up' and could not be commuted for any other tax 'less onerous to the inhabitants'. The advocates of the Charter proposed two compensatory schemes to address these concerns. The first was to collect an excise duty on salt made privately. The second was to increase import duties on Madras and British salts. The first option would have made British salt expensive in Bengal and was therefore ruled out. The Parliament chose a duty on

---

liberalism as a social theory, see Peter M. Lichtenstein, 'Some Theoretical Coordinates of Radical Liberalism', *American Journal of Economics and Sociology*, Vol. 84, No. 3 (Jul., 1984), pp. 333-339.

[38] For Grant's views on the Company and its administration of India, see Charles Grant's speeches in the Parliament, available at http://hansard.millbanksystems.com/commons/1833/jun/13/east-india-companys-charter#S3V0018P0_18330613_HOC_28. Also, see Charles Grant, *Letters of Charles Grant, Addressed to the Chairman and Deputy Chairman of the East India Company, Conveying Considerations by Which Were Recommended Proposals Contained in a Memorandum, or Paper of Hints, Dated 17th November 1832, on the Subject of the Trade and Government of the Company* (London: J. L. Cox, 1833). For Macaulay's views on India, see http://www.columbia.edu/itc/mealac/pritchett/00generallinks/macaulay/txt_commons_indiagovt_1833.html. Also, see William Thomas (ed.) *The Journals of Thomas Babington Macaulay*, 5 volumes (London: Pickering and Chatto, 2008); Lady Trevelyan (ed.) *The Works of Lord Macaulay*, 8 Volumes (London: Longsman & Green, 1866).

[39] For the Charter, see *A bill [as amended on the report] for effecting an arrangement with the India Company, and for the better government of His Majesty's Indian territories* (London: The House of Commons, 1833). For Papers respecting it, see *East India Charter. Papers Respecting the East India Company's Charter* (London: The House of Commons, 1833).

[40] Jenkins, *The Liberal* Ascendancy; *East India Charter: Papers*; Anthony Webster, *Twilight of the East India Company*, chapters 4 and 5.

Madras salt, chiefly on the produce of the districts where it perceived that both the *Khallary* and human costs were high.[41]

The BCSO, being at the helm of the monopoly enterprise, generally opposed the introduction of the excise system in Bengal.[42] Nonetheless, it also tried to appease London by demonstrating the feasibility of some sorts of excise system. Some officials cited the Ballyaghaut experiment to argue that monopoly combined with closely supervised manufacture was equivalent to the most effective excise system. A Company servant boasted in front of the British Parliament Select Committee that since '[t]he Bengal salt is manufactured within narrow limits; that the monopoly profit may be considered as something approaching in effect to an excise duty, an excise duty levied, I may say, at the place of manufacture on the whole consumption'.[43]

The 1833 Charter increased the BCSO's fiscal anxiety. Terminating the salt monopoly meant dismantling its longstanding revenue structures. The end to its China trade privileges had already created a huge gap in its finances. Now salt, the second largest source of its earnings was set to be de-monopolised. The BCSO was uncertain whether the proposed excise system was feasible or effective in keeping the same level of earnings.[44] Besides, it faced strong resentment from numerous covenanted and non-covenanted officers who were employed in the lucrative offices of the Agencies and the Chokies. The Charter created a state of disorientation in the colony as far as the BCSO was concerned.

In 1835, Prinsep claimed that at Ballyaghuat, he had successfully used solar evaporation to concentrate brine before boiling it by fire to precipitate salt. He wanted to convince the BCSO that certain technical steps could remove the causes of the underperformance at Ballyaghaut at no cost. These improvements were concordant with the BCSO's desire for better control over the inputs of labour, fuel and capital in the monopoly business. In the same year, Prinsep proposed erecting another salt works based on the principle at Narrainpore. He claimed that the site at Narrainpore was safer from inundation, had water that is more saline and therefore was a more suitable site for experimentation than the works at Ballyaghaut.

Prinsep proposed two key technological changes for the Narrainpore experiment. The first was a mixed-fuel evaporation method, similar to Heatly's sol-

[41] Extract of the Report of the Select Committee of the House of Commons on the affairs of the East India Company, 16/08/1832, *Plowden Report*, pp. 523-524.
[42] Andrew Ramsay's witness account, *Plowden Report*, p. 526.
[43] Extract from Minutes of Evidence taken before the Select Committee of the House of Commons on the Affairs of the East India Company, in the year 1832, Vol. VI, Report and Evidence, Part III, Revenue. Evidence of H. St. George Tucker, *Plowden Report*, Appendix E, No. 2, p. 527.
[44] Minute of H. M. Parker, *Plowden Report*, Appendix E, No. 8, pp. 545-563.

pyro technique above. The plan was to concentrate brine by exposing it to the sun in open flat terraces, store in covered reservoirs, and then boil it. The objective was to protect the working reservoirs from the frequent 'deluge and an accidental overflowing' of rainwater and to ensure smooth production. The second improvement was the use of the shallow wrought-iron troughs for boiling brine, 'as in Europe'. At Ballyaghuat, Prinsep had riveted several quarter- and half-inch plates together and placed them in pairs over flues going to a chimney 40 feet high. He claimed having obtained 3 to 5 Mds of salt a day with 10 Mds of freshly cut wood per boiler, three times the produce in the Agency *Khallarie*s. A still larger output could be achieved, he argued, by feeding brine three-quarters to full saturation, lining the flues with dry bricks, using more and drier wood and by raising the chimney height.[45]

Prinsep advertised the Narrainpore scheme for its superior product quality, enhanced supervisory control and better mitigation of risks as compared to the Agency manufacture. He argued that unlike the Molunghies' method of filtration used in the Agencies, his arrangement allowed one to regulate the concentration by manipulating the solar exposure of brine. It led to a better control of salt quality and fuel expenses. He enumerated three advantages of the iron troughs: First, the 'iron-boiler salt' was free from the 'brick dust scraping of the smouldering pots'. Second, the troughs allowed a 'Concentration of Manufacture' and better supervision, as hundreds of them might be set up and ring-fenced, all obtaining brine supply from a common reservoir. Third, laborious processes such as scraping, filtering and making pots were redundant in his scheme. There was little scope for 'dishonesty, improvidence and capricious idleness' of the salt makers at Narrainpore.[46] Impressed, the BCSO asked Prinsep to furnish a detailed cost estimate of the initial capital and seasonal costs for making 5000 Mds of salt.[47]

Prinsep's estimates reveal the magnitude of the planned works. An 8-mile long canal (*bund*), with 26 large sluices and accompanying masonry works, would bring brine to a 'terrace' of approximately 50000 cubic feet capacity. Hot, concentrated and heavy brine would flow 'by gravitation' from the terrace through a 'working reservoir' to three covered reservoirs. The 'working reservoir' of about 26250 cubic feet capacity was to be built with brick and tile linings. Each covered pool was to be 300 by 30 by 20 feet. There would be two tile-floored salt *golah*s. The brine would be boiled in 216 cast iron pans of about 4 feet square by one foot deep. They would be laid over a

[45] Prinsep to BCSO Secretary, 15/05/1835 (BL: *IOR/F/4/1564*).
[46] Prinsep's sample salt from the experiments, which he submitted with the proposal, were 'discoloured' but he clarified, 'this would not be the case were the boilers made of Cast Iron'. See Prinsep to BCSO Secretary, 15/05/1835 (BL: *IOR/F/4/1564*).
[47] BCSO Acting Secretary to Prinsep, 19/06/1835 (BL: *IOR/F/4/1564*).

complicated array of 24 brick-lined flues 30-feet long and four connecting flues 20-feet long. These would lead the gases of combustion to the base of two 50-feet high brick chimneys. About a million bricks, 400 tons of lime (*chunam*) and 80000 tiles would be employed in the making of this Works. The total cost of construction was to be Rs 30000 or £3000.[48] The Works would consume 2800 tons of fuel wood annually. Sixty-four labourers would be engaged in boiling 300 days a year. They would be superintended by a European Assistant and supervised by the local officers (*Sircar*s and *Chuprasse*s). The estimated cost of manufacture would be 4 As/per Md.[49]

The BCSO sought the opinion of two experienced men, the military engineer Captain W. N. Forbes and Mr. I. Stevenson of the Calcutta Mint, on Prinsep's estimates. Forbes was a close friend of James Prinsep at the Asiatic Society and Stevenson James' subordinate at the Mint. Both men were satisfied with Prinsep's grasp of the details. Both derided the 'Bengalee Plan' practiced in the Agencies and recommended the Narrainpore plan for the Government's support.[50]

While seeking the Government's approval, the BCSO re-prioritized the advertised advantages of the Narrainpore plan. It now considered concentrated manufacture as the foremost benefit. It also highlighted savings in labour and time as well as the improved control over men and processes. The BCSO said that due to 'accidents of season' and the manufacturers' tendency to compensate their past losses, manufacture was currently irregular. The provision for brine stock and centralized boiling houses in the plan would make production more dependable.[51] However, the BCSO regarded Prinsep's chief innovation, the large-scale solar evaporation, as a doubtful proposition in Bengal. Its views were thus shaped by factors other than the plan's allegedly superior technology and potential for savings. Indeed, I would suggest that its real motive was to keep the manufacture at Narrainpore under the control of a 'Government Supervisor'.[52] I will elaborate on this motive shortly.

The prevailing anti-monopoly sentiments required the BCSO to appear willing to forego its monopoly. It therefore argued that the Government's involvement in the Narrainpore works would hasten this move in two ways. First, it would create confidence among speculators, who were concerned about the profitability of such ventures and about the place of private capital in the Government monopoly. Second,

[48] Prinsep to BCSO Acting Secretary, 13/07/1835, Estimate 1 (BL: *IOR/F/4/1564*).
[49] Prinsep to BCSO Acting Secretary, 13/07/1835, Estimate 2 (BL: *IOR/F/4/1564*).
[50] BCSO Acting Secretary to Captain W. N. Forbes and Mr. Stevenson of Mint, 21/09/1835; Forbes to BCSO Acting Secretary, 28/10/1835; Stevenson to BCSO Acting Secretary, 12/10/1835 (BL: *IOR/F/4/1564*).
[51] Compare these advantages with the risks incurred by James Kyd, a master shipbuilder, who also tried improving salt making techniques in the Saugar Islands in 1822. See Kyd, *Account of the Manufacture*.
[52] BCSO to Bengal Governor, 19/11/1835 (BL: *IOR/F/4/1564*).

it would help speculators to enlarge their manufacturing concerns, eventually to meet the entire demand in Bengal. Referring to the cases of Block Machinery in Portsmouth and Bengal Silk, the BCSO argued that it would relinquish the monopoly once private capitalists demonstrated their ability to run sufficiently large enterprises.

In the winter of 1835, the Bengal Government approved the Narrainpore works. It signed the contract in early 1836 and paid an advance of Rs 30000 to Prinsep.[53] The contract allowed the BCSO to control activities at the works. It assigned the task of sanctioning expenses to its Agent at the 24-Pergunnahs. He was to scrutinize Prinsep's accounts, possess 'copies of all plans and drawings' and ensure that the latter did not conceal any information. The terms in the contract required Prinsep to allow two Government-appointed officers to oversee production processes at his Works. These men would manage the works should sickness or 'any other cause' prevent Prinsep from supervising it. They would also 'ascertain and [regularly] report' the progress of the venture.[54] At the same time, the contract allowed the BCSO to erect similar salt works 'whenever it many see fit' and 'wherever it may be considered advisable'. It also made a provision for the BCSO to buy the works at the end of a five year at a fair valuation.

Production at Narrainpore began in March 1837. By the end of 1838, the works had expanded beyond its original proportions. Capital outlay had increased to Rs 133140. With a further investment of about Rs 40000 pending that year, the sum now reached about five times the Government's advance in 1835. The works had five Chimneys, 4 brine reservoirs, 4 terraces of about 200000 square feet, and 3 large *golah*s. About 200000 person-months of labour had already been invested. The works had become a factory with associated features of concentrated manufacture and routine flow of the materials and processes.[55]

The BCSO, however, soon realized that the production experiments under private supervision were problematic. At one level, it was difficult to maintain a regular, predictable and quality output. In a year leading to February 1838, Prinsep's salt concerns, including those in Ballyaghaut and Suagar, produced 36341 Mds in contrast to the stated target of 200000 Mds. In Narrainpore, torrential rains frequently weakened the brine, damaged the lining of reservoirs and delayed repairs. Cholera and 'innumerable' holidays often halted the work, sometimes during the 'best of the

[53] Bengal Government to Court, 10/08/1836 (BL: *IOR/F/4/1564*).
[54] Accordingly, Henry I. Bamber (Balliaghaut) and I. Carry (Narrainpore) were appointed. H. T. Prinsep to BCSO, 14/02/1838; 24-Pergunnahs Agent to BCSO, 28/02/1838 in *BCSOC*, 6/03/1838, No. 17; BCSO to 24-Pergunnahs Agent, 3/03/1838 in *BCSOC*, 6/03/1838, No. 94, 226 (BL: *IOR/P/105/49*).
[55] Prinsep to 24-Pergunnahs Agent, undated, in 24-Pergunnahs Agent to BCSO, 7/01/1839 in *BCSOC*, 22/01/1839, No. 5A (BL: *IOR/P/105/60*).

season'. In May that year, production was reported as brisk; hot and sultry weather allowed making evaporated (*Kurkutch*) salt; fuel-wood collection was going vigorously. In June, reservoirs and terraces were being repaired; brine was being collected; boiling was continuing but heavy rains were hampering manufacture. In December, three of the terraces were washed out; the brick lining of the old covered reservoir' had *again* given away; repair work was going on; a new reservoir was being cut; bricks were being moulded and burnt; and the brine from the last season was being pumped out into the terrace. In March 1839, Prinsep was building a new terrace, cutting a new reservoir and finishing the lining of the 'old half done reservoir'.[56] Prinsep's opponents would later seize these reports on the haphazard state of things at Narrainpore to argue for the plan's unreliability.[57]

At another level, effective administration of the works proved to be illusory. The contract required Prinsep to deliver all his salt to the Agent's two subordinates stationed on site. On one occasion, he refused to transfer the Ballyaghaut salt to Narrainpore, saying the former was a more convenient location for the buyers. The Agent took the refusal as a breach of his contract and appealed to the BCSO. To the salt official's surprise, the salt had already been sold to a merchant.[58] Prinsep did not readily submit to the BCSO either. He constantly flouted the contract's requirement to submit accounts periodically in a prescribed format. After the BCSO's repeated nudges, he obeyed by sending an abstract of expenses for the three previous years. Being too brief, the BCSO could not ascertain its accuracy. Prinsep insisted that the summary was a better analysis of expenses 'for the purposes of which the condition referred to' in his contract.[59]

Underneath this squabbling were the incompatible views held by Prinsep and the BCSO about the nature and purpose of the Narrainpore experiment. Prinsep

[56] I. Carey to 24-Pergunnahs Agent, 19/02/1838 in *BCSOC*, 6/03/1838, No. 17 (BL: *IOR/P/105/49*); Carey to Agent, 28/02/1838 enclosed in Agent to BCSO, 10/03/1838 in *BCSOC*, 16/03/1838, No. 24 (BL: *IOR/P/105/49*); Carey to Agent, 31/03/1838 enclosed in Agent to BCSO, 31/03/1838 in *BCSOC*, 6/04/1838 (BL: *IOR/P/105/50*); Carey to Agent, 30/04/1838 enclosed in Agent to BCSO, 8/05/1838 in *BCSOC*, 11/05/1838 (BL: *IOR/P/105/51*); Carey to Agent, 30/06/1838 enclosed in Agent to BCSO, 5/07/1838 in *BCSOC*, 6/08/1838 (BL: *IOR/P/105/53*); Carey to Agent, 31/12/1838 in *BCSOC*, 15/01/1839 (BL: *IOR/P105/60*); Carey to Agent, 1/03/1839 enclosed in Agent to BCSO, 1/03/1839 in the *BCSOC*, 8/03/1839 (BL: *IOR/P/105/62*).

[57] Quality of the produce also varied. Nevertheless, ranked on the basis of their differing appearance and purity, all his produce found their niche in the local market. The I Quality was more expensive than the Agency salt. See BCSO Notification, 4/04/1838 in *BCSOC*, 6/04/1838, No. 65 (BL: *IOR/P/105/50*). The demand for the 'last class' was so great in 1838 that the Agent had to satisfy the merchants by giving I Quality salt. See Petition from Hurrischunder Bissumber & Hurris Chunder Coondoo Joodhisher Coondoo & Greeschunder Coondoo, undated in *BCSOC*, 1/05/1838, No. 36; 24-Pergunnahs Agent to BCSO, 25/04/1838 in *BCSOC*, 1/05/1838, No. 14 (BL: *IOR/P/105/52*).

[58] 24-Pergunnahs Agent to BCSO, 29/12/1838; BCSO to Agent, 4/01/1839 in *BCSOC*, 4/01/1839, No. 11, 12 (BL: *IOR/P/105/60*).

