Bengal Industries and the British Industrial Revolution (1757–1857)

Indrajit Ray

Routledge Explorations in Economic History

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This book seeks to enlighten two grey areas of industrial historiography. Although Bengal industries were globally dominant on the eve of the industrial revolution, no detailed literature is available about their later course of development. A series of questions are involved in it. Did those industries decline during the spells of British industrial revolution? If yes, what were their reasons? If not, the general curiosity is: On which merits could those industries survive against the odds of the technological revolution? A thorough discussion on these issues also clears up another area of dispute relating to the occurrence of deindustrialization in Bengal, and the validity of two competing hypotheses on it, viz. i) the mainstream hypothesis of market failures, and ii) the neo-marxian hypothesis of imperialistic state interventions.

Both the supply and demand aspects of five major industries of contemporary Bengal (cotton textiles, silk textiles, shipbuilding, salt and indigo dye) are discussed at length. In the former respect, discussions cover technology, investment, labour as well as local availabilities of raw materials for each industry. Demand-side deliberations focus on their relative prices and quality. In most cases, comparisons are made with British products in view of the nature of competition. The courses of their development (or decline) are assessed by production statistics, or in their absence, trade statistics. Since the general price level is determined by the stock of circulating specie, the contemporary movement of bullion is also discussed.

Major conclusions in this study include: i) Bengal industries prospered during 1757–1829, creating jobs by about 0.85 million during 1795–1829; ii) those excellences were achieved on the strength of their comparative advantages, both in costs and quality, iii) local entrepreneurs were marginalized in that development process; iv) the industrial decadence commenced in this province during the early 1830s; v) there was massive deindustrialization in Bengal during 1830–59 when 1.21 million workers lost their jobs; and vi) while some industries declined for their competitive setbacks in the market, others succumbed to discriminatory state interventions; hence, both the mainstream and neo-marxian hypotheses hold case-wise true.

Indrajit Ray is Professor in the Department of Commerce at the University of North Bengal, India.

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To
my late father and philosopher-guide,
Hirendra Nath Ray,
and
my mother and schooldays home-tutor,
Srimati Minati Ray

Contents

Foreword

The present monograph on the history of manufacturing industries in Bengal in the eighteenth and early nineteenth centuries appears at a most appropriate time. In recent years, interest in the economy of early modern India has revived among historians of the world economy. The revival has taken place mainly in response to two fields of scholarship; neither is very new, but both have seen path-breaking new contributions. One of these shows the extent to which the world economy became integrated by the commodity and bullion trades in the eighteenth century, and the central role that manufactured and semi-manufactured goods from the Indian subcontinent played in this worldwide exchange. The other scholarship investigates the origins of international economic inequality, which can be roughly dated from the time when this early modern globalization began to weaken and 'deindustrialization' set in; and suggests that the scale of the present-day inequality owes much to stagnation in the old world regions of Asia, principally India and China. Together, the two stylized facts present a puzzle, and a challenging one, for the historian of India. All the more so, because some of the old paradigms with which international inequality had been understood until about twenty years ago, such as the neo-marxist surplus appropriation model or modernization theories, do not explain all the facts. New conceptual models are needed. And these need to build on new research.

The present work fits that agenda especially well. It is among the few pioneering book-length works in the economic history of early modern India to aim explicitly at meeting global history questions with Indian evidence. The region of interest, Bengal, was the most important one among those areas in the subcontinent deeply involved in the twofold transformation referred to above. A great deal of the existing scholarship on the economic history of Bengal deals with trade, agrarian relations and the state. The present work studies manufacturing industries, a relatively undeveloped field even though manufacturing occupies a very important part in speculations about India in this period of transition. The author, Indrajit Ray, has established his credentials to write a book on this subject by publishing a series of widely cited articles in leading professional journals. The quality of that research is recognized by peers to be outstanding, especially in its attention to facts, archival research, and narrative depth. The book builds on that strong foundation, and adds to it

an analytical and interpretive dimension only possible when these studies are read together in a collection.

The five examples that figure here – cotton and silk textiles, salt, shipbuilding and indigo – confirm a picture of decline in traditional industry in Bengal when the early nineteenth century is compared with the late eighteenth. Ray considers two main approaches to deindustrialization: technological change and adverse state intervention. The illustrations reveal a fundamental difficulty in reading this history in terms of either the one or the other approach: the five examples do not fit a single model of decline. This difficulty makes the whole project and the raw material especially interesting. Staying true to the complexity of the cases studied, and the depth of his empirical research, Ray refrains from projecting a single overarching model of deindustrialization upon all. If there is a common pattern in these stories, it is that endogenous strengths, contradictions and challenges were as important as externally induced variables such as a new regime or technological change in shaping the pathways that unfolded in each case. The examples suggest to us that in order to develop a nuanced interpretation of global economic trends in this time, it is necessary to pay close attention to regional and local conditions, especially institutional conditions, and that these conditions were not similar between industries. Ray, in other words, combines in this book a firm footing in the region, an understanding of the specificity of the livelihoods, with a world history orientation, leading to the kind of story that global historians will find it very rewarding to read.