[59] 24-Pergunnahs Agent to BCSO, 7/01/1839 in *BCSOC*, 22/01/1839; BCSO to Prinsep, 22/01/1839 in *BCSOC*, 22/01/1839, No. 6 (BL: *IOR/P/105/60*); Prinsep to 24-Pergunnahs Agent, 18/02/1839, No. 20; BCSO to Prinsep, 21/03/1839 in *BCSOC*, 12/03/1839; (BL: *IOR/P/105/62*).

sought the Government's encouragement because it was the administrator of the land, it had ready money and it was the largest dealer of salt in Bengal. However, he always considered Government's involvement to be temporary. For him, the project was a trial to introduce private capital into the development of Indian industries.

The BCSO too perceived the Narrainpore works as an experiment. But its goal was to establish and extend certain 'principles' to the Agency manufacture, so that it could control labour and production process in a more effective manner. The BCSO did employ Prinsep's argument that concentrated manufacture at Narrainpore might facilitate the change from 'monopoly to an excise system' which it thought was 'a thing to be desired'. Yet its emphasis was chiefly on the reinvigorating effects the works might bring to its monopoly profits.[60] As we will see in the next section, the views of Prinsep and the BCSO further diverged as they considered the future of the Government salt monopoly.

Narrainpore Principles and the Future of Monopoly

In order to understand why the BCSO was trying to encourage Prinsep's endeavour and, at the same time, to keep it under control, it will be useful to contrast the BCSO's thinking with the evolving views in London on the Company's salt concerns. In 1836, the House of Commons Select Committee on Salt rejected the Company's pro-monopoly argument that substitution of the monopoly by the excise system might cripple its revenue base in Bengal. Yet the Committee did not suggest terminating the monopoly at once. It recommended that Agency manufacture should be restricted, both spatially and by volume. It also suggested that the inland salt trade should be opened for private capitalists in return for a duty.[61] The Company was unwilling to concede any aspect of its monopoly. However, an enormous amount of public debt, estimated to be about 47.6 millions sterling in 1833, had undermined its ability to negotiate proposals with the Parliament.[62]

The BCSO in India had two reservations about the proposed excise system. First, collecting tax from 'poor' peasants, who employed 'rude' processes to make small quantities of salt over great tracts of country, was bound to be costly. It argued that for such small-scale and widely dispersed production, monopoly was the only

[60] BCSO to Bengal Governor, 19/11/1835 (BL: *IOR/F/4/1564*).
[61] Charles Grant, *Papers Respecting the East India Company's Charter* (London: The House of Commons, 1833).
[62] Grant, *Papers Respecting East India Company's Charter*, pp. 5-8; Anthony Webster's *The Twilight of the East India Company* (Woodbridge: The Boydell Press, 2009), ch. 5. The Company argued for discounting the amount with the assets possessed by every Indian. See Pablo Pebrer, *Taxation, Revenue, Expenditure, Power, Statistics, and Debt of the Whole of British Empire* (London: Baldwin and Cradock, 1833), pp. 454-471.

viable fiscal administration. Second, the BCSO believed that an effective system of excise presupposed the existence of large private capitalists. Otherwise, the investors would not have 'power and knowledge to protect their venture against injustice and extortion', which the BCSO thought was rampant in the colony. The BCSO advanced the Narrainpore works as a fiscal experiment to test the feasibility of large capitalist works, and thereby of the excise system in Bengal. The BCSO used Prinsep's plan to dampen the enthusiasm of the pro-excise lobby, which was demanding a quick end to its monopoly.

In early 1838, the BCSO acknowledged that the Narrainpore experiments had demonstrated the usefulness of its technological arrangements. However, it remained doubtful about the feasibility of large-scale private investments in salt. In the later half of that year, Prinsep requested permission from the Bengal Government to erect yet another salt works at Gorda, about 42 miles southeast of Calcutta. If permitted, the Gorda works would enable Prinsep to produce over half a million Mds of salt a year. This was more than the produce of some of the Company's Salt Agencies. He also proposed to have an Excise Officer at Gorda. Until the purchases paid 'a tax equal to the customs duty', he stated, they would not remove salt from the works.[63] The Gorda was the first salt works designed exclusively to test the feasibility of the excise system in Bengal.

The Gorda proposal came at a time when the BCSO, following the 1836 Select Committee recommendations, was reducing the extent of its salt manufacturing areas. It was withdrawing the *Khallarie*s, for instance, from some quarters in the 24-Pergunnahs where it deemed the production costs to be high and smuggling rampant. The departure of the Agency, however, was leaving the salt lands open to unemployed salt makers and to smugglers. Illicit manufacture in these areas was increasing.[64] The BCSO hoped that the erection of private schemes, like those at Narrainpore and Gorda, would preclude the possibility of reclaiming the abandoned salt lands.

Yet the BCSO's response to the Gorda proposal was ambiguous, not least because the works involved a trial of the excise collection system. First, it negotiated the contract price with Prinsep, citing declining costs in Agency manufacture. Prinsep replied that his rate was lower by 4 As/Md than the Agency costs even when he bore land rents, transportation, canal building and repair costs. None of these was included in the BCSO's comparative assessment. His rate appeared more favourable if one

[63] Prinsep to BCSO, 21/12/1838 in *BCSOC*, 2/01/1839, No. 1 (BL: *IOR/P/105/60*).
[64] 24-Pergunnahs Agent to BCSO, 30/11/1838 in the *BCSO Consultations*, 11/01/1839, No. 19 (BL: *IOR/P/105/60*). Emphasis added.

added the costs of checking illicit salt to the Agency rate. Nevertheless, he said he was ready to lower his rate, should Agency costs decrease.[65]

Prinsep's tactical reply created a rift in the BCSO.[66] Its senior member, H. M. Parker, thought that Prinsep 'fairly met the Board's objections'. The junior member, John Trotter, wanted him to reduce his rate further.[67] Trotter soon gave up his stand when Parker indicated that the Council would not entertain any objection on costs alone.[68] Both agreed to give 'a trial to the Excise System', but they did so on one condition: Prinsep had either to maintain enough stocks of brine and fuel to run the works without interruption or to pay for measures to prevent smuggling.[69] This condition reflected the BCSO's doubts about the scheme's workability, as much as its concerns about the place of private manufacture in the monopoly arrangement.

The BCSO's uncertainty increased when Prinsep published his Bengal Salt Company prospectus in January 1839. In the prospectus, Prinsep gave a limited role for the Government in the future of salt making and trading in Bengal. He suggested that the produce of the Salt Company would be its property, which it could store duty free, in its own *golah*s and as long as it wanted. The Salt Company would agree to limit its profit to less than Re 1/Md provided the Government guaranteed several privileges. First, the company would reserve the right to regulate production quantity and selling price of salt. Second, the Government would observe 'the principle of equality' in regulating the *Pangah* price. Third, the Government would gradually close down its Agencies when the Salt Company expanded its salt works.[70]

In the afterglow of the 1833 Charter, those who favoured more inflow of private capital to India welcomed Prinsep's prospectus. They read the plan as the final blow to the Company's last commercial stronghold. The BCSO, by contrast, was concerned. It now saw that the Gorda proposal, and indeed the Narrainpore and

---

[65] Prinsep to BCSO, 8/01/1839 in *BCSOC*, 15/01/1839, No. 23 (BL: *IOR/P/105/60*); Prinsep to BCSO, 4/03/1839 in *BCSOC*, 23/04/1839, No. 31 (BL: *IOR/P/106/1*).

[66] The rift appears as a series of arguments and counterarguments in the margins of their report to the Council. See BCSO to Deputy Bengal Governor, 23/04/1839 in *BCSOC*, 23/04/1839, No. 35 (BL: *IOR/P/106/1*).

[67] H. M. Parker's Minute, 14/03/1839; J. Trotter's Minute, 15/03/1839 in *BCSOC*, 23/04/1839 (BL: *IOR/P/106/1*).

[68] H. M. Parker's Minute, 16/03/1839; J. Trotter's Minute, 18/03/1839 in *BCSOC*, 23/04/1839 (BL: *IOR/P/106/1*).

[69] The first option reads more like a condition for production license. It says that Prinsep should prove 'by means of a suitable Hydrometer (or such other tests as it ordinarily employed for ascertaining the strength of brine in English salt Works)' that he had enough brine to produce 50000 Mds of salt and his boiling apparatus 'in actual operation' was capable of making 200 Mds/day. See BCSO to Prinsep, 29/12/1838 in *BCSOC*, 2/01/1839, No. 1 (BL: *IOR/P/105/60*).

[70] Given these terms, the prospectus promised its potential investors an annual rate of return on investment of 563 percent, in stark contrast with the usual dividend of around 10 percent in the railways in the 1830s. The total initial capital for the Salt Company was CRs of 30 million, or round £3 million. For contemporary rate of return on investment, see Richard Brown, *Society and Economy in Modern Britain 1700-1850* (London: Routledge, 1991), p, 237.

Ballyaghaut works, had been small steps towards eventually substituting excise for the entire monopoly organization.[71] The prospectus also showed a clear roadmap of how that end would be achieved. This raises the question of how the BCSO eventually managed to defer the shift to excise system for two more decades.[72]

In February 1839, W. P. Palmer, the Agent of the 24-Pergunnahs, submitted to the BCSO a report of his visit to Narrainpore. In this report, Palmer presented a thorough criticism of Prinsep's technological organization and supplied his own alternative to it. Palmer's report presented the BCSO with a choice: either it allowed the proposed Bengal Salt Company to replace the Agency manufacture by several works like Narrainpore, as outlined in the Salt Company prospectus, or it changed the technology of production in the Agency *Khallarie*s according to the arrangements at Narrainpore. The former would mean an end to the Government monopoly on manufacture, the latter its continuation on an improved footing.

Palmer began his report by citing the superfluity of some of the seemingly sophisticated contrivances at Narrainpore: The chimneys were dispensable; the iron troughs were unnecessary as Indians little 'cared' about salt's appearance. Palmer pointed out that the complex arrangements at the works had hindered their proper functioning, resulting in a dismal output of 51000 Mds, as compared to the promised 300000 Mds. Instead, he argued for the effectiveness of conventional earthen furnaces that afforded close contact between fire and the boiling pots. Palmer also thought that the 'native process' of collecting and concentrating brine was cheaper and quicker. If the boiling houses were laid closely and circumscribed by a brine canal, he suggested, the Agencies would have all the advantages Prinsep proffered. In short, certain technological improvements would make the existing Agency manufacture far more dependable and cheaper than Narrainpore.[73]

Since the Ballyaghaut days, the BCSO had been arguing that Prinsep's experimental works were the safest way – in both the sense of preserving its profit and reliably meeting existing demand – of transforming the monopoly into an excise system. Palmer's report laid out an alternative technological arrangement which could fulfil the conditions of economy and reliability yet render such transformation unnecessary.

---

[71] Bengal Salt Company Prospectus in *BCSOC*, 22/01/1839, Enclosure 14 (BL: *IOR/P/105/60*).
[72] On BCSO's preference for the monopoly, see BCSO to Bengal Government, 15/01/1839 in *BCSOC*, 15/01/1839, No. 24 (BL: *IOR/P/105/60*); BCSO to Deputy Bengal Governor, 23/04/1839 in *BCSOC*, 23/04/1839, No. 35 (BL: *IOR/P/106/1)*.
[73] Palmer to BCSO, 1/06/1838 in *BCSOC*, 25/01/1839, No. 6 (BL: *IOR/P/105/60*); Palmer to BCSO, 1/02/1839 in *BCSOC*, 15/02/1839, No. 21 (BL: *IOR/P/105/61*).

Prinsep tried to dismantle Palmer's alternative by questioning his expertise on several technical points. He argued that selective appropriation of the Narrainpore features would not work. The conventional brine strengthening method by scraping and filtration required well-dispersed boiling houses. This in turn would make the use of iron troughs impractical in terms of repairs and control. Similarly, he thought it impossible to achieve centralized production without reservoirs.[74] Palmer refused to be drawn on these technical details. He pressed that the Narrainpore works was not dependable for making '*large definite* quantities of salt *with any degree of certainty*', as past reports showed. If one included the cost of capital invested in Narrainpore, Palmer argued, it was not even economical.[75]

The BCSO now had to decide between these two alternative proposals. In a sense, its position was predetermined. In entertaining Prinsep's past endeavours, its interest had always been to develop a system of manufacture whereby it would have 'all the advantages of the Monopoly… [while] *getting rid of the name*'.[76] In the aftermath of the 1833 Charter it wanted to consolidate the existing supply of 'the *monopoly* Provision' but discard the label *monopoly*. It supported Prinsep's experiments at Narrainpore because it believed that the successful 'principles' developed there would – when applied later in the Agencies – help it save a million Rs a year.[77]

The BCSO's roadmap had always been clear: pick effective elements from the Prinsep's works, employ them in the Agencies to enhance their efficiency and supervision, but limit the scope of these works by calling them experiments on the feasibility of the excise system, and continue deriving profits without using the term *monopoly*. While evaluating Prinsep's and Palmer's alternative proposals, the BCSO executed that plan by formulating its own 'modified excise system'.

To Parker, the BCSO's senior member, Prinsep's experiments indicated that the opportune moment for private investment in salt had come. In his view, the Government undertaking ensured protection against illicit salt, but would never produce an 'adequate profit' for the investors in the way that a privately-managed venture would. In principle, the Government should forsake all speculative ventures at

[74] Prinsep to Parker, 3/07/1838 in *BCSOC*, 25/01/1839, No. 11 (BL: *IOR/P/105/60*).
[75] Palmer to BCSO, 26/11/1838 in *BCSOC*, 25/01/1839, No. 12 (BL: *IOR/P/105/60*). There was a personal aspect to the conflict between the two. In March 1838, Prinsep's request for erecting two *golah*s in Narrainpore, one for the Pangah and the other for Kurkutch, was refused by Palmer. See Prinsep to Palmer, 19/03/1838 in *BCSOC*, 25/01/1839, No. 6, Enclosure No. 9 (BL: *IOR/P/105/60*); Palmer to Prinsep, 28/03/1838 in *BCSOC*, 25/01/1839, No. 6, Enclosure No. 10 (BL: *IOR/P/105/60*). The mutual dislike intensified as these discussions took place. Prinsep accused Palmer of taking on 'prejudiced view of things'. Palmer did not care 'two straws about' his competence on technical matters. He alleged Prinsep for giving away to self-interest.
[76] Minute by H. M. Parker, 17/12/1838 in *BCSOC*, 25/01/1839, No. 16 (BL: *IOR/P/105/60*).
[77] BCSO to Bengal Governor, 19/11/1835 (BL: *IOR/F/4/1564*).

once. The 1833 Charter also required this step. However, he realized that a completely deregulated sector would necessitate an elaborate and costly excise collection mechanism. As an interim plan, Parker favoured a supply 'competition' between a few large works, each with more than 2 lakhs Mds of annual production (only Prinsep's works qualified the criteria). Curiously, Parker also posed the BCSO as a competitor to private enterprise. He argued that private capitalists should have equal stock and bear the same costs of smuggling prevention as the BCSO did, and then compete with it on the retail price.[78] Parker's pro-excise and pro-competition views were thus strongly qualified: The BCSO would relinquish the monopoly only when private capitalists proved their ability to outperform the Government.

By contrast, the BCSO's junior member, Trotter, recommended the merits of the Narrainpore 'principles' but thought them unsuitable for large-scale manufacture in Bengal.[79] He pointed out that the unpredictable climate and deadly diseases in the Sundarbans made it impossible to maintain a large stock of saturated brine. Instead, he preferred importing salt 'in a Crystallized state from the Coramondel Coast'.[80] Hence, unless the promoters of the Salt Company came up with 'definite proof' of the dependability in the Narrainpore arrangements, he would be against abandoning the Agency System. Trotter was in favour of seeing the Agency System improved. Privately managed concerns, in Trotter's opinion, could never compete with the improved Agencies.[81]

A prolonged debate ensured between the two members. Parker construed Trotter's position as 'directed to the maintenance of the salt monopoly on an improved footing' his own as 'directed to its destruction'. There should be no comparison between a plan for improving the existing Agency manufacture and another which would supersede 'altogether the clumsy unnatural and objectionable process by which the State provides a necessity of life'. The question for Parker was therefore primarily one of principle and only secondarily of practicality.[82] Trotter subjoined that he was *for* the excise system *if* it was 'equally advantageous to the State'.

---

[78] Ibid.
[79] Minute of Junior Member, 31/01/1838 in *BCSOC*, 25/01/1839, No. 17 (BL: *IOR/P/105/60*). The 'European processes' of Narrainpore Works, in Trotter eyes, 'in all essentials followed' the salt works at Woodside near Lymington in Hampshire'.
[80] In the same way, Trotter wrote, Britain used to import 'spontaneously evaporated Provision' from France, Portugal and Spain before 'the concentration of Brine by means of mineral salt was adopted in England'.
[81] Here, Trotter paraphrased Palmer's five objections. But they differed considerably, both in content and in emphasis, from Palmer's own. To illustrate the point, Trotter's charge that cost of labour in Narrainpore was forbiddingly expensive and unreliable was missing in Palmer's report. He suspected that Prinsep's arrangement could never secure 'nearly twice as much concentrated Brine' as in the native method. He also believed that there was a faulty brine strength measurement.
[82] Minute of H. M. Parker, 23/01/1839 in *BCSOC*, 25/01/1839, No. 18 (BL: *IOR/P/105/60*).

However, it would be injudicious to support a questionable change in haste. If the BCSO abandoned the Agency System and Prinsep's plan failed, the salt supply would be crippled for years.[83]

These apparently distinct views of the BCSO members, however, converged on one crucial point: that they would consider ending the monopoly only when private speculators proved their ability to manage large-scale production ventures under an excise system in a more reliable and economical way than the BCSO.

In March 1839, Prinsep died of the 'fatal illness …contracted while exploring some of those marshy spots most favourable for the erection of the works, but notoriously inimical to human life'.[84] Prinsep's death by cholera caused 'temporary embarrassment' in the operations of his salt works. But within a week, the BCSO assigned the Agent's two assistants to take charge of the works and ensure, 'proper flooding of the brine fields during the springs [sic] of this and two succeeding months'.[85] I. Carey, the assistant-in-charge at Narrainpore, duly submitted the accounts of the works in a prescribed format that Prinsep had resisted doing throughout his life. By April, the entire produce of Narrainpore had been brought to store in the Government *golah*s. Its saleable portion was now 'inserted in the [Agent's] monthly statements of unsold salt'. From May onwards, Carey began reporting to the Agent and not to the Board, as Prinsep had done. The Agent paid less and less attention to Prinsep's works.[86] The BCSO now began to dictate the terms of purchase of Prinsep's salt.[87]

The BCSO's moves worried the promoters of the proposed Bengal Salt Company. By May 1839, the public had taken up only 1551 (out of 300000 floated) shares.[88] Indeed, the prospect of this capital venture faded away quickly. In the age

[83] Minute of J. Trotter, 25/01/1839 in *BCSOC*, 25/01/1839, No. 19 (BL: *IOR/P/105/60*).
[84] *The Asiatic Journal and Monthly Register for British and Foreign India, China and Australasia*, Vol. XXIX, New Series (May-August, 1839), p. 246.
[85] BCSO to 24-Pergunnahs Agent, 29/03/1839 in *BCSOC*, 30/03/1839 (BL: *IOR/P/105/62*); 24-Pergunnahs Agent to BCSO, 28/03/1839 in *BCSOC,* 2/04/1839, No. 15 (BL: *IOR/P/106/1*). The term 'springs' appears to refer to the early rains.
[86] I. Carey to 24-Pergunnahs Agent, 1/04/1839 in *BCSOC*, 23/04/1839, No. 30A; W. Prinsep to BCSO, 5/04/1839; BCSO to W. Prinsep, 8/04/1839 in *BCSOC*, 9/04/1839, No. 17, 18; BCSO to Agent, 22/04/1839 in *BCSOC*, 23/04/1839, No. 30B (BL: *IOR/P/106/1*); Agent to BCSO, 29/04/1839; BCSO to 24-Pergunnahs Agent, 10/05/1839 in *BCSOC*, 10/05/1839, No. 1, 2 (BL: *IOR/P/106/2*); Agent to BCSO, 6/06/1839 in *BCSOC*, 11/06/1839, No. 50; Carey to Agent, 7/06/1839; Agent to BCSO, 10/06/1839 in *BCSOC*, 10/06/1839 , No. 23, 24 (BL: *IOR/P/106/2*).
[87] BCSO, for instance, was now unwilling to offer more than 8 As/Md for the Gorda Salt. See BCSO Secretary to W. Prinsep, 28/06/1839 in *BCSOC*, 28/06/1839 (BL: *IOR/P/106/2*). The Agent refused William's request to keep the Ballyaghaut *Pangah* and *Kurkutch* locally and demanded that they should be transferred to the Sulkea *Golah*s. See Agent to W. Prinsep, 25/04/1839; W. Prinsep to H. M. Parker, 17/05/1839; Agent to W. Prinsep, 28/06/1839; BCSO to Agent, 3/07/1839 in *BCSOC*, 5/07/1839, Nos. 6-10 (BL: *IOR/P/106/3*).
[88] Prinsep's brother William tried to keep the Salt Company afloat. See *The Asiatic Journal and Monthly Register for British and Foreign India, China and Australasia*, Vol. XXIX, New Series (May-August, 1839), p. 254. On William Prinsep's India years, see A. C. Staples, 'Memoirs of William Prinsep,

when, according to a contemporary writer, capital was so 'superabundant' both in England and Bengal, no manufacturing concern of reasonable promise should have gone unnoticed the way the Bengal Salt Company did.

By the end of the 1830s, critics of the salt monopoly had run out of steam in Britain. Pamphlets of the 1840s had no effect on the BCSO, which directed influential critics to the Narrainpore and Gorda Works and claimed that it had always favoured a 'modified excise system'. Lay critics were informed that Prinsep's failures exemplified why an excise system was unsuitable in Bengal.[89]

The BCSO's claims are questionable because of the way it treated Prinsep's works after his death. In the 1850s, the Narrainpore and Gorda Works were the only sets of 'private' salt works where an excise officer kept manufacture and delivery accounts. Each also had 'a small establishment under the control of the superintendent of salt chowkey' to 'supervise the storage and delivery'. This was an indication that the 'private' works based on the excise system were by then thoroughly integrated within the Government's monopoly organization.[90]

Both works were said to employ the 'European process' of evaporation. Yet despite their allegedly superior manufacturing principles, they stood neglected. In 1854, only one out of three sets of 'furnaces' in Narrainpore was functioning. The average yearly production of the works in the period 1849-54 was only half of its working capacity of 40-50000 Mds. The Gorda Works was in no better state. Its working capacity was 40000 Mds in comparison to its design capacity of 300000 Mds. It had in any case remained closed for 'many years'.[91]

The prolonged neglect of these excise experiments indicates their peripheral significance to the Government's monopoly organization. From the Government's perspective, they had already served their function of warding off criticism of the salt monopoly. The BCSO had kept them open as counterexamples to argue why the Government had no choice but to continue its monopoly. Indeed, the Government

---

Calcutta years, 1817-1842', *Indian Economic and Social History Review*, Vol. 26 (Mar. 1989), pp. 61-79.

[89] For anti-monopoly arguments, see Salt Chamber of Commerce, *The Press versus the Salt Monopoly in the British India* (Northwich: 1846); Nimmuck, *A Letter to Sir James Weir Hogg, Bart., Chairman of the East India Direction on the Salt Monopoly of the East India Company* (1846); D. C. Alwyn, *A Pamphlet on the Salt Trade in Indi*a (London: Maddon & Malcom, 1846); George Wilbraham, *Thoughts on the Salt Monopoly in India* (London: 1847). For pro-monopoly answers, see John Chapman, *Remarks on Mr. Alwyn's Letter* (1847); British Indian Association, *Petition of the British Indian Association Regarding the Laws Enacted to Prevent Infractions of the Monopoly of Salt* (Calcutta: 1853).

[90] A. R. Young, Revenue Board Officiating Junior Secretary to G. Plowden, Commissioner on Salt, 16/09/1854 in *Plowden Report,* pp. 437-439.

[91] *Plowden Report*, pp. 497-498.

monopoly of salt manufacture outlived even the Company's dispossession of its Indian territories in 1858. It was only abolished in 1863.

Salt Experiments and Colonial State

This chapter, while describing the BCSO's response to Prinsep's experiments, focussed on three themes: the relationship between private capitalists and the Government in the colony; the fiscal dilemmas of the Bengal Government around the 1833 Charter; and, the role of the Narrainpore 'principles' in shaping the BCSO's policy regarding the future of the salt monopoly.

The evidence presented above showed two characteristics of the relationship between the Company Governments and private speculators in the colony. Firstly, this relationship was asymmetrical. The Government acted both as a sovereign and as a resourceful capitalist. It claimed the salt monopoly as its right but also framed laws and acted as the ultimate arbiter. At the same time, being an executive arm of a mercantile firm, it hesitated to abandon its commercial privileges. When required, it even posed as a competitor to private speculators. Placed on an unequal footing, individual entrepreneurs like Prinsep and Heatly depended on the capitalist Government for permission, protection and incentives to carry out their ventures.

Secondly, this unequal relationship influenced the unfolding of large-scale private manufacturing ventures in Bengal in many ways. First, personal and family connections influenced the fate of the ventures much more strongly than did the Government's stated policy. As repeated favours to the Ballyaghaut works and Heatly's fate show, close personal and family ties with the officials ensured favour, regardless of the Court's policy or the entrepreneur's status. Second, private speculators operated within the overarching commercial interests of the Government. As the similarity between Kyd's experiments in the 1780s and Prinsep's in the 1830s indicates, what mattered was the Government's profit, not the speculators' ideology.

The 1833 charter reconfigured the Government-speculator relationship. I have shown how emboldened by the Charter, speculators called upon the Government to dismantle its salt monopoly, and began devising ambitious schemes and forming associations such as the Bengal Salt Company. The anti-monopoly sentiments triggered by the Charter made the BCSO members apologetic. The members now looked for ways to get rid of the term monopoly. Yet the commotion created in the colony by the 1833 Charter was not a simple monopoly versus free competition debate. Prinsep used *laissaz faire* rhetoric to call for an end to the Government's monopoly but he expected pecuniary assistance and exclusive treatment from the

same Government. The views within the monopolist BCSO were equally nuanced. While Parker argued for a rapid introduction of private capital in salt, Trotter showed more caution. But both concurred that the BCSO would not consider abandoning its exclusive privilege until private capitalists proved their ability to run salt manufactories competitively and reliably. In the prevailing anti-monopoly climate, it was important to appear willing to give up the monopoly although, as I showed, the BCSO never intended to do so.

Existing histories of manufacture, business and economy in colonial India do not place sufficient emphasis on this complex relationship and its implications for our understanding of the history of large-scale commodity manufacture in the colony after 1833. As I mentioned in the Introduction, most accounts of the Company's commercial affairs terminate in 1833, implying that the Indian Governments were immediately transformed into purely administrative structures, and that various Government monopolies ended in 1833 or soon after.[92] Indeed, this was the view espoused by the British Parliament, the Board of Control and the Court of Directors in London.

There are two historiographical consequences in adopting such a London-centred perspective. First, it reinforces a particular understanding of colonialism, in which London and its Governments in India are linked by an unchanging master-subordinate relationship. In this understanding, the metropolis framed the fiscal policies for the colony in its own interests while the local Governments, as its 'arms', faithfully implemented these policies. Second, the London perspective has led some historians to seek motivations for fiscal changes in India in Britain. For example, they have traced the origins of various colonial legal provisions on commercial activities either in British legal thinking or in colonial officials' reconstruction of the local conventions.[93] On this showing, the continuity of the Company's monopoly of salt manufacture beyond the 1833 Charter, and even beyond 1858, is extremely puzzling.

In this chapter, I have de-coupled the assumed London-Bengal link and paid more attention to the BCSO's reactions to Prinsep's salt experiments in the wake of London's call for the shift from the monopoly to the excise administration. This focus

[92] John Crawfurd's article. Quoted in *Plowden Report*, pp. 629- 640. For examples in this vein, see Sadanand Choudhury, *Economic History of Colonialism: A Study of British Salt Policy in Orissa* (Delhi: Inter-India Publications, 1979); Narayan Prasad Singh, *The East India Company's Monopoly Industries in Bihar: With Particular Reference to Opium and Saltpetre, 1773-1833* (Muzaffarpur: Sarvodaya Vangmaya, 1980); Hoh-Cheung Mui and Loma H. Mui, *The Management of Monopoly: A Study of the East India Company's Conduct of its Tea Trade, 1784-1833* (Vancouver: University of British Colombia Press, 1984), pp. 136-144.

[93] Recent expressions of such a view are Jon E. Wilson, *The Making of a Colonial Order: Information, Uncertainty and Law in Early Colonial Bengal* (Cambridge: Centre of South Asian Studies, University of Cambridge, 2004); Ritu Birla, *Stages of Capital: Law, Culture and Market Governance in Late Colonial India* (Durham; London: Duke University Press, 2009).

on how local Governments were responding to local concerns reveals new perspectives on the unfolding of various commercial and economic arrangements in the colony.[94] I showed that the BCSO continued to believe in the effectiveness of the monopoly arrangements for its salt income and argued that its income would be endangered under an excise system.[95] Because of the BCSO's strong representations to the Court, the Directors were able to persuade the Select Committee in 1836 to accept the monopoly 'unwillingly'. Encouraged, the BCSO now looked for ways to save the Agency System without appearing disobedient to London. The search led it to encourage Prinsep's ventures. Its hope was to improve the performance of the existing organization by introducing the Narrainpore 'principles' and consolidating the monopoly, rather than moving towards its substitution. Yet the BCSO continued to present the ventures as experiments in the feasibility of large-scale private salt manufacture and of the excise system of salt revenue collection in Bengal.

Several developments in 1839 forced the BCSO to become more decisive regarding its salt monopoly. Prinsep's ultimate objective of substituting the Government's monopoly arrangements became public through his Bengal Salt Company prospectus. Palmer's alternative plan in the form of 'improved' Agency manufacture also came to the BCSO's notice. The choice between Palmer and Prinsep, expressed in the sources as the 'Narrainpore Works' and the 'Narrainpore Principles' respectively, appeared as a choice between two different sets of technological arrangements. These rival technological arrangements altered the terms of the debate, which had hitherto been about the choice between the monopoly and the excise systems of salt revenue administration in Bengal. Nevertheless, the BCSO's deliberation on these rival 'principles' led it to postpone the dismantling of the monopoly organisation until Prinsep demonstrated his ability to manage large-scale salt works efficiently, in a cost-effective manner and on a par with the existing Agency System. Prinsep began his salt works as alternatives to the salt monopoly but the BCSO continually portrayed them as experiments on excise. That it did not discard Prinsep's works after his death, but kept them running as anomalies within its monopoly organization is also worth emphasizing. The works served the BCSO well. It used them to justify the unsuitability of the excise system of salt administration in Bengal, and to continue its monopoly of manufacture.

[94] Tirthankar Roy also has demonstrated recently that the Bengal Government promulgated a new contract law because conventional arrangements were proving inadequate under changed exchange situations in the Indigo trade and not because of colonising aims. See Tirthankar Roy, 'Indigo and Law in Colonial India', *Economic History Review*, Vol. 64, S1 (2011), pp. 60-75.

[95] '[T]here would be an illicit manufacture and exportation from these districts, under [excise system] to an extent materially injurious to the revenue', remarked one senior financial official of the Company Government. See Extracts from the evidence of H. St. George Tucker, Quoted *Plowden Report*, p. 527.

The findings of this chapter have implications for the wider historiography concerning the relationship between technology and the fiscal administration of the State. Historians have shown how new fiscal demands of the State led to the development of new technologies, either for satisfying the taxman or for evading him.[96] The other literature, which emphasizes fiscal, ideological and institutional rationales to explain technological change in the colonial world, is also well known.[97] This portrayal of technological change, however, needs to be complemented with the role technology played in the BCSO's management of the salt monopoly. I have shown how technological details such as the methods of boiling the brine (solar evaporation or boiling by fire, or both) and the layout of the boiling pans (concentrated or dispersed arrangements) enabled the BCSO to create its own 'improved monopoly' scheme. This in turn helped the BCSO to put off the imminent introduction of the excise administration in Bengal, and to continue its monopoly of manufacture. Here, the Bengal Government employed the technological scheme to defer a colonial fiscal policy framed in London, not to implement it in the colony.

Technology gained this role in the colony, however, in a period of disorientation caused by the 1833 Charter. The costs of administering a growing territory in India and of meeting the 'home charges' in Britain (such as contributing towards the dividends to the Company's shareholders and the repayment of the Crown debts) had come to outweigh the earnings from the territories by the 1830s. The Company was heavily in debt to the British state and was unable to resist the demanding terms of the 1833 Charter. Yet in the same period, the Company's officials in India began to speak of the 'State' instead of the 'Company' and of 'India' instead of the older term the 'East Indies'. The new State of India, as it emerged from the shadow of the debt-ridden Company, was about to be crippled by the ending of its monopoly of the China trade, the profit from which had hitherto offset the deficit in running the Indian administration. In addition, the supporters of the 1833 Charter expected the Indian Governments to abandon its long-held commercial dealings and assets in India.

While the existing historiography leaves the task of transformation faced by the Company officials after 1833 as a puzzle, this chapter has offered technology in the shape of manufacturing 'principles' as a site for investigating how they managed to carry over the commercial interests of the Governments well past 1858. The indebted

[96] Ashworth, *Customs and Excise*, Chapters IV and V.
[97] For an example on the emphasis on fiscal, institutional and ideological rational for a change in the abolition of the tobacco monopoly in the Philippines, See Edilberto C. de Jesús, *The Tobacco Monopoly in the Philippines, 1782-1882*, PhD Thesis, Yale University (1997), pp. 245-274, p. 288.