Tirthankar Roy
London School of Economics and Political Science

Preface

This book presents my research over the last two decades. I was formally least exposed to economic history as econometrics was my area of specialization at the master's level, and my PhD dissertation was on transport economics. Only a taste of it did I get through one course at the undergraduate level (half on Indian economic history and the other half on the UK, the USA, Japan and the erstwhile USSR) and another at the post-graduate level (on the UK and East European countries). My real interest, however, developed during my tenure at the Bengal National Chamber of Commerce and Industries in the late 1980s when I looked after, *inter alia*, the Chamber's history writing project being carried out by a research team of Jadavpur University's history department under Professor Chittabrata Palit. I still remember noting down the first list of references from Professor Palit in my room in the Chamber's office at the Dalhousie Square in Calcutta.

Since I could study at the National Library (Calcutta) only in the evening hours, it took about two years to prepare a detailed plan of work on the history of Bengal industries. I was fortunate that Professor Bhabatosh Dutt agreed to go through it. Given the burden of age (he was then about eighty years old), he asked for the first impression of its typed copy (the computer was yet to be a mass product!) and adequate time (as he could read only in daylight). He corrected my draft very painstakingly, and spent more than two hours giving me advice and numerous references. His handwritten notes are still with me.

I am also privileged by the advice of Professor Amiya Kumar Bagchi who twice read the earlier drafts of my article on salt. He ignited my curiosity on the delicate issues of employment in contemporary Bengal.

The book has been so organized that each chapter represents a full-length article. Almost all the core chapters were first submitted to various journals in article form, so that from their referees' reports I could identify any lapses in my deliberations. Many of my initial submissions were rejected but their reports were very valuable to me since I had neither any formal training in history nor any formal supervisor to guide me. In fact, those 'invisible' referees were my teachers in the true sense of the term, who guided me to many writings, new thoughts and alternative logics. I am unable to express my heart's gratitude to those 'invisible' teachers. The same is true for the three referees of this book.

While the absence of formal guidance was a serious hurdle, it was advantageous in that I did not become associated with any school of thought. I grew up on my own in this world of economic history. Everything was new to me. I saw with my own eyes, interpreted what I saw with my own intelligence, accepted (or rejected) my interpretations after due comparison with other interpretations, and finally presented them in my own style. To be an orphan is certainly painful, but it provides an unbiased environment in which to grow. Readers will assess the comparative strength of such scholarship.

Acknowledgements

This book is based on a series of articles published in various journals during 1995–2009. Without the copyright permissions from those journals this book could not have seen the light of the day. I therefore acknowledge with thanks Manchester University Press for giving permission to incorporate here an enlarged version of my article in the *Journal of Transport History*, and John Wiley and Sons for permission for an article in the *Economic History Review*. I am equally indebted to Sage Publications India Pvt. Ltd for permission to use the enlarged versions of my three articles in the *Indian Economic and Social History Review*.

1 Introduction

The present state of global economic disparity is alternatively explained by two phenomena of previous centuries. According to the mainstream school of thought, the industrial revolution in Great Britain during the second half of the eighteenth century and its subsequent spread to the European Continent and North America thwarted the marketing edge of industries of the rest of the world, and thus led to uneven economic progress. Challenging this thesis of market failures, neo-marxian writers like Andre Gunder Frank, Samir Amin and Arghiri Emmanuel, to name a few, centre their argument on the growth of the world capitalist system that created a colonial milieu across Asia, Africa and Latin America in previous centuries. They underscore that the 'core' capitalist countries in Europe and North America developed an exploitative economic relationship with the 'peripheral' colonial countries, which caused deindustrialization in the latter, and hence their economic backwardness. This study intends to empirically verify these competing hypotheses of deindustrialization.

Bengal is our study area. It is referred to time and again in the literature of economic theory. Adam Smith (1937: 17–21), for example, described its context while developing his masterpiece theory of the division of labour as an explanation for the wealth of a nation. Karl Marx (1887: Ch. 33) also referred to Bengal in his deliberation on the genesis of industrial capital.[1] Certainly, it is a point of reference in the literature of the British industrial revolution shows how technological innovations ushered in global industrial supremacy for Great Britain (Landes 1966: 275). But there is confusion surrounding the concept of Bengal as a geographical entity in history. It is indeed an ancient seat of civilization, dating back to before the Common Era. But the province of Bengal, as it stood under the governance of the English East India Company, had not been a cohesive geographical unit over the past millennia. Different sovereign kings ruled over it, sometimes by segmentation or else in annexation with neighbouring territories. Consequently, we first define in section I below the geographical extent of Bengal that comes under the purview of this study, and then briefly introduce its political history. Section II describes in brief various theories tending to explain deindustrialization in colonial economies. Section III introduces the basic approach of this study.