Court of Directors in London might have lost its influence over the British Government's policy on India, as the term 'twilight' suggests,[98] but its Indian Governments were discovering a new autonomy that in the case of the Bengal Salt Department appeared to be a form of sovereignty.

[98] Webster, *Twilight of the East India Company*.

Chapter 7
CONCLUSION

A Summary of the Findings of the Thesis

Unlike existing narratives of decline and failure, the preceding chapters argued for a more mature understanding of the development of large-scale iron and salt manufacture in colonial India. The chapters highlighted the diversity and changing aspects of the local manufacturing milieu. They emphasised the provisional character of technological arrangements in the early enterprises and linked such arrangements to changing government policy in a new way. They revealed the crucial role played by hitherto overlooked factors such as the vestiges of pre-colonial relations of production and the uncertainties related to iron and salt technologies.

Existing accounts of the Birbhum iron ventures interpret their repeated demolition either as spontaneous reactions by politically unaware insurgents, the *Chuar*s, or as local responses to the Company's attempt to change the link between power and territoriality. Chapter 2, by contrast, showed that the 'incursions' were the *Chuar*s' attempts to reproduce pre-colonial relations between themselves and the natural resources that colonial ventures threatened to reconfigure. Chapter 3 demonstrated that the distinguishing feature of the Company's salt monopoly was its reconfiguration of the local relations of production, and not its institutionalisation of state violence, which the existing literature ascribes exclusively to colonial rule. However, despite changes in the local organisation of salt manufacture, the government monopoly was not a political economic tool of colonisation. It was simply a fiscal experiment, the experimental aspect being revealed in the frequent reversals in government salt policy, and in the fragmented nature of the local revenue and judicial apparatus. The changing relationship between colonial officials and the local salt making population, and the diverse responses of the latter to the emerging order of production also underscore the tentative character of the monopoly programme.

Chapter 4 provided another critique of the political-economic interpretations. It showed that the standard argument about the role of power and profit in the persistence of 'illicit' salt actually reflects the Company officials' own perspectives more than the local political and socio-economic reality. As a result, historians of the illicit production of salt have missed the crucial role of the norms of the local manufacturers. I argued in the chapter that in pursuing the illicit production and trade of salt, the disgruntled elite and greedy salt makers in Bengal were in fact acting

normally, merely reproducing the plural production arrangements of the pre-colonial days, and not resisting the colonial enterprise.

Chapter 5 sought to challenge the narrative of failure that dominates the historiography of iron production in colonial India. In this pessimistic outlook, technology transfer and diffusion processes figure prominently while the experimental aspect of technology and governance in the period is ignored. The chapter, by contrast, showed how contemporary uncertainties in the technology and organisation of charcoal iron making resulted in the plant's underperformance and eventually determined its fate. The relationship between the iron company and the colonial officials were evolving and the objectives of the project changing. The quantity and quality of output were irregular. There were challenges from competing plans to industrialise iron resources, and knowledge of charcoal iron making was sketchy. All these factors suggest the need to redefine the link between technology and colonial policy in large-scale commodity manufacture.

Chapter 6 returned to the notion of experiment in attempting to explain the relationship between technological change and the fiscal requirements of the colonial state. The chapter showed that the Bengal Board of Revenue utilised certain technological principles employed in Prinsep's experimental salt works to manipulate the anti-monopoly directives sent to India from London. The Prinsep story is, therefore, as much of a technological experiment in creating fiscal policy options for the Company's government as a bureaucratic experiment by a government keen to maintain exclusive control over salt production in Bengal. Overall, the findings of my study call for a new general interpretation of the way technology and government policy interacted in large-scale iron and salt production projects in colonial India.

Large-scale Manufactures in Colonial India: Experiments at the Colonial Frontier

The arguments developed in the chapters above cluster around the two key notions of 'frontier' and 'experiment'. The term 'frontier' has been used in the political history of the United States as a metaphor for what the European settlers perceived as its empty landscape but one rich in natural resources. The term 'experiment', normally stands, in the history of science literature, for a knowledge-making activity by men of science. East India Company officials, by contrast, employed the term 'frontier' to refer to the inhospitable and wild sites in colonial India, and the term 'experiment' to convey the sense of an open-ended undertaking whose outcome was uncertain. I have refashioned these cognitive and bureaucratic meanings to include two key characteristics of the large-scale manufacturing projects that my chapters have consistently highlighted.

One is the peripheral but contentious landscape of manufacturing in a local society. The other is the tentative aspects of the technological and political economic arrangements of these projects. Such reconfiguration of the terms helps not only to describe the development of these ventures more accurately, but also to redefine the link between colonial policy and technology.

The marginal state of the manufacturing activities is evident in the stories presented in chapters 2 and 3. We saw there that numerous intermediate layers of merchant-contractors and sub-tenants played a crucial role in intensifying or weakening the impact of emerging colonial production and trade arrangements on the manufacturers' lives and livelihoods. The chapters also showed that large-scale iron and salt projects drew fuel, raw materials and labour from local sources, and also utilised local technical knowledge. They therefore interfered with the extant social and economic organisation of manufacture. Their social distance made Company officials blind to the ways in which commodity production was embedded in the local socio-economic relations. Hence, the Burdwan officials' misunderstood the *Chuar*s' rationale for their 'incursions', and the Agency officials' failed to grasp the normative criteria of the 'illicit' salt makers. Consequently, the colonial governments were unable to regulate labour, resources, and processes in these manufacturing areas.

As I have shown, the Company officials, for their part, tried their best to manage manufacture in the 'frontier' landscape. They first employed local elites as intermediaries to facilitate the execution of the large-scale projects. They also adopted existing tools of coercion, such as the Ordeals for salt labour recruitment, and the forced advance (*dadani*) for the supplies of raw materials and finished products. As officials became better versed in the local customs and languages, they began modifying the local organisation of production. They started removing the weaker intermediaries to bring manufacturing activity directly under their scrutiny, and introducing legal and policing arrangements for controlling labour and production output. They then monopolised the manufacture and resources in the case of salt, and in the case of iron, awarded monopolies to private entrepreneurs for the supply of ores and charcoal. Subsequently, they tried to centralise manufacture and regularise production by introducing new mechanical devices such as waterwheels and steam engines, and new techniques such as sol-pyro evaporation.

While existing accounts have argued for the destructive effects of these interventions, the chapters above demonstrated their tentative nature. The provisional aspect of the political economic arrangements in the years after the granting of *Dewany* in 1765 should not be overlooked. The grant transformed the Company's

merchants and militia in India into new ruling elite, but their trade privileges were withdrawn by the British Government through a series of India Acts. As I showed in Chapters 5 and 6, the Company's governments in India reacted to these moves by contradicting the directives sent from London and pursuing their local political and fiscal interests. For example in the 1820s, the Madras Council supported Porto Novo in order to protect its silver reserves. That support, however, dried up as new Council members arrived in the 1840s. In encouraging Prinsep's salt works, the Bengal government too was following its own agenda of extending the life of its salt monopoly. Nevertheless, the Company officials' treatment of the local organisation of iron and salt production was ambivalent. The 'science of political economy', through which they made sense of the local polity and economy, was an alien ideology in the distant colony and was of doubtful value even in England.

The above chapters brought to the fore other unsettled issues of governance that contributed to the experimental state of affairs in the period. Interdepartmental feuds, officials' abuse of their positions, personal and family connections between entrepreneurs and government officials, the ambivalent attitude of the local elites toward the Company's plans and projects, and the manufacturers' resistance, all blunted the officials' administrative and legal tools, and made the outcome of the Company government's strategies uncertain.

Another set of factors that added to the uncertain development of the large-scale manufacturing ventures relates to technology. Chapters 5 and 6 demonstrated that the promoters' confidence in the effectiveness of the so-called 'European plan' or 'European manner' was misplaced because large-scale manufacturing in the period was essentially an excursion into the realms of untested and untried techniques. Technological uncertainties included specific issues of making the right kind of 'artificial mix' ('cinder'), of using waterwheels, cast-iron brine boiling pans, or chimneys, as well as broader issues about the suitability of centralised or distributed production in the Indian milieu (Chapter 5). There was also the question of whether or how to replicate some of proven 'principles' of manufacturing (Chapter 6).

The findings of the chapters also suggest a new overarching narrative of the development of large-scale iron and salt manufacture in colonial India. During the period in question, company officials and private entrepreneurs worked continually to improve the local organisation of manufacture. In so doing, they believed that they gained better control over the socio-political aspects of the projects. Their confidence is reflected in the changing focus of their concerns. In the late eighteenth century, officials struggled to organise labour and capital in what they perceived as the hostile

terrain of manufacture. By the middle of the nineteenth century, they felt much less threatened by the recalcitrant behaviour of the local population. Consequently, they shifted their focus to achieving technical efficiency within the Indian milieu. There was therefore a gradual shift in the subject of experimentation, from socio-economic relations to the technology of production.

The outcome of any individual manufacturing project, however, remained unpredictable due to the various socio-political and technical uncertainties. Consequently, the Company's effort to industrialise iron production in India did not bear fruit until the 1850s. While its monopoly over production did ensure a regular supply of salt in Bengal, that in itself did not lead to the growth of local manufacture. On the contrary, the hard and unjust work in the salt fields forcibly turned many salt makers into cultivators, tank diggers and wage-earning labourers. Landholders and merchants preferred to invest in the lucrative salt trade. Consequently local manufacture shrank to an insignificant size soon after the monopoly establishment was dismantled in 1862.

Efforts to undertake the large-scale manufacturing of iron and salt in the period under discussion were thus experiments in a double sense. Firstly, specific knowledge, techniques, and artefacts of production were undergoing trials in colonial settings, and secondly, the political and economic approaches toward governing these trials were themselves experimental. The full range of meanings of the terms 'frontier' and 'experiment', as revealed in the previous chapters, therefore provides an effective explanation of the development of large-scale iron and salt manufacturing during the Company's rule in India.

Implications for the Existing Historiography of Colonial India

Existing accounts of iron and salt manufacture in colonial India are stories of either the decline of local industries or the failures of colonial governments to modernise traditional technologies of production. As I argued in the introduction, these accounts draw their pessimism from the standard economic history and history of technology in the colony. The former espouses the view that the colonial governments' exploitive, pro-British manufacturing policies led to the deindustrialisation of the Indian economy. The latter claims that early large-scale production ventures failed to transfer European capital and/or technologies to India. These literatures portray both the colonial policies and technologies of production as pre-formed and readily usable tools of colonisation.

However, I have demonstrated that the colonial policies proclaimed by the Company's Directors and the British Parliamentarians in London were often merely matters of retrospective analysis and had rarely, if ever, any prescriptive force in the colony. The local governments, on the other hand, frequently prioritised their own fiscal interests over London's directives. Conflicts within the colonial apparatus also considerably weakened the governments' ability to manage large-scale production ventures. The states assumed by officials on industrial projects underwent continuous shifts and reversals because of their personal interests and attitudes. Furthermore, this thesis showed how the messy affairs of production in the frontier landscape forced these officials to adopt tentative and constantly evolving policies on the industrialisation of local resources. The affairs also elicited varied responses from the local manufacturing population. The common conceptualisation of colonialism as a set of political economic responses preconceived in London and faithfully realised in the colony therefore prevents us from grasping the hotchpotch, diverse realities of the iron- and salt-makers' day-to-day activities. While existing accounts award little significance to these complexities, my work has revealed their profound importance to the development of large-scale manufacturing ventures in colonial India. I have argued, moreover, that the notions of 'frontier' and 'experiment' are powerful means of comprehending the constantly evolving nature of both colonial policy and technologies of production.

As I mentioned in the introduction, existing accounts of technology in the colony attempt to illuminate its relationship with the colonial political economy by enquiring into the transfer and diffusion of certain technologies. However, I demonstrated in the chapters that their use of the term *technology* is problematic, and that their exclusive attention to the dynamics of transfer simply reinforces Euro-centric perspectives of technological development. This focus also perpetuates false dichotomies in the Indian historiography such as technology vs. craft and European vs. indigenous technologies.

Conceptions of technology have important bearings on the way we write the history of manufacture in the colony. For instance, historians of the Indian economy and industry have missed the significance of prevalent uncertainties in charcoal iron technology because they wrongly assumed that, like all technologies, it was transferable. Consequently, they attributed the demise of the Porto Novo iron project to every possible factor but the provisional nature of technical knowledge. Yet, as I have shown, technological uncertainty in charcoal iron making both in Britain and in India in the early nineteenth century proved the most crucial of all reasons for the

Indian failures.

In my view, the technology/craft dichotomy in the historiography of the colonial world has had two important consequences. Firstly, the colonies have been routinely portrayed as technological *terra nullius*. Secondly, the arrival of colonising powers and their technologies has been associated with the advent of modernity in the colonies and the globalisation of its knowledge, capital and labour. However, neither perspective is helpful in differentiating the intended meaning of the phrase 'European plan' (viz. the plan used in Europe) from the messy and provisional production processes actually adopted under that label in the Porto Novo iron plant and the Hidgellee salt manufactories. Indeed, I have cast considerable doubt on the idea that the so-called European plan was ever successful or even in use in Europe.

In explicating the relationship between colonial political economy and technology, it is important to avoid this conceptual quagmire about technology. This thesis, therefore, focused on the interaction between local production technologies and colonial policy in the development of large centralised, mechanised production ventures. This reorientation enabled me to show that household-level distributed manufacturing, which had always been a mainstay of the Indian economy, proved influential in shaping the outcome of the Government's experiments to centralise and/or mechanise commodity production in colonial India. In Chapter 4, the domestic manufacture of salt can be seen as posing a constant challenge to closely supervised Agency salt production in Bengal. In Chapter 5, Campbell's plan to promote conventional small-scale iron manufacture became a feasible alternative to the large-scale Porto Novo experiment. The attention paid to manufacturing activities also allowed the power, profit, and norms of the people involved in these manufacturing activities to be systematically monitored (Chapters 3 and 4). This, in turn, revealed how the core of the Indian economy functioned under colonial rule.

The relationship between technology and political economy in the colony becomes a more interesting site of enquiry in my experiment-based approach than in the tool and transfer approaches. While the latter deals with questions about local contexts of diffusion and adaptation of imported technologies, my focus on local manufacturing has revealed how supposedly imported ideas, artefacts and knowledge were fabricated, and how the contexts of supposed transfer were themselves manipulated in the colony. For example, the promoters of the 'European plan', including several Madras Governors, continued to insist upon its existence despite noticing how Heath and his iron-makers mixed it with conventional techniques at Porto Novo. By 1845, on the other hand, the Madras Council had switched its support

to Campbell's 'native' arrangements and left the promoters to salvage what they could from the sinking iron plant. Similarly, Prinsep's European arrangements at Narrainpore were actually closer to Palmer's conventional 'native' plan, but the Bengal government used these hybrid 'principles' of salt making to delay the London-directed transition from the monopoly to the excise system of salt revenue collection. Conventional tool- and -transfer approaches clearly cannot accommodate such manoeuvres. The experiment-based approach, on the other hand, can help to explain not only the varied development of different production ventures in colonial India, but also why the governments continuously readjusted and refined their policy towards these ventures and the technologies they employed.

The notion of experiment developed in this work has the potential for wider historiographical application. Historical actors did not have the benefit of hindsight. They acted with an imperfect knowledge of their own past and no knowledge of their own immediate future. They were also ignorant about the long-term consequences of their actions. The Company officials who found themselves in the unprecedented position of trying to manage a distant economy had no well-defined plan for the future of Indian manufacturing. Their strategies of governance were not yet proven effective in England, and were completely untested in the colonial territory. They could only behave tentatively, fully prepared to withdraw or revise their policies in response to adverse outcomes or changes in political and economic context. While existing historiographies of colonial India assert or at least imply that the colonisation of India was a well-calculated plan, the notion of experiment effectively captures the ways in which everyone struggled to formulate and react to the changing political and economic context without being fully aware of how their own actions were contributing to that process. The vision of experimentation has thus enabled me to take the historiography of colonial India to a new level. In the interpretation offered in this dissertation, one can assess the actions of both the Company's men and the native Indians independently of the post-colonial predicament that historians have so readily, and I think inaccurately, attributed to them.