I

Pre-modern European travellers knew Bengal (or Bengala) as an important port on the Bay of Bengal although confusion surrounded its location relative to the port of Chittagaon, which the Portuguese called Porto Grande.[2] Perhaps, as Demes later proposes (Barbosa 1518: 145), Bengal was then not a single port but a cluster of ports surrounding Gaur. To Barbosa, it was a great city with a very good harbour (ibid.: 181). The confusion continued down to the British rule. In its earlier days, the whole of North India under British rule was referred to as the Presidency of Fort William in Bengal. Later on, Bengal was taken to refer to the Lower Provinces of Bengal that fell under the jurisdiction of the Lieutenant-Governor of Bengal. It incorporated Bengal proper, Bihar, Orissa, Chota Nagpur and Assam. Our study area, however, covers generally Bengal proper, encompassing approximately 94,000 square miles, although, in a few cases, the Lower Provinces of Bengal are referred to in view of data constraints.

For administrative purposes, Bengal proper was then divided into six divisions: the Presidency, Rajshahi and Koch Behar divisions in the middle, the Dacca and Chittagaon divisions in the east and the Burdwan division in the west, each being placed under one commissioner. Many cities and towns in these divisions went through significant ups and downs in line with the fate of different dynasties. Nadia (or Navadwipa) in the Presidency division and Gaur (or Lakhnauti) in the Rajshahi division were the capitals of the Hindu Kingdom. The Muslim period saw the rise of first Dacca and then Murshidabad in the Rajshahi division as the seat of Bengal's nawabs. Whereas these were certainly places of commercial importance, the axis of Bengal's trade shifted towards the sea port in the south with the growth of European business. The Europeans initially set up their establishments at Satgaon (or Saptagram, what the Portuguese called Porto Pequeno) and then at Hugly (after the siltation of the river Swaraswati), both belonging to the Burdwan division. Later, they were shifted to Calcutta in the Presidency division which remained the capital of India under British rule until 1912.

Bengal's river system, which attracted the attention of Adam Smith (1937: 20), as also did the Nile in Egypt, principally comprises the Ganges and the Brahmaputra. They provided perennial flows receiving snow-melts from the great Himalayas. An extensive delta was formed between them covering the whole of the Presidency division, and parts of Rajshahi and Dacca. These great rivers, along with a large number of interconnecting smaller rivers and rivulets, represented the main artery of trade and commerce in contemporary Bengal. As the delta was frequently inundated, its soils were rich in black alluvium and therefore highly productive for agriculture. In the eastern hemisphere, the soils were muddy and the climate was hot and moist while, in the west, the soils contained granite and sometimes coal, and the climate was dry. The geographical features of Bengal's northern boundaries, running over the Himalayan ranges and their foothills, were quite different. The districts of Darjeeling and Jalpaiguri were located there, and had a cold climate and heavy rainfall, which gave rise to a cover of dense forests.

Bengal's ethnology resembled that of North Indian because of the great Aryan movement before the Common Era (Raychaudhuri 2003: Ch. 2). Its populace was largely of Aryan and Dravidian origins, with Mongoloids predominating along the eastern and northern peripheries. Most of the Bengali were Aryan Hindus, with an admixture of Dravidian tribes in lower castes. In later times, the Muslims became numerous in the south-east, descending either from the Afghan conquerors or the Mughal rulers of Bengal, or from converts from low Hindu or aboriginal tribes. Amidst such diversity in race and religion, and also the related customs, language was the thread uniting them.

The early history of Bengal is obscure (Majumdar 2003: Ch. 4). For a long time after about 300 bce it was a constituent of the Maghad Empire with its capital at Pataliputra in modern Bihar. Several Hindu kingdoms subsequently sprang up in different segments of Bengal such as Banga in the east of the river Bhagirathi (a branch of the Ganges), Karna Suvarna, which covered Burdwan, Bankura, Murshidabad and Hugly, and Tamralipta, covering the present jurisdictions of Midnapore and Howrah. Hiuen Tsiang, the Chinese pilgrim of the seventh century ce, also referred to the Mongoloid kingdom of Pragjyotisha (Kamapura) in Assam which included parts of north and east Bengal, and also the kingdom of Pundra around modern Pubna in Bangladesh. Among the important dynasties in the early Common Era, the Gupta dynasty was certainly most powerful, ruling over Karna Suvarna. Dynastic details are, however, more reliably available from about 700 ce when the Pal dynasty began under King Bhu Pal and continued for about two centuries with twelve kings in succession. It initially ruled over Anga in Bengal proper but subsequently spread to north Bengal and the whole of Bihar under Deva Pal, the third king of this line. The Pal kings undertook many public works such as the construction of splendid tanks for public use, some of which are still operational in Dinajpore, bearing their names. In the closing century of the first millennium, however, the Brahminical tide of Hinduism is believed to have brought an end to the Pal dynasty, who were Buddhists, and heralded the Sena dynasty in about 964 ce under King Adisura. Vijaya Sena, the second king of this dynasty, was a great conqueror and extended the kingdom to Kamrup in west Assam, and Kalinga in south Orissa. His son Ballala Sena, however, consolidated the administrative network of the kingdom by dividing it into five provinces with Gaur as the capital. Those provinces largely corresponded to the administrative divisions under British rule. Ballala Sena also introduced certain social reforms – for example, social ranking and polygamy among the high castes of *Brahmins* and *Kayasthas* – which percolated down to nineteenth-century Bengal.

The Sena dynasty came to an end in 1203 when a Turk invader, Muhammad-i-Bakhtyar Khilji, defeated Lakhmaniya (or Su Sena or Sura Sena, as the Hindus called him). For the next five and a half centuries, the Muslims ruled over Bengal mostly in subordination to the supreme authority of the Delhi emperors (Majumdar and Sarkar 2003: vol. 2). Many a time powerful rulers punctured Delhi's authority, declaring their own sovereignty. The rulers were of mixed origin – some of them were Pathans, others were Turkish, and still others were

Abyssinian eunuchs. From the viewpoint of allegiance to Delhi, this period may be divided into four sub-periods: (a) 1203–1337 – the Sultanate period; (b) 1338–1575 – the rule of independent kings including Sher Shah and his Afghan successors; (c) 1576–1739 – the Mughal period; and (d) 1740–57 – the rule of nawabs, nominally subject to the emperors of Delhi. Bengal's interaction with Central Asian civilization in this period undoubtedly brought excellence to its art and culture, especially in the fields of architecture, music, painting, construction and even industry. But many economic evils also followed. Certainly exorbitant taxes were levied to satisfy rulers in both Bengal and Delhi, and these must have been escalated to finance frequent wars whereby Bengal rulers sought to gain, or to retain, the independence of Bengal. Moreover, a large sum of specie left Bengal every year as tribute to Delhi – an issue that we discuss in Chapter 2.

The most significant event during the Muslim period was possibly the steady penetration of European merchants into the polity and business of Bengal. Following the discovery of the sea route by Vasco da Gama in 1498, Portuguese merchants came to India in the first half of the following century, and took an interest in Bengal. Opening business centres at Chittagaon and Saptagram, they dominated Bengal trade for about a century. Their business suffered subsequently at the hands of the Dutch who traded at Chinsura (near Hugly) from 1625 onwards. From about the middle of that century, the English East India Company also began to involve itself in Bengal trade from its factories at Murshidabad, Dacca and Malda. For a couple of decades English trade lagged behind the Dutch but the scenario was reversed later.

The English East India Company became the virtual ruler of Bengal after its victory at the Battle of Plassey in 1757 as it appointed the nawabs and controlled them accordingly. Through a treaty after the Battle of Buxar in 1765 they obtained *dewani* (revenue) directly from the emperor of Delhi, and thus assumed the sovereign power in this province.

II

Deindustrialization is a controversial issue in Indian historiography. Disagreements range over its definition, measurement methodology and periodization as well as its causative factors. The basic questions are obviously: did deindustrialization take place in India during the colonial period? If so, why?

Two alternative definitions of deindustrialization are available from the writings of Kaldor. In one he considers the term to represent the contraction of manufacturing capacity and employment in an economy (Singh 1977: 113); but later he defines it more rigorously as

> a state of affairs in which there is a continued decline in a country's share of world trade in manufactures and/or a continued increase in the share of imported manufactures in domestic expenditure in consequence of which it becomes progressively more difficult to achieve a sufficient surplus of

> exports over imports of manufactures to keep the economy in external balance.
>
> (Kaldor 1979: 18)

The latter definition is, indeed, related to the former according to Harrod's foreign trade multiplier (for details, see Kamitake 1990: 49–59): $Y = \left(\frac{1}{m}\right). X$ where Y is the level of output, X the level of exports and m the marginal propensities to import. At a fixed value of m, a fall in manufacturing exports and/or a rise in its imports depress the demand for domestic manufacturing output, and thus cause its employment to fall.

Empirical studies on India largely accept Kaldor's former definition although their terminological perspectives vary. Thorner (1962: 70–81) indeed defines deindustrialization as a macroeconomic feature whereby a declining proportion of the working population, or total population, is dependent on secondary industries. Though apparently equivalent in implication, these two ratios certainly differ if the series of total population and working population behave divergently. A similar definition is also adopted in Bagchi (1975, 1976) though with a different theoretical underpinning. He argues that industrialization is reflected in three developmental indices: (a) a rise in the proportion of national income generated in the secondary sector; (b) a rise in the proportion of population engaged in the secondary sector; and (c) growing mechanization of industries. While a simultaneous occurrence of these conditions generates higher per capita income, this may also occur in the absence of industrialization. Hence, rising per capita income is a necessary but not sufficient condition for industrialization. Bagchi argues that since these three conditions must be satisfied simultaneously for industrialization to occur, the absence of any of them (along with stagnant per capita income) should be termed non-industrialization or stagnation. In this perspective, deindustrialization is defined as a process whereby one or more of the above three conditions are reversed. However, he takes up the second condition for the verification of deindustrialization in nineteenth-century India.