Appendix A

Index to the Petitions cited in the Chapter from the *Bengal Board of Revenue Consultations*, September 24, 1788, British Library London (BL: *IOR/P/51/24*)

Petition ACB : *Petition of Amanny Cawn of Beharry, Buzurgumedpur against Ramzanny Molungie of Kakollah, Buzurgumedpur.*

Petition AGS : *Petition of Ajooderam Gomastah of Shack Jendie of Chelta Bunnea, Talokdar of New Cultivation against Ramjy Doss of Ramnagore, Selimabad.*

Petition BCC : *Petition of Buggeru Chung of Chumta, Pergunnah Buzurgumedpur against Prawnkissen Goo of Otumpore, Pergunnah Baukla.*

Petition BCP : *Petition of Bessy of Chumta, Pergunnah Burzurgumedpur against Saaduck Mahomed and Mahomed Erof of Ramnagar and Mihespore, Pergunnah Buzurgumedpur.*

Petition DCC : *Petition of Dussurut Chung of Chumta, Pergunnah Buzurgumedpur against Prawnkissen Goo of Otumpore, Pergunnah Bakla.*

Petition DCM : *Petition of Deen Cawn and Mohibullah of Chelta Bunnea of the new Cultivation against Dunny Molungie Ennayut Molungie and Hussain Molungee of Soonawottah and Jubcatta of the Pergunnahs Seedpore and Boosoorgomenpore.*

Petition FBS : *Petition of Fauzil's Brother Shaick Sety against Prawnkissen Goo and Hunniefa Molunga (now dead).*

Petition FMB : *Petition of Fausil Mahomed of Bansbunnea, Pergunnah Seidpore against Mahomed Ruffee and Baidul Manjie of Adiltullah, Pergunnah Seidpore.*

Petition KMP : *Petition of Koosy of Mihespore, Pergunnah Buzurgumedpur against Ram Ram Goo.*

Petition KMR : *Petition of Kully's Mother of Runsee, Pergunnah Buzurgumedpur against Ram Gopaul Dauss of Ramchunderpore, Pergunnah Chunderdeep and Mahatady Mirdha of Rogoonauthpore, Pergunnah Buzurgumedpur.*

Petition KRO : *Petition of Kurrumoollah and Roopgauzy of Oorooah, Buzurgumedpur against Seebchund Ghose of Cassipose.*

Petition MAJ : *Petition of the Mother of Assaubdie against Jullel Molungie.*

Petition MBC : *Petition of the Mother of Bolly Chung of Chumta, Pergunnah Buzurgumedpur against Prawnkissen Goo, Salt Merchant of the Village Autumpore.*

Petition MCC : *Petition of Miheboollah Cawn of Chelta Bunnea against Kirtie Narrian, Ram Ram Goo, Mahomed Hunnif and Moglebeg of Hagser and Coosungul.*

Petition MCH : *Petition of Munhoor Cawn of Haut, Pergunnah Selimabad against Jullel Beparree of Bisaggee, Pergunnah Selimabad.*

Petition MCS : *Petition of Mahdel Chung of Shaumpore, Pergunnah Buzurgumedpur against Ram Ram Goo of Kossungul in the Same Pergunnah.*

Petition MEK : *Petition of Mahomed Etteem, of Kurroonah, Pergunnah Boosoorgomedpore, Against Prawnkissore Goo and Hissamdy Molungie of Myndy Gunge and Rogonautpore.*

Petition MMM : *Petition of Mahomed Mooraud against Mahatabdy Molungie of Calladah, Pergunnah Buzurgumedpur.*

Petition MRB : *Petition of Minollah of Rampore, Boosoorgomedpore against Soonawoolah Molungie of Berungul.*

Petition NDB : *Petition of Nundkissore Doss, Bridge Mohun Sircar, Rammony Bhose, RamGunga Goo, Seebchunder Bhose, Doorgapersaud Goo, and Neelmony Chund. Beparries Manufacturers of the Salt of the Division of Boozoorgomudpore.*

Petition NDK : *Petition of Nusuasdey Dawkooah of Jutchbunea, Pergunnah Buzurgumedpur against Mahatabdey Molungie of Silah Bunnea, Pergunnah Selimabad.*

Petition RCD : *Petition of Rajah Cawn of Dowkatty, Purgunnah Buzurgumedpur against Chootoo Molungie of the same place.*

Petition RDB : *Petition of Ramjy Dutt, Beparrie of Pergunnah Selimabad against Simon Ewart.*

Petition RDG : *Petition of Ramjy Dutt by his Gomastah Ram Rutton Dauss against Mr. S. Fanbent.*

Petition RDGR : *Petition of Ramjy Dutt through his Gomastah Ram Rutton Doss of Ramnagur, Pergunnah Selimabad against Ramcaunt Dutt and Beijeram Lascar Gomastahs of Bowannysunker Dutt, Beparrie of Kooingul, Pergunnah Buzurgumedpur.*

Petition RKG : *Petition of Ram Kissen Ghose and Durpnarain Ghose of Village Roonsie against Kanjuir Cawn Manjee of the Salt Manufactory* .

Petition RRG : *Petition of Ramsunkur Ray, by his Gomastah Guddadur Roy residing at Doolsoorah, Pergunnah Potposar, Beparry of the Selimabad and Seebpor Salt*.

Petition SBB : *Petition of Shack Barru of Bouttellee, Pergunnah Chunderdeep against Jeetun Molungie and Soonawoolah Peon of Shaistanagur and Asimpore*.

Petition SBC : *Petition of Shaik Bushee of Chumta, Pergunnah Buzurgumedpur against Rammanick Bhose and Ramgunga Goo, Beparries of Shawzadpore and Causeepore.*

Petition SBO : *Petition of Shaik Besy of Ooooah, Pergunnah Buzurgumedpur against Shaik Chootoo of Dawkatty.*

Petition SBR : *Petition of Shaik Burmullah against Ram Gopaul Dauss*.

Petition SBS : *Petition of Shaik Burkuttollah of Shawzadpore against Matabday Mirdah and Sol Mahomed Peon Rogonauthpor*.

Petition SCC : *Petition of Suffaid Cawn of Cheltabunnea of the New Cultivation against Md. Waus, a servant of Mr. Ewart, of Soonawootah, Pergunnah Seedpore*.

Petition SCN : *Petition of Sabaram Chung of Nagharrah, Selimabad against Jynarain Shickdar, Indernarain Sheickdar, Bridgeram Sheickdar and Govindpersaud Shickdar of Seiglapore, Selimabad*.

Petition SDS : *Petition of Shack Dunny, brother of Soonawoolah of Neamutty Purgunnah Boosoorgomedpore against Mahomed Shuffee of Chumta, Purgunnah Boosoorgomedpore on the part of Hurry Chowdry*.

Petition SHM : *Petition of Shaick Hazary Molungie of Soomcally, Pergunnah Buzurgumedpur.*

Petition SIS : *Petition of Shaik Innayet of Soonawootah against Ram Ram Goo and Ramjy Dutt of Koosungul.*

Petition SKB : *Petition of Shaik Kubber of Bataggee, Pergunnah Buzurgumedpur against Hussain Molungie and Soorut Cawn of Jobcatty, Pergunnah Buzurgumedpur*.

Petition SKS : *Petition of Shaik Kubber, son of Subbolahat, of Bataggee Pergunnah, Boosoorgomedpore against Hussain Molungie and Soorut Cawn of Jobcatty Pergunnah Boosoorgomedpore*.

Petition SMD : *Petition of Shaik Mannick of Doorgapore, Pergunnah Buzurgumedpur against Mahomed Ruffee Mirdah of Mahespore, Pergunnah Buzurgumedpur.*

Petition SPC : *Petition of Shaik Puunnawoollah of Chelta Bunnea, Shawzadpoor against Dunny Kurrummoollah and Mooraud, Molungies of Soonawootah, Pergunnah Syedpore.*

Petition SSM : *Petition of Shaik Saaduck by his Mother of Mihespore, Buzurgumedpur against Mahatabdy Molungie of Colladda, Selimabad.*

References

Manuscript Sources

British Library London

European Manuscripts: EUR MSS D 154

Indian Office Records:

Board's Collection:

IOR/F/4/19/767; IOR/F/4/511/12281; IOR/F/4/678/18826;
IOR/F/4/839/22459; IOR/F/4/925/25921; IOR/F/4/953;
IOR/F/4/1282; IOR/F/4/1357/54159; IOR/F/4/1552/6225;
IOR/F/4/1564

Provincial Council of Revenue at Burdwan Proceedings:

IOR/G/6/1; IOR/G/6/2; IOR/G/6/3;
IOR/G/6/4; IOR/G/6/8; IOR/G/6/9;
IOR/G/6/10; IOR/G/6/11; IOR/G/6/12;
IOR/G/6/13; IOR/G/6/14

Provincial Revenue Council at Dacca Proceedings

IOR/G/15/11

Home Correspondences:

IOR/H/205; IOR/H/351; IOR/H/MISC/779

Bengal Revenue (Salt, Opium etc.) [Public, Separate] Proceedings:

IOR/P/99/41; IOR/P/99/45; IOR/P/99/47;
IOR/P/99/48; IOR/P/99/54; IOR/P/99/59;
IOR/P/100/1; IOR/P/100/3; IOR/P/100/5;
IOR/P/100/8; IOR/P/100/16; IOR/P/100/17;
IOR/P/100/27; IOR/Z/P/770

Bengal Board of Revenue (Miscellaneous) [Salt] Proceedings:

IOR/P/105/47; IOR/P/105/49; IOR/P/105/50;
IOR/P/105/51; IOR/P/105/52; IOR/P/105/53;
IOR/P/105/60; IOR/P/105/61; IOR/P/105/62;
IOR/P/106/1; IOR/P/106/2; IOR/P/106/3

Bengal Revenue Proceedings

IOR/P/51/16; IOR/P/51/19; IOR/P/51/20;
IOR/P/51/24; IOR/P/51/25; IOR/P/51/26;
IOR/P/51/33

Calcutta Committee of Revenue Proceedings

IOR/P/68/6; IOR/P/68/11; IOR/P/68/26

Institution of Civil Engineers London Library Archives

Original Communications O.C /129: *Account of the Manufacture of Salt in Bengal by Mr. Kyd of Calcutta with an Appendix by Josiah Parkes*.

Printed Sources

'Bengal Mofussil Records', *Bengal Past & Present*, Vol. 5 (1915)

'The Letters of Mr. Richard Barwell-IX', *Bengal Past & Present*, Vol. 12 (Jan.-Jun., 1916), pp. 230-235.

A bill [as amended on the report] for effecting an arrangement with the India Company, and for the better government of His Majesty's Indian territories (London: The House of Commons, 1833)

Achison, Graeme G., Charles R. Hickson, John D. Turner and Qing Ye, 'Rule Briatannia! British Stock Market Returns, 1825-1870', *Journal of Economic History*, Vol. 69, No. 4 (Dec., 2009), pp. 1107-1137.

Adas, Michael, *Technology and European Overseas Enterprise: Diffusion, Adaption and Adoption* (Aldershot: Variorum, 1996)

Adshead, Samuel A. M., *Salt and Civilization* (Hampshire; London: Macmillan, 1992)

Aggarwal, Shugan Chand, *The Salt Industry in India*, 2e (Delhi: Manager of Publications, 1956)

Ågren, Maria (ed.) *Iron-making Societies: Early Industrial Development in Sweden and Russia, 1600-1900* (Providence; Oxford: Berghahn Books, 1998)

Alwyn, D. C., *A Pamphlet on the Salt Trade in India* (London: Maddon & Malcom, 1846)

Ameringer, Carl F., *The Health Care Revolution: From Medical Monopoly to Market Competition* (Berkeley; London: University of California Press, 2008)

Anand, Chuni Lal, *Constitutional Law and History of Government of India etc.* (Allahabad: University Book Agency, 1990)

Andrew, W. P., *Tramroads in Northern India, In Connection with the Iron Mines of Gurhwal* (London: Effingham Wilson, 1857)

Anonymous, *Indian Monopolies &c. &c.* (1820)

Anstis, Ralph, *Man of Iron – Man of Steel: Lives of David and Robert Mushet* (Coleford: Albion House, 1997)

Arbuthnot, A. J., 'Prinsep, Henry Thoby (1792-1878)', rev. R. J. Bingle, first published Sept 2004. http://dx.doi.org/10.1093/ref:odnb/22811.

Arias, Luz Marina, 'A Theory of the Origins of Coercive Enforcement by the State: Insights from Colonial Mexico'. Available at http://iis-db.stanford.edu/evnts/5091/paper.pdf, accessed on 11/06/2011.

Arnold, David (ed.), *Science, Technology and Medicine in Colonial India* (Cambridge: CUP, 2004)

Arnold, David, 'Salutation and Subversion: Gestural Politics in Nineteenth Century India', *Past & Present*, supplement 4 (2009), pp. 191-211.

Ascoli, F. D., *Early Revenue History of Bengal and the Fifth Report, 1812* (Oxford: Clarendon Press, 1917)

Ashton, T. S., *Iron and Steel in the Industrial Revolution*, 3e (Aldershot: Gregg Revivals, 1963)

Ashworth, William J., *Customs and Excise: Trade, Production and Consumption in England, 1640-1845* (Oxford: OUP, 2003)

Baden-Powell, B. H., *The Land Systems of British India: Being a Manual of the Land-Tenures and of the Systems of Land-Revenue Administration Prevalent in the Several Provinces*, 3 vols. (Oxford: Clarendon, 1892)

Baden-Powell, B. H., 'The Origin of Zemindari Estates in Bengal", *Quarterly Journal of Economics*, Vol. 11, No. 1 (1896), pp. 36-69.

Bagchi, Amiya Kumar, 'Deindustrialization in Gangetic Bihar 1809-1901', in B. De et al., *Essays in Honour of Prof. S. C. Sarkar* (New Delhi: People's Publishing House, 1976), pp. 499-522.

Bagchi, Amiya Kumar, 'Deindustrialization in India in the Nineteenth Century: Some Theoretical Implications', *Journal of Development Studies*, Vol. 12 (1976), pp. 135-164.

Balfour, Edward, *On the Iron Ores; the Manufacture of Iron and Steel and the Coals of the Madras Presidency* (Madras: Fort St. George Gazette Press; Military Male Orphan Asylum Press, 1855)

Ball, V., *Jungle Life in India: or the Journeys and Journals of an Indian Geologist* (London: Thos. De La Rue, 1880)

Ball, V., *A Manual of the Geology of India, Part III: Economic Geology* (Calcutta: Government of India, 1881)

Ballantyne, Tony, 'Archive, Discipline, State: Power and Knowledge in South Asian Historiography', *New Zealand Journal of Asian Studies*, Vol. 3, No. 1 (Jun., 2001), pp. 87-105.

Banarjee, Tarashankar, *Internal Market in India, 1834-1900* (Calcutta: Academic Publishers, 1966)

Bansal, Usha Rani and B. R. Bansal, 'Industries in India during 18th and 19th Century', *Indian Journal of History of Science,* Vol. 19, No. 3 (1984), pp. 215-223.

Barui, Balai, *The Salt Industry of Bengal 1757-1800: A Study in the Interaction of British Monopoly Control and Indigenous Enterprise* (Calcutta: K. P. Bagchi & Co., 1985)

Barui, Balaichandra, 'Resistance of the Bengal Zemindars to the East India Company's Salt Monopoly', *Calcutta History Journal*, Vol. 2, No. 2 (Jan.-Jun., 1978), pp. 136-170.

Barui, Balaichandra, *Smuggling: Rural Resistance in Bengal Presidency, 1757-1833* (Kolkata: Sujit Prakashan, 2001)

Bastable, C. F., 'Taxation through Monopoly', *The Economic Journal*, Vol. 1, No. 2 (Jun., 1891), pp. 307-325.

Baumann, Desiree Marie, *The English East India Company in British Colonial History, 1599-1833: Trading Company-Territorial Power* (Essen: Die Blau Eule, 2007)

Bayly, C. A., *Indigenous and Colonial Origins of Comparative Economic Development: the Case of Colonial India and Africa*, Policy Research Working Paper 4474 (Washington D. C.: The World Bank, 2008)

Beadon, Cecil, 'A Review Article on A Pamphlet on the Salt trade of India by D. C. Aylwin (London, 1846)', *Calcutta Review*, Vol. 7 (1847), pp. 524-570.

Becher, Charles, *Memorial to the Honourable Court of Directors for the Affairs of the East India Company* (1826)

Berg, Maxine and Kristine Bruland (eds.) *Technological Revolutions in Europe: Historical Perspectives* (Cheltenham: Edward Elgar, 1998)

Beveridge, H., *The District of Bákergunj: Its History and Statistics* (London, Trübner & Co., 1876)

Bhagwati, Jagdish and Bent Hansen, *A Theoretical Analysis of Smuggling*, Working Paper of the Department of Economics, Massachusetts Institute of Technology, No. 75 (Jun., 1971)

Bhardwaj, H. C., 'Development of Iron and Steel Technology in India during 18th and 19th Centuries', *Indian Journal of History of Science*, Vol. 17, No. 2 (1982), pp. 223-233.

Bhargava, Meena, 'Visibility through Resistance: The Malangis and Salt Making in Eighteenth Century Bengal', *Indian Historical Review*, Vol. 33, No. 1 (Jan., 2006), pp. 24-43.

Bhattacharya, Sabyasachi, 'Cultural and Social Constraints on Technological Innovation and Economic Development: Some Case Studies', *Indian Economic and Social History Review*, Vol. 3, No. 3 (Sept., 1966), pp. 240-267.

Bhattacharya, Sabyasachi, 'Iron smelters and the Indian Iron and Steel Industry of India: From Stagnation to Atrophy', *Journal of the Indian Anthropological Institute*, Vol. 5, No. 1-2 (1970), pp. 133-151.