Bagchi's definition allegedly suffers from a serious drawback if the term deindustrialization is defined strictly in terms of the output variable, i.e. as a declining share of manufacturing output to total output, or of manufacturing output per capita or per worker engaged. Keeping this output definition in view, Krishnamurthy (1967, 1976) argues that in the historical process of industrialization a higher ratio of manufacturing workers was associated with the rising share of manufacturing output per capita although the former may not be a necessary or a sufficient condition for the latter. For example, independent of any rise in employment, a compositional change in the manufacturing sector may raise the average productivity of labour and, hence, the sectoral output. Again, a higher employment level may not increase the sectoral output under an adverse compositional change of the sector. Thus, a higher ratio of workers in manufacturing is neither a necessary nor a sufficient condition for industrialization. By the same logic, deindustrialization does not imply as a necessary or a sufficient condition a declining share of the manufacturing sector in the total

workforce. Chattopadhayay (1975), however, disagrees with this argument, citing the evidence of some 'enclave' economies, and adopts Bagchi's definition with a modification. Retaining Bagchi's conditions (a) and (b), he replaces the condition (c), namely growing mechanization of industries, by the condition that NNP or national income should increase over time in the event of industrialization. He then argues that since all these ratios must simultaneously increase over time in the event of industrialization, deindustrialization is defined in the strict sense when all these three ratios fall over time, and in the weak sense when there is a decline in the first or second ratio with a constant level of national income (or NNP).

Clingingsmith and Williamson (2005: 2) recently defined the term in a two-good three-factor framework. Suppose an economy produces exportable agricultural goods and importable manufacturing goods. While labour is mobile across the sectors, land is used only in agriculture, and capital only in manufacturing. The 'small country' assumption is also made, so that the terms of trade are exogenously determined by the world market. Under these assumptions deindustrialization is defined as a movement of labour from manufacturing to agriculture, measured either in absolute number (what is called strict deindustrialization) or as a share of total employment (what is called weak deindustrialization).

The term is given an altogether different connotation in Roy (2000: 1142–7). Instead of treating the term in the traditional way, he defines it as a theory with four constituent propositions, namely (a) that traditional industries declined in a colony; (b) that the decline was initiated by technological obsolescence in the domestic economy; (c) that it was sustained by colonial policies; and (d) that the development of modern industries could not compensate the economic loss resulting from the decline of traditional industries. The significance of this definition lies in that it does not recognize the decline of traditional industries in isolation as deindustrialization. This is said to occur only when the decline is triggered and sustained in specific economic environments, and remains uncompensated. In fact, this definition captures Indian nationalist sentiment about the term. It should, however, be qualified in certain respects. It is true that in most cases declines of traditional industries were triggered by technological obsolescence and sustained by colonial policies. But should we not use the term when: (a) the colonial industry in question was not a traditional one; (b) the decline of the industry was triggered not by technological obsolescence but by discriminatory colonial policies; or (c) the decline of the industry was triggered by technological obsolescence but not sustained by discriminatory policies? Our discussion in the following chapters confirms all these possibilities for industry in Bengal. The task of modifying the definition is, however, reserved for the next section.

Deindustrialization is explained, as adumbrated above, in two alternative theoretical frameworks; one is based on the analysis of market forces while the other is deduced from the concept of the world capitalist system. The central proposition of the former is that since deindustrialization represents a transfer of productive resources from manufacturing to agriculture, it must be induced by terms of trade unfavourable to the manufacturing sector. Such a movement in

relative prices may be explained by: (a) the globalization hypothesis; and (b) the hypothesis of negative price shocks to agriculture; or both.

The globalization hypothesis (Morris 1968: 2–3) stresses that technological advance in Europe during the industrial revolution substantially improved the productivity of its manufacturing industries. India failed to emulate Europe in view of (a) a dearth of entrepreneurs; (b) a stubborn attitude towards any departure from tradition; and (c) 'other worldliness' (ibid.: 3), signifying the deep attachment of the people to spirituality rather than the material world. While India's manufacturing sector was thus globally placed disadvantageously, its agricultural products enjoyed higher price supports from European and North American industries because of rapid industrialization there. A great divergence, therefore, took place in the price trends of India's agricultural and manufacturing products in the international market. The prevailing globalization process must have perpetuated these divergences. If this hypothesis is valid, opposite movements in those prices would be expected in the European economies. To this end, Imlah's study (1952: 208–39) is cited. For the British economy, Imlah showed that the terms of trade (i.e. the ratio of export prices (representing the prices of manufacturing goods) to import prices (representing the prices of industrial intermediaries, food and other primary products)) fell by about 40 per cent between 1801–10 and 1841–50. Once such price divergences are accepted, it follows that under the shocks of the external terms of trade, India's productive resources were reallocated from manufacturing to agriculture, leading to deindustrialization in the nineteenth century.

For the hypothesis of negative price shocks to agriculture, the underlying logic is that a fall in agricultural productivity due to certain historical events led to higher prices for primary products so that the domestic terms of trade between agriculture and industry turned against the latter, causing deindustrialization. This is also known as 'the dragging out effect'. There are two alternative hypotheses to explain this setback to agriculture: (a) the Mughal collapse hypothesis; and (b) the El Nino hypothesis. The former hypothesis[3] states that with the ebbing of Mughal hegemony, a number of small successor states emerged in India, and indulged increasingly in revenue farming to finance frequent warfare among them. Evidently, there was a ten percentage point hike in the burden of rent, from 40 per cent to 50 per cent on average (Bayley 1983: 10), during the declining phase of the Mughal rule. Frequent wars also shifted cultivation away from insecure border areas to newer settlements of inferior land where agricultural productivity would be low, and shifted human and animal resources away from agriculture to defence, causing escalation of wage rates and animal prices. All these factors undermined productivity in agriculture.

Another negative event for earlier centuries was El Nino, a term that is used to denote the periodic rise in the surface temperature of the Pacific Ocean that causes the monsoon rains in India to fail. Clingingsmith and Williamson (2005: 4–13) empirically correlate this oceanic phenomenon to productivity fluctuations in Indian agriculture on the basis of a fifty-year moving average of droughts during 1550–1900. They specify that the average occurrence of droughts fell

from 0.35 (i.e. one drought year every three) in 1550–1640 to about 0.17 (i.e. one drought year every six) in 1641–1725, and further to 0.10 (i.e. one drought year every ten) in 1735. This period of low-average droughts, i.e. 1650–1735, corresponded to the Mughal Empire's golden age of Shah Jahan and its overextension and collapse under Aurangzeb. Good harvests that followed in consequence of infrequent droughts must have been the kingpin of those events, including the empire's collapse as it was brought about by the Marathas benefiting from good harvests. For the period 1735–1813, however, Clingingsmith and Williamson's estimate suggests that the frequency of droughts steadily increased from one year in ten to one in two and a half years as the value of the moving average rose from 0.10 to 0.40 (ibid.: 10–11). In view of these statistics, one should expect that India's agricultural productivity suffered from bad monsoons in 1735–1813. One year of drought used to generate severe knock-on effects for a couple of years. Farmers would eat their seeds in a drought year so that production in subsequent years suffered in the absence of developed seed markets in the countryside. Second, villages became extensively depopulated since droughts were invariably followed by famine and epidemics. This was indeed the case in 1791, the worst El Nino year, when half the inhabitants in the Northern Circar in India died. Those who survived were no more fortunate as they became too feeble to earn their subsistence.

Declining agricultural productivity, under either hypothesis, means that agricultural prices must have shot up in India during the eighteenth–nineteenth centuries. This argument is strengthened by the empirical findings that India's grain prices rose by more than 30 per cent in 1740–60. The adverse domestic terms of trade that higher grain prices caused is believed to have transferred resources from industry to agriculture, ushering in a phase of deindustrialization in India.

The neo-marxian writers, however, do not accept these market-based explanations of deindustrialization but view it as an impact of the development of the world capitalist system.[4] The system, according to them, is constituted of the 'metropolitan' (or 'core') countries of Europe and North America, where capitalism was born, and a number of 'peripheral' countries in the erstwhile colonies of Asia, Africa and Latin America. Historically, world capitalism developed very slowly but steadily towards a dependent relationship between the core and the periphery. This theory is, therefore, variously known as dependency theory or core–periphery theory. The theory postulates that development in the metropolis and underdevelopment in the periphery are not two different processes. Rejecting the 'two coin' theory (Frank 2004: 4198), they argue that these are two different sides of the same coin. The result is, on the one hand, 'development of underdevelopment' in the periphery and, on the other, 'development of development' in the metropolis.