Birch, Alan, *The Economic History of the British Iron and Steel Industry, 1784-1879* (Oxon: Routledge, 2006 [1967])

Bird-David, N., 'The Nilgiri Tribal Systems: A View from Below', *Modern Asian Studies*, Vol. 28, No. 2 (1994), pp. 339-355.

Birla, Ritu, *Stages of Capital: Law, Culture and Market Governance in Late Colonial India* (Durham; London: Duke University Press, 2009)

Biswas, Anirban, *Money and Markets from Pre-colonial to Colonial India* (Delhi: Aakar Books, 2007)

Biswas, Arun Kumar, 'Iron and Steel in Pre-Modern India – A Critical Review', *Indian Journal of History of Science*, Vol. 29, No. 4 (1994), pp. 579-610.

Blochmann, H. F., *Contributions to the Geography and History of Bengal* (Calcutta: The Asiatic Society, 1968 [1873-1875]), pp. 16-17.

Blues, Gregory, Martin P. Bunton and Ralph C. Croizier (eds.) *Colonialism and the Modern World: Selected Essays* (New York; London: M. E. Sharpe, 2002)

Bolts, William, *Considerations on Indian Affairs* (London: 1772)

Bose, Sugata, *Peasant Labour and Colonial Capital: Rural Bengal since 1770* (Cambridge: CUP, 1993)

Bowen, H. V., *Revenue and Reform: The Indian Problem in British Politics, 1757-1773* (Cambridge: CUP, 1991)

Bowen, H. V., *The Business of Empire: the East India Company and Imperial Britain, 1756-1833* (Cambridge: CUP, 2006)

British Indian Association, *Petition of the British Indian Association Regarding the Laws Enacted to Prevent Infractions of the Monopoly of Salt* (Calcutta: 1853)

Broadberry, Stephen and Bishnupriya Gupta, 'Lancashire, India, Shifting Competitive Advantage in Cotton Textiles, 1700-1850: the Neglected Role of Factor Price', *Economic History Review*, Vol. 62, No. 2 (May, 2009), pp. 279-305.

Brown, Richard, *Society and Economy in Modern Britain 1700-1850* (London: Routledge, 1991)

Brown, T. J., T. Bide, A. S. Walters, N. E. Idoine, R. A. Shaw, S. D. Hannis, P. A. J. Lusty, and R. Kendall, *World Mineral Production 2005-2009* (Nottingham: British Geological Survey, 2011)

Buchanan, Francis, *A Journey from Madras through the Countries of Mysore, Canara and Malabar*, 3 Vols. (London: T. Cadell and W. Davies; Black, Parry and Kingsbury, 1807)

Buchanan, Francis, *An Account of the District of Purnea in 1809-1810* (Patna: Bihar and Orissa Research Society, 1928)

Buchanan, Geoffrey and James Buchanan, *The Reason of Rules* (Cambridge: CUP, 1985)

Cain, P. J. and A. G. Hopkins, 'Gentlemanly Capitalism and British Expansion Overseas I: The Old Colonial System, 1688-1850', *Economic History Review, New Series*, Vol. 39, No. 4 (1986), pp. 501-525.

Calvert, *Salt in Cheshire* (London: E. & F. N. Spon. Ltd., 1915)

Cardwell, Donald, 'Ure, Andrew (1778-1857)', *ODBN* (OUP, 2004). Available at http://www.oxforddnb.com/view/article/3258, accessed on 28/08/2010.

Chakrabarty, Ranjan, *Authority and Violence in Colonial Bengal, 1800-1860* (Calcutta: Bookland, 1997)

Chakraborty, Ratan Lal and Haruo Noma (compilers) *Select Records on Agriculture and Economy of Comilla District, 1782-1867* (Dhaka: JICA, 1989)

Chapman, John, *Remarks on Mr. Alwyn's Letter* (1847)

Chaudhari, B. B., ''The Myth of the Tribe'? The Question Reconsidered', *Calcutta History Journal*, Vol. 16, No. 1 (1994), pp. 125-156.

Chaudhury, Sushil, 'Merchants, Companies and Rulers: Bengal in the Eighteenth Century', *Journal of Economic and Social History of the Orient*, Vol. 31 (1988), pp. 74-109.

Chaudhury, Sushil, 'Familial and Cultural Networks of Entrepreneurs in India during the Middle Years of the 18th Century' in Clara Eugenia Nunez (ed.) *Entrepreneurial Networks and Business Culture* (Sevilla, University de Sevilla, 1998), pp. 93-104.

Choudhary, Sadanand, *Economic History of Colonialism: A Study of British Salt Policy in Orissa* (Delhi: Inter-India Publications, 1979)

Cipolla, Carlo M., *Guns, Sails, and Empires: Technological Innovation and Early Phases of European Expansion, 1400-1700* (New York: Pantheon Books, 1966)

Clingingsmith, D. and Jeffery G. Williamson, 'India's Deindustrialization in the 18th and 19th Centuries', *NBER Working Paper 10586* (Cambridge, Mass.: National Bureau of Economic Research, 2004)

Coates, Ken S., *A Global History of Indigenous Peoples: Struggle and Survival* (Hampshire: Palgrave Macmillan, 2004)

Cohn, B. S., *Colonialism and Its Forms of Knowledge: the British in India* (Princeton: Princeton University Press, 1996)

Cohn, Bernard, 'Note on the History of the Study of Indian Society and Culture', in Milton Singer and Bernard S. Cohn (eds.) *Structure and Change in Indian Society* (Chicago: Aldine Pub. Co., 1968), pp. 3-28.

Crawfurd, J., 'On the Supposed Aborigines of India as Distinguished from its Civilized Inhabitants', *Transactions of the Ethnological Society of London*, Vol. 6 (1868), pp. 59-71.

Crosseley, Pamela K., Helen F. Siu and Donald S. Sutton, *Empire at the Margins: Culture, Ethnicity and Frontier in Early Modern China* (Berkeley, Calif.; London: University of California Press, 2006)

Dalton, E. T., 'The 'Kols' of Chota-Nagpore', *Transactions of the Ethnological Society of London*, Vol. 6 (1868), pp. 1-41.

Das, Binod, *Changing Profile of the Frontier Bengal* (Delhi: Mittal, 1984)

Datta, K. K., *The Santal Insurrection of 1855-57*, (Calcutta: University of Calcutta, 1940)

Datta, Rajat, 'From Medieval to Colonial: Markets, Territoriality and the Transition in Eighteenth Century Bengal', *Medieval History Journal*, Vol. 2, No. 1 (1999), pp. 143-167.

Davini, Roberto, 'Bengali Raw Silk, the East India Company and the European Global Market, 1770-1833', *Journal of Global History*, Vol. 4 (2009), pp. 57-70.

de Barros, Philip, *The Bassar: Large-scale Iron Producers of the West African Savanna*, PhD Thesis, University of California at Los Angeles (1985)

de Jesús, Edilberto C., *The Tobacco Monopoly in the Philippines, 1782-1882*, PhD Thesis, Yale University (1997)

De, B. (ed.) *Essays in Honour of Prof. S. C. Sarkar* (New Delhi: People's Publishing House, 1976)

Dean-Smith, Susan, *Bureaucrats, Planters and Workers: The Making of Tobacco Monopoly in Bourbon Mexico* (Austin: University of Texas Press, 1992)

Deshpande, Anirudh, 'An Historical Overview of Opium Cultivation and Changing State Attitudes Towards the Crop in India, 1878-2000', *Studies in History*, Vol. 25, No. 1 (2009), pp. 109-143.

Desika Char, S. V., *Centralised Legislation: A History of the Legislative System of British India from 1834 to 1861* (London: Asia Publishing House, 1963)

Dharampal, *Indian Science and Technology in the Eighteenth Century* (Goa: Other India Press, 2000)

Diamond, Jared M., *Guns, Germs and Steel: The Fates of Human Societies* (London: Jonathan Cape, 1997)

Dodwell, H. H., *The Cambridge History of the British Empire, Volume 4: British India 1497-1858* (Cambridge: University Press, 1929)

Dravid, S. K., *Development of Salt Industry in India* (Jaipur: Upma Prakashan, 1972)

Dutt, R. C., *The Economic History of India under Early British Rule, from the Rise of the British Power in 1757 to the Accession of Queen Victoria in 1837* (London: K. Paul, Trübner & Co. Ltd., 1908)

Dutt, Romesh, *Economic History of India under Early British Rule*, Vol. 2 (London: Kegan Paul, Trench and Trübner, 1902)

East India Charter. Papers Respecting the East India Company's Charter (London: The House of Commons, 1833)

East India. Correspondence relating to the Revision of Assessment in South Arcot; Meriah Agency in Ganjam and Orissa; Moturpha, &c., Taxes at Madras; Administration of the Hyderabad Assigned Districts; and the Public Works Department (London: House of Commons, 1857)

Ellis, Steven G. and Raingard Esser (eds.) *Frontiers and the Writing of History, 1500-1800* (Hannover-Laatzen: Wehrhahn, 2006)

Ellis, Steven G., Esser, Raingard, Berdah, Jean-Francois and Milos Reznik G. (eds.) *Frontiers, Regions and Identities in Europe* (Pisa: Plus-Pisa University Press, 2009)

Elwin, Verrier, *The Agaria* (London: OUP, 1942)

Evans, Chris and Gören Rydén (eds.) *The Industrial Revolution in Iron: The Impact of British Coal Technology in Nineteenth-Century Europe* (Aldershot: Ashgate, 2005)

Farooqui, Amar, *Smuggling as Subversion: Colonialism, Indian Merchants, and the Politics of Opium* (New Delhi: New Age International, 2005 [1998])

Farrar, W. V., 'Andrew Ure, F. R. S., and the Philosophy of Manufactures', *Notes and Records of the Royal Society of London*, Vol. 27, No. 2 (Feb., 1973), pp. 299-324.

Farrington, Anthony, *Trading Places: the East India Company and Asia, 1600-1834* (London: British Library, 2002)

Fourth Report from the Committee of Secrecy Appointed to Enquire into the State of the East India Company (London: House of Commons, 1773)

Frederick, Henry, *The Intrigues of a Nabob (R. Barwell): Or, Bengal the Fittest Soil for the Growth of Lust, Injustice and Dishonesty etc.* (London: Author, 1780)

Geijerstam, Jan af, *Landscape of Technology Transfer: Swedish Ironmakers in India, 1860-1864* (Trita Hot: Stockholm Papers in the History and Philosophy of Technology, 2004)

Ghosal, Akshoy K., *Civil Service in India under the East India Company: A Study in Administrative Development* (Calcutta: University of Calcutta, 1944)

Ghose, Bhaskar and Sanat Kumar Bose (eds.) *Midnapore Correspondence of the Salt Districts. Hidgellee Salt Division: Letters Received* (Calcutta: Superintendent Government Printing, 1971)

Gill, Graeme, *The Nature and Development of the Modern State* (Hampshire: Palgrave Macmillan, 2003)

Goody, Jack, *The East in the West* (Cambridge: CUP, 1996)

Grant, Charles, *Letters of Charles Grant, Addressed to the Chairman and Deputy Chairman of the East India Company, Conveying Considerations by Which Were Recommended Proposals Contained in a Memorandum, or Paper of Hints, Dated 17th November 1832, on the Subject of the Trade and Government of the Company* (London: J. L. Cox, 1833)

Grant, Charles, *Papers Respecting the East India Company's Charter* (London: The House of Commons, 1833)

Grout, Andrew, *Geology and India: 1770-1851. A Study in the Methods and Motivations of a Colonial Science*, PhD Thesis, School of Oriental and African Studies, University of London (1995)

Guha, Ranajit, *A Rule of Property for Bengal: An Essay on the Idea of Permanent Settlement* (Paris: Mouton, 1963)

Guha, Ranajit, *Elementary Aspects of Peasant Insurgency in Colonial India*, 2e (Durham; London: Duke University Press, 1999)

Gupta, Rai Bahadur M. N., *Analytic Survey of Bengal Regulations and Acts of Parliament Relating to India up to 1833* (Calcutta: University of Calcutta, 1943)

Gupta, Ranjan, *The Economic Life of a Bengal District Birbhum 1770-1857* (Burdwan: University of Burdwan, 1984)

Habib, Irfan, *Essays in Indian History: towards a Marxist Perception* (New Delhi: Tulika, 1995)

Hamilton, H. C., *Notes on the Manufacture of Salt in Tumlook Agency* (Calcutta: Calcutta Gazette Office, 1853)

Hann, C. M., 'Introduction: The Embeddedness of Property' in C. M. Hann (ed.) *Property Relations: Renewing Anthropological Traditions* (Cambridge: CUP, 1998), pp. 1-47.

Hardiman, David, *Peasant Resistance in India, 1858-1914* (Delhi: OUP, 1992)

Harnetty, P., ''Deindustrialization' Revisited: The Handloom Weavers of the Central Provinces of India c. 1800-1947', *Modern Asian Studies*, Vol. 25, No. 3 (1991), pp. 455-510.

Hayman, Richard, *The Shropshire Wrought-Iron Industry c 1600-1900: A Study of Technological Change*, PhD Thesis, University of Birmingham (2003)

Hayman, Richard, 'Charcoal Making in Nineteenth Century Shropshire', *Economic History Review*, Vol. 60, No. 1 (2008), pp. 80-98.

Headrick, Daniel R., *The Tools of Empire: Technology and European Imperialism in Nineteenth Century* (Oxford and New York: OUP, 1981)

Headrick, Daniel R., *The Tentacles of Progress: Technology Transfer in the Age of Imperialism, 1850-1940* (New York; Oxford: OUP, 1988)

Heath, J. M., 'On Indian Iron and Steel', *Journal of the Royal Asiatic Society of Great Britain and Ireland*, Vol.5 (1839), pp. 390-397.

Heath, J. M., 'On the Cotton Cultivation in India', *Journal of the Royal Asiatic Society of Great Britain and Ireland*, Vol. 5 (1839), pp. 372-378.

Heath, J. M., 'On the Introduction of the American Plough in India', *Journal of the Royal Asiatic Society of Great Britain and Ireland*, Vol. 7 (1843), pp. 92-97.

Heatly, S. G. T., 'Contributions towards a History of the Development of the Mineral Resources of India', *Journal of the Asiatic Society of Bengal*, Vol. 11, Part 2 (1842), pp. 813-838.

Heatly, S. G. T., 'Contributions towards a History of the Development of the Resources of India, Memoranda 2: The Working of Iron in Bengal', *Journal of the Asiatic Society of Bengal*, Vol. 12, Part 2 (1843), pp. 542-563.

Henderson, T. F., 'Farquhar, John (1751-1826)' rev. H. V. Bowen in *ODNB* (Oxford: OUP, 2004). Also available at http://dx.doi.org/10.1093/ref:odnb/9179.

Hendriks, Frederick, 'On the Statistics of Indian Revenue and Taxation', *Journal of the Statistical Society of London*, Vol. 21, No. 3 (Sep., 1858), pp. 223-296.

Heyne, Benjamin, *Tracts, Historical and Statistical, of India with Journals of Several Tours through Various Parts of the Peninsula; also an Account of Sumatra in a Series of Letters* (London: Robert Bladwin; Black, Parry, and Co. Booksellers, 1814)

Hodgson, Geoffrey M., 'Malthus, Thomas Robert (1766-1834)' in Donald Rutherford (ed.) *Biographical Dictionary of British Economists* (Bristol: Thoemmes Continuum, 2004)

Holland, Thomas, 'Preliminary Report on the Iron Ores and Iron Industries of the Salem District', *Records of the Geological Society of India*, Vol. XXV, Pt. 3 (1892), pp. 139-152.

Howe, Henry Marion, *The Metallurgy of Steel* (New York, The Scientific Publishing Company, 1890)

Hunter, W. W., *Bengal MS. Records: A Selected List of 14,136 Letters in the Board of Revenue Calcutta, 1782-1807: With an Historical Dissertation & Analytical Index*, 4 Vols. (London: W. H. Allen & Co., 1894)

Hunter, W. W., *The Annals of Rural Bengal* (London: Smith, Elder & Co., 1897)

Hyde, Charles K., *Technological Change and the British Iron Industry 1700-1870* (Princeton, N. .: Princeton University Press, 1977)

Inkster, Ian, 'Prometheus Bound: Technology and Industrialization in Japan, China and India prior to 1914-A Political Economy Approach', *Annals of Science*, Vol. 45 (1988), pp.399-426.

Inkster, Ian, 'Colonial and Neo-colonial Transfers of Technology: Perspectives on India before 1914' in Roy MacLeod and Deepak Kumar (eds.) *Technology and Raj: Western Technology and Technical Transfers to India, 1700-1917* (New Delhi: OUP, 1995), pp. 25-50.

Inkster, Ian, *Technology and Industrialisation: Historical Case Studies and International Perspectives* (Aldershot, UK; Brookfield, VT: Ashgate, 1998)

Jack, J. C., *Bengal District Gazetteer: Bakarganj* (Calcutta: Bengal Secretariat Book Depot, 1918)

Jackson, W., 'Memorandum on the Iron Works of Beerbhoom', *Journal of the Asiatic Society of Bengal*, Vol. 16, Part 2 (1845), pp. 754-756.