The theory starts with the proposition that the metropolitan economic policies – that followed from their political ideologies – played a crucial role in perpetuating economic backwardness in peripheral countries. The dawn of capitalism was heralded by the rolling back of the protectionist policies of mercantilism under the dictum of *laissez-faire*. The reform began in 1774 with the repeal of prohibition on

the use of Indian cotton textiles in England, consolidated through the partial and complete demonopolization of 'eastern' trade in 1793 and 1813 respectively, and culminated in the repeal of the Corn Laws in 1846 and Navigation Laws in 1849. With these, as Frank remarks, 'British industrialists won the battle to institute free trade – and to enshrine it as a natural scientific law' (Frank 1978: 75). Not only did metropolitan policies thus shape the first stage of capitalism, but they were equally instrumental in subsequent stages. The second (and also third) stage of capitalism saw large-scale world accumulation involving a vast expansion of world trade. With support from suitable policy designs, the latter brought about such an international division of labour that a dependent relationship was forged between the core and the periphery. A world trade boom is statistically evident: world trade had tripled in 1700–1820 and quintupled in 1820–70. This boom was, however, accompanied by imperial policies tending towards decapitalization, discrimination and deindustrialization in the periphery, so that it could give rise to a rule of unequal exchange against the peripheral interest.

For India, the phase of decapitalization began after the Battle of Plassey in 1757. This is often explained by the 'drain theory'. The theory has its roots in early colonial literature (Steuart 1772: 56–73) but was largely popularized by Dadabhai Naoroji (Naoroji 1962; Ganguli 1965) during the late nineteenth century. According to Naoroji, resources were drained at two levels: at the internal level, draining purchasing power from rural areas to urban centres, and at the external level, draining resources from India to England. In the initial phase of colonial rule, the external drain was constituted of various gifts and tributes that higher company officials received from the 'puppet' kings and their top officials. Marx (1887: Ch. 33) referred to it as the primitive accumulation of capital acting as the kingpin of global capitalist development. Authorities like Digby and Adams, however, believe that the drain of resources from Bengal financed the industrial revolution in Great Britain through banking institutions. There is no dispute over the role of the Bank of England during the industrial revolution. That the Bank of England got its financial leverage from the inflow of specie from Bengal is established on the following evidence: for more than sixty years from its inception in 1694, the Bank had been issuing as the lowest denomination £20 notes – notes too large for wide circulation; but it began to issue notes of lower denominations shortly after 1757. Adams observes, '[T]he arrival of the Bengal silver not only increased the mass of money, but stimulated the movement; for at once, in 1759, the bank issued £10 and £15 notes, and in the country private firms poured forth a flood of paper' (Adams 1895: 3). In the same vein, Digby argues, 'England's industrial supremacy owes its origin to the vast hoard of Bengal.… Before Plassey was fought and won, and before the stream of treasure began to flow to England, the industries of our country were at a very low ebb' (Digby 1901: 30–1). This outflow of specie certainly decapitalized Bengal to a good extent.

Naoroji, however, argues that the external drain became perennial only after the assumption of the revenue administration by the East India Company in 1765 since a link was developed thereby between the external and the internal components of the drain. By way of taxation, the company transferred purchasing

power from the rural areas to its own authority. Part of it was spent as salaries for British officials in the administration and army (the payments to local staff being presumably insignificant because of their employment at low levels and also at low wages) while the surplus was retained. Company officials also carried out internal trade with British 'free' traders, enjoying profitable returns. Thus, the internal drain transferred wealth to the company and British individuals in urban centres, especially Calcutta – wealth which ultimately left the country. The external drain usually took the form of unrequited merchandise export, not an export of specie, since the company used the surplus revenue for the procurement of finished goods and industrial raw materials for export. Also, the individual funds did not cause bullion to outflow as the remittances were made by drawing bills on trading companies operating in Bengal.

It should be noted that remittances in the form of goods or bills did not cause decapitalization as the money capital was used for the purchase of domestic goods, and thus retained domestically. What leaked out was the profit margin arising from productive activities in the country, thus forestalling further accretion of capital. In Steuart's version of the drain, which deals with the outflow of specie (see Chapter 2), this represents decapitalization.

Along with decapitalization, India also suffered from discriminatory policies, both at home and in England, which are believed to have reduced it from its industrial glory to an agrarian economy. Dutt (1901: 176–85) argues, like O'Brien *et al.* (1991), that the British parliament discriminated against Indian industries directly through domestic tariff barriers, and indirectly through the Court of Directors and the colonial government, which imposed low tariffs on imports of British products into India, and also instituted adverse colonial industrial policies. Following chapters will discuss them at length.

In the neo-marxian framework, however, the thesis of deindustrialization is largely a logical deduction from the evidence of decapitalization and policy discrimination. Instead of providing direct empirical evidence to this end, most of its proponents cite opinions from Indian nationalist writers[5] who accept the hypothesis of deindustrialization. The literature largely concentrates on the cotton textile industry, drawing conclusions mainly from its export–import statistics and, in some cases, from the evidence of depopulation of industrial districts like Dacca. Major empirical literature on India's deindustrialization will be discussed shortly.