Jaggi, O. P., *Technology in Modern India*, *History of Science, Technology and Medicine in India: Vol. 10* (Delhi & Lucknow: Atma Ram & Sons, 1984)

James, Frank A. J. L., 'Brande, William Thomas (1788–1866)', *ODBN* (OUP, 2004). Also, available at http://www.oxforddnb.com/view/article/3258, accessed 28/08/2010.

Jenkins, Terence Andrew, *The Liberal Ascendancy, 1830-1886* (Basingstoke: Macmillan, 1994)

Jeyaraj, K. V. *A History of Salt Monopoly in the Madras Presidency, 1805-1878* (Madurai: Ennes Publications, 1984)

Jha, J. C., *The Kol Insurrection of Chota-Nagpur* (Calcutta: Thacker, Spink and Co., 1964)

Jha, J. C., *The Bhumij Revolt, 1853- 33: Ganga Narain's Hangama or Turmoil* (Delhi: Munshiram Manoharlal, 1967)

Kaletsky, Anatole, 'Goodbye, homo economicus', *Real-World Economics Review*, Issue 58 (8 September 2009), pp. 151-156.

Kalpagam, U., 'Colonial Governmentality and the 'Economy'', *Economy and Society*, Vol. 29, No. 3 (Aug., 2000), pp. 418-438.

Kaye, John William, *The Administration of the East India Company: A History of Indian Progress* (London: Richard Bentley, 1853)

Keir, Archibald, *Thoughts on the Affairs of Bengal* (London: 1772)

Kent, Eliza F. and M. P. Ramanujam, 'Fierce Gods and Dense Forest: Sacred Groves in Coramandel', *Indian Folklife*, No. 26 (2007), p. 15.

Khan, Seid Gholam Hossein, *The Seir Mutaqherin; or Review of Modern News: Being An History of India* (Calcutta: 1784)

Kharewal, Jeewan S. & Shruti (eds.) *History of Science and Technology: a New Perspective* (Princeton: Infinity Foundation, n.d.)

Klimberg, Alexander, 'Some Research Notes on Carl A. Trocki's Publication "Opium, Empire and Global Political Economy"', *Bulletin of the School of Oriental and African Studies*, Vol. 64, No. 2 (2001), pp. 260-267.

Kling, Blair B., 'The Origin of the Managing Agency System in India', *Journal of Asian Studies*, Vol. 26, No. 1 (Nov., 1966)

Kling, Blair B., *Partner in Empire: Dwarkanath Tagore and the Age of Enterprise in Eastern India* (Berkeley: University of California Press, 1976)

Knight, Roger, 'Sugar, Technology, and Colonial Encounters: Refashioning the Industry in the Netherlands Indies, 1800-1942', *Historical Sociology*, Vol. 12, Issue 3 (1999), pp. 218-250.

Krisgaard, Christine M., *The Sources of Normativity* (Cambridge: CUP, 1996)

Kumagai, Yukihisa, *The Lobbying Activities of Provincial Mercantile and Manufacturing Interests against the Renewal of the East India Company's Charter, 1812-1813 and 1829-1833*, PhD Thesis, University of Glasgow (2008)

Kumar, Dharma (ed.) *The Cambridge Economic History of India, 2: c.1757-c.1970* (Cambridge: CUP, 1983)

Kumar, Prakash, *Facing Competition: The History of Indigo Experiments in Colonial India, 1897-1920*, PhD Thesis, Georgia Institute of Technology (2004)

Kumar, Raj (ed.) *Military System of East India Company* (New Delhi: Commonwealth, 2004)

Lahiri Chaudhary, Deep Kanta, *Telegraphic Imperialism* (Basingstoke: Palgrave Macmillan, 2010)

Lebeau, Christine, 'Regional Exchanges and Patterns of Taxation in Eighteenth Century Europe: the Case of Italian Cadastres' in Holger Nehring and Florian Schui (eds.) *Global Debates about Taxation* (Basingstoke: Palgrave Macmillan, 2007), pp. 21-35.

Lichtenstein, Peter M., 'Some Theoretical Coordinates of Radical Liberalism', *American Journal of Economics and Sociology*, Vol. 84, No. 3 (Jul., 1984), pp. 333-339.

Long, Rev. J., *Unpublished Records of the Government*, 2e (Calcutta: Firma K. L. Mukhopadhyay, 1973 [1869])

Lord, Eleanor Louisa, *Industrial Experiments in the British Colonies of North America* (New York: Burt Franklyn, 1898)

Losty, J. P., 'Prinsep, James (1799-1840)', first published Sept. 2004. http://dx.doi.org/10.1093/ref:odnb/22812.

Machan, Tobor R., 'Social Contract as a Basis of Norms: A Critique', *Journal of Libertarian Studies*, Vol. 7, No. 1 (Spring, 1983), pp. 141-145.

Macleod, Roy and D. Kumar (eds.) *Technology and Raj: Western Technology and Technical Transfers to India: 1700-1945* (Thousand Oaks: Sage Publications, 1995)

Malik, Salahuddin, *1857: War of Independence or Clash of Civilizations? British Public Reactions* (Karachi: OUP, 2008)

Mallick, Binoy Shankar, 'English Trade and Indigenous Finance in Bengal and Gujarat in the Seventeenth Century: A Study of Dadni System and the Rate of Interest', *Studies in History*, Vol. 2, No. 1, New Series (1986), pp. 31-45.

Markovits, Claude, 'The Political Economy of Opium Smuggling in Early Nineteenth Century India', *Modern Asian Studies*, Vol. 43, No. 1 (2009), pp. 89-111.

Marshall, P. J. (ed.) *The Oxford History of the British Empire: Volume II: The Eighteenth Century* (Oxford; New York: OUP, 1998)

Marshall, P. J., 'Debate: Early British Imperialism in India', *Past & Present*, No. 106 (Feb., 1985), pp. 164-169.

Martin, R. Montgomery, *The History, Antiquities, Topographies and Statistics of Eastern India; Comprising the Districts of Behar, Shahabad, Bhagulpoor, Goruckpoor, Dinajepoor, Puraniya, Rungpoor and Assam etc. etc. collated from the Original Documents at the E. I. House with the Permission of the Honourable Court of Directors*, 3 Vols. (London: Wm. H. Allen and Co., 1838)

Mauss, Marcel, *The Gift: The Form and the Reason for Exchange in Archaic Societies* (London: Routledge, 2006 [1924])

Maylor, Willliam, 'The Manufacture of Iron and Steel in Southern India', *Minutes of the Proceedings of the Institution of Civil Engineers*, Vol. 126 (1896), pp. 383-386.

McCreery, David, *Frontier Goiás, 1822- 1889* (Stanford: Stanford University Press, 2006)

Meek, C. K., *Land Law and Custom in the Colonies* (London; New York: OUP, 1949)

Meelis, Kitsing, 'Political Economy and Technology: A Comparative Study of Internet Diffusion in Transition Economies', *Paper presented at the annual meeting of the American Political Science Association, Marriott, Loews Philadelphia, and the Pennsylvania Convention Centre, Philadelphia, PA*, Aug 31, 2006.

Metcalf, Barbara D. and Thomas R. Metcalf, *A Concise History of India*, 2e (Cambridge: CUP, 2006)

Mill, John Stuart, 'On the Definition of Political Economy, and on the Method of Investigation Proper to It', *London and Westminster Review* (October 1836). Collected in *Essays on Some Unsettled Questions of Political Economy*, 2nd ed. (London: Longmans, Green, Reader & Dyer, 1874)

Mishra, Satya Narayan, *Salt Industry in India* (New Delhi: Mohit, 2005)

Misra, B. B., *The Central Administration of the East India Company* (Manchester: Manchester University Press, 1959)

Misra, B. B., *The Judicial Administration of the East India Company in Bengal, 1765-1782* (Delhi: Motilal Banarsidass, 1961)

Misra, B. B., *The Administrative History of India, 1834-1947: General Administration* (London: OUP, 1977)

Mitra, Asoka (ed.) *West Bengal District Records New Series. Birbhum 1786-97 & 1855* (Calcutta: 1954)

Mittra, Sangha and S. R. Bakshi, *Administration of East India Company, 1740-1856* (New Delhi: Commonwealth, 2003)

Montgomery, Sy, *Spell of the Tiger* (White River Junction, Vt.: Chelsea Green Pub., 2008)

Moon, Suzanne, 'Place, Voice, Interdisciplinarity: Understanding Technology in the Colony and Postcolony', *History and Technology*, Vol. 26, No. 3 (2010), pp. 189-201.

Morris, Morris D., 'The Growth of Large Scale Industry to 1947' in Dharma Kumar (ed.) *The Cambridge Economic History of India, 2: c.1757-c.1970* (Cambridge: CUP, 1983), pp. 583-589.

Morris, Morris D., 'Towards a Reinterpretation of Nineteenth Century Indian Economic History', *Journal of Economic History*, Vol. 23, No. 4 (Dec., 1963), pp. 606-618.

Moxham, Roy, 'Salt Starvation in British India-Consequences of High Salt Taxation in the Bengal Presidency, 1765 to 1878', *Economic and Political Weekly*, Vol. 36, No. 25 (Jun., 2001), pp. 23-29.

Moxham, Roy, *Great Hedge of India: The Search for the Living Barrier that Divided a People* (London: Constable, 2001)

Mui, Hoh-Cheung and Loma H. Mui, *The Management of Monopoly: A Study of the East India Company's Conduct of its Tea Trade, 1784-1833* (Vancouver: University of British Colombia Press, 1984)

Mukherjee, Rudrangshu, 'Trade and Empire in Awadh, 1765-1804', *Past & Present*, No. 94 (Feb., 1982), pp. 85-102.

Mukherjee, Rudransghu, 'A Rejoinder', *Past & Present*, No. 106 (Feb., 1985), pp. 169-173.

Mushet, David, *Experiments on Wootz*, *Philosophical Transactions of the Royal Society of London*, Vol. 95 (1805), pp. 163-175.

Mushet, David, *Papers on Iron and Steel: Practical and Experimental* (London: John Weale, 1840)

Muslim, Imam, *Shahi Muslim* (Tr.) Abdul Hamid Siddiqui, 4 Vols. (Lahore: Muhammad Ashraf, 1972-1975)

Nag, J. K., 'History of Bengal's Salt Industry', *Modern Review* (Sept., 1939), pp. 300-303.

Neale, W. C., *Change in Rural India: Land Tenure and Reform in Uttar Pradesh, 1800-1955* (New Haven: Yale University Press, 1962)

Nehring, Holger and Florian Schui (eds.) *Global Debates about Taxation* (Basingstoke: Palgrave Macmillan, 2007)

Ness, W., 'The Government Experiment in Iron Making in India', *Colliery Guardian*, Vol. 30 (1875), pp. 925-939.

Nimmuck, *A Letter to Sir James Weir Hogg, Bart., Chairman of the East India Direction on the Salt Monopoly of the East India Company* (1846)

Ninth Report from the Select Committee Appointed to Take into Consideration the State of the Administration of Justice in the provinces of Bengal, Bahar, and Orissa (London: House of Commons, 1783)

Norton, George, *Commentaries on the History, Constitution and Chartered Franchises of the City of London* (1829)

Norton, George, *Young Accountant's Guide* (1837)

Norton, G., *Rudimentals: Being a Series of Discourses…Addressed to the Natives of India* (Madras: J. B. Pharoah, 1841)

Nunez, Clara Eugenia (ed.) *Entrepreneurial Networks and Business Culture* (Sevilla, University de Sevilla, 1998)

O'Boyle, Edward J., 'Requiem for *Homo Economicus*', *Journal of Markets and Morality*, Vol. 10, No. 2 (Fall 2007), pp. 321-337.

O'Malley, L. S. S., *Bengal District Gazetteers, Khulna* (Calcutta: Superintendent Government Printing, 1908)

O'Malley, L. S. S., *Bengal District Gazetteers, Birbhum* (Calcutta: Bengal Secretariat Book Depot, 1910)

O'Malley, L. S. S., *West Bengal District Gazetteers, Santal Parganas* (Calcutta: Bengal Secretariat Book Depot, 1910)

O'Malley, L. S. S., *West Bengal District Gazetteers, Midnapore* (Calcutta: Bengal Secretariat Book Depot, 1911)

O'Malley, L. S. S., *Bengal District Gazetteers, 24-Parganas* (Calcutta: Bengal Secretariat Book Depot, 1914)

Oldham, C. E. A. W. (ed.) *Journal of Francis Buchanan Kept During the Survey of the District of Bhagalpur in 1810-1811* (Patna: Superintendent Government Printing, 1930).

Oldham, T., *Report of the Examination of the Districts in the Damoodah Valley and Beerbhoom, Producing Iron Ore* (Calcutta: Military Orphan Press, 1852)

Page, Melvyn Eugene (ed.) *Colonialism: An International, Social, Cultural, and Political Encyclopaedia* (Santa Barbara: ABC-CLIO, 2003)

Palit, C. and P. K. Bhattacharya, *Business History of India* (Delhi: Kalpaz Publications, 2006)

Pande, Girija and Jan af Geijerstam (eds.) *Tradition and Innovation in the History of Iron Making: An Indo-European Perspective* (Nainital: Pahar, 2003)

Pandey, Smita, *Visions of the Rebels During 1857: Aspects of Mobilisation, Organisation and Resistance* (New Delhi: Rupa, 2008)

Pargiter, Frederick E., *A Revenue History of the Sundarbans, from 1765 to 1870* (Calcutta: Bengal Secretariat Press, 1885)

Parthasarathi, P., *The Transition to a Colonial Economy: Weavers, Merchants and Kings in South India* (Cambridge: CUP, 2001)

Parthasarathi, P., 'Iron Smelting in the Indian Subcontinent', a paper presented in *XIV International Economic History Congress, Helsinki 2006, Session 38*. Also available on-line at http://www.helsinki.fi/iehc2006/papers1/Partha.pdf. Accessed on 30/06/2008.

Pati, Biswamoy (ed.) *The Great Rebellion of 1857 in India: Exploring Transgressions, Contests and Diversities* (London: Routledge, 2009)

Pavlov, V. I., *Historical Premises for India's Transition to Capitalism: Late 18th to Mid-19th Centuries* (Moscow: Nauka Publishing House, 1978)

Pearson, George, 'Experiments and Observations to investigate the Nature of a Kind of Steel, manufactured at Bombay, and there called Wootz: with Remarks on the Properties and Composition of the different States of Iron', *Philosophical Transactions of the Royal Society of London*, Vol. 85 (1795), pp. 322-346.

Pebrer, Pablo, *Taxation, Revenue, Expenditure, Power, Statistics, and Debt of the Whole of British Empire* (London: Baldwin and Cradock, 1833)

Phillips, C. H., *The East India Company, 1784-1833* (Manchester: Manchester University Press, 1940)

Pillai, P. P., 'Iron and Steel Production in India', *Economica*, No. 7 (Jan., 1923), pp. 55-66.

Polanyi, Karl, *The Great Transformation* (London: Beacon Press, 2001 [1942])

Porter, Andrew (ed.) *The Oxford History of the British Empire Volume III: The Nineteenth Century* (Oxford; New York: OUP, 1999)

Porto Novo Iron Company, &c. Return to an order of the Honourable the House of Commons, dated 12 April 1853;--for, copies of all despatches, minutes, and reports received from the Madras government, respecting the origin and transactions of the Porto Novo Iron Company, with the answers of the Court of Directors of the East India Company thereto; and of the correspondence between the Court of Directors, the Board of Control, and the East India Iron Company, relating to the same subject (London: House of Commons, 1853)

Prinsep, Charles C., *Records of Services of the Honourable East India Company's Civil Servants in the Madras Presidency from 1741 to 1858* (London: Trübner & Co., 1885)

Prinsep, G. A., *Remarks on the External Commerce and Exchanges of Bengal* (London: Kingsbury, Parbury, and Allen, 1823)

Prinsep, G. A., *An Account of Steam Vessels and of Proceedings Connected with Steam Navigation in British India* (Calcutta: Government Gazette Press, 1830)

Prinsep, G. A., *Sketch of the Proceedings and Present Position of the Saugar Island Society and its Lessees* (Calcutta: Printed Baptist Mission Press, 1831)

Prinsep, G. A., 'On the spontaneous heating of Brine', *Journal of the Asiatic Society of Bengal*, Vol. 7 (1838), pp. 1014-1017.

Prinsep, G. A., 'On a remarkable heat observed in masses of Brine kept for some time in large reservoirs', *Journal of the Asiatic Society of Bengal*, Vol. 7 (1838), pp. 207-211.

Rahman, A. and B. V. Subbarayappa, 'A Note on the Native Method of Bar Iron Production in South India (Salem Region)', *Indian Journal of History of Science*, Vol. 1, No. 2 (1967), pp. 158-161.

Raman, Bhavani, *Document and Raj: Scribes and Writing under Early Colonial Rule in Madras, 1771-1860*, PhD Thesis, University of Michigan (2007)

Ramsbotham, R. B., *Studies in the Land Revenue History of Bengal 1769-1787* (London: Humphrey Milford, 1926)

Rangan, Haripriya, 'Property vs. Control: The State and Forest Management in the Indian Himalaya', *Development and Change*, Vol. 28 (1997), pp. 71-94.

Ray, Indrajit, 'Imperial Policy and Decline of the Bengal Salt Industry under Colonial Rule: An Episode in the "De-Industrialization" Process', *Indian Economic and Social History Review*, Vol. 37, No. 2 (2001), pp. 181-205.

Ray, Rajat Kanta, 'Indian Society and the Establishment of British Supremacy, 1765-1818' in P. J. Marshall (ed.) *The Oxford History of the British Empire: Volume II: The Eighteenth Century* (Oxford; New York: OUP, 1998), pp. 508-529.

Raychaudhuri, Siddhartha, 'Colonialism, Indigenous Elites and the Transformation of the Cities in the Non-Western World: Ahmedabad (Western India) 1890-1947', *Modern Asian Studies*, Vol. 35, No. 3 (2001), pp. 677-726.

Report from the Select Committee on East India Produce; together with the Minutes of Evidence, an Appendix and Index (London: House of Commons, 1840)

Report from the Select Committee on Salt, British India; Together with the Minutes of Evidence, and Appendix (London: House of Commons, 1836)

Report of the Commissioner Appointed to Enquire into and Report upon the Manufacture and Sale of, and Tax upon Salt in British India (London: Houses of Parliament, 1856)

Richards, F. J., *Madras District Gazetteer Salem*, Volume 1, Part 1 (Madras: The Superintendent Government Press, 1918)

Rickets, H., *Report on the District of Singbhoom* (Calcutta: Bengal Military Orphan Press, 1854)

Riden, Philip, *A Gazetteer of Charcoal-fired Blast Furnaces in Great Britain in Use Since 1600* (Cardiff: the Author, 1987)

Risley, H. H., 'The Study of Ethnology in India', *Journal of the Anthropological Institute of Great Britain and Ireland*, Vol. 20 (1891), pp. 235-263.

Robb, Peter, 'Landed Property, Agrarian Categories, and the Agricultural Frontier: Some Reflections on Colonial India' in Gregory Blues, Martin P. Bunton and Ralph C. Croizier (eds.) *Colonialism and the Modern World: Selected Essays* (New York; London: M. E. Sharpe, 2002), pp. 71-99.

Roitman, Janet, *Fiscal Disobedience: An Anthropology of Economic Regulation in Central Africa* (Princeton, NJ: Princeton University Press, 2005)

Roy, S. C., 'The Birjhia Asur of the Ranchi District in Chota Nagpur', *Journal of the Bengal and Orissa Research Society*, Vol. 12 (1921), pp. 147-163.

Roy, Tirthankar, *Traditional Industry in the Economy of Colonial India* (Cambridge: CUP, 1999)

Roy, Tirthankar, 'Economic History and Modern India: Redefining the Link', *Journal of Economic Perpectives*, Vol. 16 (2002), pp. 109-130.

Roy, Tirthankar, *Rethinking Economic Change in India: Labour and Livelihood* (London: Routledge, 2005)

Roy, Tirthankar, 'Did Globalisation aid Industrial Development in Colonial India? A Study of Knowledge Transfer in the Iron Industry', *Indian Economic and Social History Review*, Vol. 46, No. 4 (2009), pp. 579-613.

Roy, Tirthankar, 'Indigo and Law in Colonial India', *Economic History Review*, Vol. 64, S1 (2011), pp. 60-75.

Royle, J. Forbes, 'Arts and Manufactures of India', *Lectures on the Results of the Exhibition Delivered before the Society of Arts, Manufactures, and Commerce* (London: David Bogue, 1852)

Rudner, David W., *Caste and Capitalism in Colonial India: The Nattukotai Chettiars* (Berkeley, Los Angeles, London: University of California Press, 1994)

Saha, K. V., *Economics of Rural Bengal* (Calcutta: Chuckervertty, Chatterjee & Co., 1930)

Sahai, Nandita Prasad, *Politics of Patronage and Protest: The State, Society, and Artisans in Early Modern Rajasthan* (New Delhi: OUP, 2006)

Sahlins, Marhsall, *Stone Age Economics* (London: Routledge, [1972]2003)

Salt Chamber of Commerce, *The Press versus the Salt Monopoly in the British India* (Northwich: 1846)

Sangwan, Satpal, *Science, Technology and Colonisation: An Indian Experience, 1757-1857* (Delhi: Anamika Prakashan, 1991)

Santra, Manas Kumar, *Land Revenue Administration in Bengal under Early British Rule: A Case Study of Birbhum District, 1765-1820* (Delhi: Sharada Publishing House, 1994)

Sanyal, H. R., 'The Indigenous Iron Industry of Birbhum', *Indian Economic and Social History Review*, Vol. 5, No. 1 (1968), pp. 101-108.

Sarkar, Smritikumar, 'From Autonomy to Subordination: A Study of the Changing Organization of Artisanal Production in Colonial Bengal: the Cases of the Kansaris and the Sankharis', *Calcutta History Journal*, Vol. 16, No. 2 (1994), pp. 105-152.

Sarkar, Smritikumar, 'The Changing Image of the Craftsman: Blacksmith in Colonial Jharkhand', *Calcutta History Journal*, Vol. 18, No. 2 (1996), pp. 67-85.

Sarkar, Smritikumar, 'Social Organization of Artisan Production in India: Changing Role of the Market, Technology, and Merchant-Creditor: 18th to 20th Centuries', in B. B. Chaudhari (ed.) *Economic History of Indian from Eighteenth to Twentieth Century* (New Delhi: PHISPC and CSC, 2005), pp. 107-354.

Sayako, Miki, *Merchants, Markets, and the Monopoly of the East India Company: The Salt Trade in Bengal under Colonial Control, c. 1760-1836*, PhD Thesis, School of Oriental and African Studies, University of London (2005)

Schendel, William (ed.) *Francis Buchanan in Southeast Bengal* (Dhaka: University Press Limited, 1992)

Scott, James C., *Weapons of the Weak: Everyday Forms of Peasant Resistance* (New Haven; London: Yale University Press, 1985)

Scott, James C., *Domination and Arts of Resistance: Hidden Transcripts* (New Haven: Yale University Press, 1992)

Sen, Suchibrata, *The Santhals of Jungle Mahals: An Agrarian History 1793-1861* (Calcutta: Ratna Prakashan, 1984)

Sen, Sudipta, *Conquest of Market Places: Exchange, Authority and Conflict in Early Colonial India*, PhD Thesis, University of Chicago (1994)

Serajuddin, A. M., *The Revenue Administration of the East India Company in Chittagong, 1761-1785* (Chittagong: University of Chittagong, 1971)

Serajuddin, A. M., 'The Condition of the Salt manufacturers of Bengal under the Rule of the East India Company', *Journal of the Asiatic Society of Bangladesh*, Vol. 18, No. 1 (Jun., 1973), pp. 55-71.

Serajuddin, A. M., 'The Salt Monopoly of the East India Company's Government in Bengal', *Journal of Economic and Social History of the Orient*, Vol. 21, No. 3 (Oct., 1978), pp. 304-322.

Shaha, Radhamadhab, 'Saltworkers of Nadia, 1785-1795', *Bengal Past & Present*, Vol. 83 (Jan.- Jun., 1964), pp. 25-31.

Shils, E., *Tradition* (London: Faber, 1981)

Siddiqi, Asiya (ed.) *Trade and Finance in Colonial India, 1750-1860* (New Delhi: OUP, 1995)

Sikka, Ram Prasad, *The Civil Service in India: Europeanisation and Indianisation Under the East India Company, 1765-1857* (New Delhi: Uppal, 1984)

Singer, Milton and Bernard S. Cohn (eds.) *Structure and Change in Indian Society* (Chicago: Aldine Pub. Co., 1968)

Singh, Abhay Kumar, *Modern World System and Indian Proto-Industrialization: Bengal 1650-1800* (New Delhi: Northern Book Centre, 2006)

Singh, Kashi N., 'The Territorial Basis of Medieval Town and Village Settlement in Eastern Utter Pradesh, India', *Annals of the American Association of Geographers*, Vol. 58, No. 2 (1968), pp. 203-220.

Singh, Narayan Prasad, *The East India Company's Monopoly Industries in Bihar: With Particular Reference to Opium and Saltpetre, 1773-1833* (Muzaffarpur: Sarvodaya Vangmaya, 1980)

Singh, Paras Nath, *Jagat Seth and the Founding of the English Raj in Bengal* (Prayag, Bharati Bhandar, 1950). In Hindi.

Singh, S. B., *European Agency Houses in Bengal (1783-1833)* (Calcutta: Firma K.L. Mukhopadhyay, 1966)

Sinha, A. K., *Transition in Textile Industry*: *The Textile Industry in Bihar, 1783-1833* (New Delhi: Capital Publishers, 1984), pp. 64-87.

Sinha, Narendra Krishna (ed.) *Midnapore Salt Papers: Hijli and Tamluk, 1781-1807* (Calcutta: West Bengal Regional Records Survey Committee, 1954)

Sivaramakrishnan, K., *Modern Forests: State-making and Environmental Change in Colonial Eastern India* (Stanford: Stanford University Press, 1999)

Smiles, Samuel, *Industrial Biography: Iron-Workers and Tool-Makers* (Boston: Ticknor and Fields, 1864)

Smith, Adam, *An Inquiry into the Nature and Causes of the Wealth of Nations*, 3 Vols. (Dublin: Whitestone, 1776)

Smith, George (printer), *Two Reports on the East India Salt Monopoly* (Liverpool: 1838)

Smith, George David, *From Monopoly to Competition: the Transformation of Alcoa, 1888-1986* (Cambridge: CUP, 1988)

Srinivasan, Sharada, 'Textures of 'Wootz': Techno-cultural Insights on Steel and Ferrous Metals in South Indian Antiquity' in Jeewan S. Kharewal & Shruti (eds.) *History of Science and Technology: a New Perspective* (Princeton: Infinity Foundation, n.d.), pp. 144-160.

Srivastava, Ramesh Chandra, *Development of Judicial System in India under the East India Company, 1833-1858* (Bombay: Tripathi, 1971)

Staples, A. C., 'Memoirs of William Prinsep, Calcutta years, 1817-1842', *Indian Economic and Social History Review*, Vol. 26 (Mar. 1989), pp. 61-79.

Stephenson, John, *Treatise on the Manufacture of Saltpetre: Descriptive of the Operations and Proper Plans to be Used for the Manufacture of Culmee and Cooteah* (Calcutta: Military Orphan Press, 1835)

Stokey, Nancy L., 'A Quantitative Model of the British Industrial Revolution, 1780-1850', *Carnegie-Rochester Conference Series in Public Policy*, Vol. 55 (2001), pp. 55-109.

Subramniam, Ajantha, *Shorelines: Space and Rights in South India* (Stanford: Stanford University Press, 2009)

Sundberg, Ulf, 'Ecological Economics of the Swedish Baltic Empire: An Essay on Energy and Power, 1560-1720', *Ecological Economics*, Vol. 5 (1992), pp. 51-72.

Sutton, Jean, *The East India Company's Maritime Service, 1746-1834: Masters of the Eastern Seas* (Woodbridge: Boydell, 2010)

Swarnalatha, P., *The World of the Weaver in Northern Coromandel* (Hyderabad: Orient Longman, 2005)

Sweezy, Paul M., *Monopoly and Competition in the English Coal Trade, 1550-1850* (London: Routledge, 1996)

Tagliacozzo, Eric, *Secret Trades, Porous Borders: Smuggling and States Along a Southeast Asian Frontier, 1865-1915* (New Haven; London: Yale University Press, 2005)

Tann, Jennifer and John Aitken, 'The Diffusion of the Stationary Steam Engine from Britain to India 1790-1830', *Indian Economic and Social History Review*, Vol. 29 (Jun., 1992), pp. 199-214.

Teignmouth, J. R., 'The Late Mr. Farquhar', *The Asiatic Journal and Monthly Miscellany,* Vol. 29 (1829), pp. 15-17.

The Asiatic Journal and Monthly Register for British and Foreign India, China, and Australasia, Vol. 29, New Series (May-August, 1839)

The Calcutta Courier, Vol. 1, No. 9, 2/05/1832.

The Constructions of the Regulations and Acts issued by the Court of Sudder Dewanny Adawlut, from 1798 to 1847, with an Index (Calcutta: Thacker, Spink and Co., 1855)

The Sydney Gazette and New South Wales Advertiser, 2/06/1836.

Thomas, P. J. and B. Natarajan, 'Economic Depression in the Madras Presidency (1825-54)', *Economic History Review*, Vol. a7, Issue 1(1936), pp. 67-75.

Thomas, William (ed.) *The Journals of Thomas Babington Macaulay*, 5 volumes (London: Pickering and Chatto, 2008)

Todd, Jan, *Colonial Technology: Science and the Transfer of Innovation to Australia* (Cambridge; New York: CUP, 1995)

Tomlinson, B. R., *The Economy of Modern India, 1860-1970* (Cambridge: CUP, 1993)

Travers, Robert, *Ideology and Empire in Eighteenth Century* (Cambridge: CUP, 2007)

Trevelyan, Lady (ed.) *The Works of Lord Macaulay*, 8 Volumes (London: Longsman & Green, 1866)

Tripathi, Amales, *Trade and Finance in the Bengal Presidency, 1793-1833, rev. ed.* (Calcutta: OUP, 1979)

Trocki, Carl A., *Opium, Empire and Global Political Economy: A Study of the Asian Opium Trade, 1750-1950* (London; New York: Routledge, 1999)

Tuck, Patrick (ed.) *The East India Company: 1600-1858*, 6 Vols. (London: Routledge, 1998)

Turner, Frederick J., *The Frontier in American History* (New York: Holt, 1920)

Two Reports on the East India Salt Monopoly (Liverpool: Pr. George Smith, 1838)

Vicziany, Marika, 'The Deindustrialization of India in the Nineteenth Century: A Methodological Critique of Amiya Kumar Bagchi', *Indian Economic and Social History Review*, Vol. 16 (1979), pp. 105-146.

von Mises, Ludwig, *Human Action: A Treatise on Economics* (San Francisco: Fox & Wilkes, 1996 [1949]).

Washbrook, David, 'Law, State and Agrarian Society in Colonial India', *Modern Asian Studies*, Vol. 15, No. 3 (1981), pp. 649-729.

Washbrook, D. A., 'Progress and Problems: South Asian Economic and Social History c. 1720-1860,' *Modern Asian Studies*, Vol. 22, No. 1 (1988), pp. 57-96.

Washbrook, David, 'South India 1770-1840: The Colonial Transition', *Modern Asian Studies*, Vol. 38, No. 3 (2004), pp. 479-516.

Webster, Anthony, 'The Political Economy of Trade Liberalization: The East India Company Charter Act of 1813', *Economic History Review*, Vol. 43, No. 3 (Aug., 1990), pp. 404-419.

Webster, Anthony, 'The Strategies and Limits of Gentlemanly Capitalism: the London East India Agency Houses, Provincial Commercial Interests, and the Evolution of British Policy in South and South East Asia, 1800-50', *Economic History Review*, Vol. 59, No. 4 (2006), pp. 743-764.

Webster, Anthony, *The Richest East India Merchant: The Life and Business of John Palmer of Calcutta 1767-1836* (Woodbridge: The Boydell Press, 2007)

Webster, Anthony, *The Twilight of the East India Company* (Woodbridge: The Boydell Press, 2009)

Webster, Thomas, *The Case of Josiah Marshall Heath, The Inventor and Introducer of the manufacture of Welding Cast Steel from British Iron* (London: W. Benning & Co., 1856)

Wendt, Ian Christopher, *The Social Fabric: Textile Industry and Community in Early Modern South India*, PhD Thesis, University of Wisconsin-Madison (2005)

Westland, J., *District of Jessore: Its Antiquities, Its History and Its Commerce* (Calcutta: Bengal Secretariat Office, 1871)

Wilbraham, George, *Thoughts on the Salt Monopoly in India* (London: 1847)

Williams, D. H., *A Geological Report on the Kymore Mountains, The Ramghur Coal Fields and the Manufacture of Iron, &c &c.* (Calcutta: Bengal Military Orphan Press, 1852)

Wilson, Jon E., *The Making of a Colonial Order: Information, Uncertainty and Law in Early Colonial Bengal* (Cambridge: Centre of South Asian Studies, 2004)

World Heritage Nomination: IUCN Summary, *April 1989*. Available at http://whc.unesco.org/ archive/advisory_body_evaluation/452.pdf.

Wright, H. R. C., 'Reforms in the Bengal Salt Monopoly, 1786-95', *Studies in Romanticism*, Vol. 1, No. 3 (1962), pp. 129-154.

Yule, H. and A. C. Burnell, *Hobson-Jobson: A Glossary of Colloquial Anglo-Indian Words and Phrases of Kindred Terms, Etymological, Historical, Geographical and Discursive* (London: Linguasia, 1886 [1989])