Once the deindustrialization of the periphery was complete, it is believed that the emergent exchange system at the global level generated an international division of labour such as to produce a dependent relationship globally. Emmanuel (1972: 52–64) calls it an unequal exchange on the basis of equal values. His theory is based on the Marxian terminology of the organic composition of capital $q = \frac{c}{v}$, the rate of surplus $s = \frac{m}{v}$ and the rate of profit $r = \frac{m}{(c+v)}$, where c is the constant capital, v variable capital, and m surplus value or profit. The rate of profit may also be expressed as

$$r = \left(\frac{m}{v}\right) \cdot \left(\frac{v}{c+v}\right) = \left(\frac{s}{(1+q)}\right) \qquad \text{(i)}$$

If the subscripts 1 and 2 refer to the metropolis and the periphery respectively, and if $(c_i + v_i + m_i)$, $i = 1, 2$ is the break-up of exports worth \$1 from Country i, then the exchange is represented by

$$c_1 + v_1 + m_1 = c_2 + v_2 + m_2 \qquad \text{(ii)}$$

We now assume, first, that capital is mobile across countries, and, second, that the rate of surplus is uniform, i.e. $s_1 = s_2$, due to uniform variable capital, i.e. $v_1 = v_2$, and uniform surplus value, i.e. $m_1 = m_2$. Equation (ii) indeed represents an exchange of equal values in the Ricardian version of the labour theory of value since, by the second assumption, $v_1 = v_2$. Also, Equation (ii) signifies $c_1 = c_2$ under the second assumption. Now, if we consider that the organic composition of capital is increased in the metropolis so that $q_1 > q_2$, then

$$r_1 = s_1/(1 + q_1) < s_2/(1 + q_2) = r_2 \qquad \text{(iii)}$$

That is, the rate of profit (r) becomes lower in the metropolis. If, at this stage, we introduce the mobility of capital, capital would obviously flow from the metropolis to the periphery, raising r_1 (and hence m_1) and depressing r_2 and m_2. With $(c + v)$ remaining the same for the countries, a higher value of m_1 increases the unit price of exports for the metropolis and the lower value of m_2 reduces that for the periphery. An unequal exchange is thus heralded, transferring the surplus value from the periphery to the metropolis. Emmanuel calls it unequal exchange in the broad sense. It occurs in the strict sense when along with $q_1 > q_2$, we consider a higher wage rate ($w_i = v_i/\text{l}$) for the metropolis, i.e. $w_1 > w_2$, which signifies that $v_1 > v_2$. In that case, the unit price difference is further widened.[6]

The transfer of surplus value through unequal exchange enriches the metropolis, increasing thereby its prevailing wage rate. This further raises its unit price of export since Emmanuel postulates a one-way causation from the wage rate to the export price. The events are just the opposite in the periphery where the wage rate and the export price spiral downwards. Since this kind of world exchange presupposes different lines of product specialization between different countries, the metropolis is believed always to thwart the periphery's specialization in its own line of production. We thus have an international division of labour that generates a dependent exploitative relationship between the core and the periphery.

Turning now to the empirical literature on India's deindustrialization, we find very few studies for the eighteenth–nineteenth centuries. One such study is by Bairoch (1982), who estimates on the basis of export statistics that India's share in world manufacturing output fell from 24.5 per cent in 1750 to 19.7 per cent in 1800 whereas China's share improved by half a percentage point during the same period. For 1750–1880 as a whole, India is found to lose by 21.7 per cent points. On the basis of Kaldor's second definition, noted above (pp 4–5), one may take these estimates to signify large-scale deindustrialization in colonial India. But such an inference requires two brave assumptions: (a) that manufacturing

exports constituted a significant share of the total output of India at that time; and (b) that the trend of global manufacturing exports was non-increasing. None of these is empirically verified.

Bagchi's study (1976) also covers this period, especially the nineteenth century, investigating the question for Gangetic Bihar (the present-day districts of Patna, Gaya, Shahabad, Monghyr, Bhagalpur and Purnea). Based on Buchanan's survey data collected during 1809–13 and the adjusted census data of 1901, he reports that as against a 26 per cent growth in the total population, the absolute number of the population dependent on secondary industries declined by about 45 per cent while the percentage of the population dependent on industry declined by ten points. Moreover, all the surviving industries in 1901 belonged to the traditional sphere, so the retrenched workers must have opted for agricultural pursuits. Strong deindustrialization is thus indicated. The study is, however, criticized on the grounds of methodological differences between Buchanan's survey and the census as well as definitional variances across working categories (Vicziany 1979; Robb 1981).

Exclusive census data provided material for a series of studies on the period from 1881 onwards. Clark's pioneering work (1950) in this field reports that between 1881 and 1911 the share of the workforce in manufacturing, mining and construction dropped by sixteen percentage points, from 28.4 per cent to 12.4 per cent, implying deindustrialization. But Thorner (1962: 70–7) challenges the comparability of the underlying census data in three respects, namely, (a) that the 'general labour' category, as reported in earlier censuses, included largely agricultural labour, rather than industrial workers as envisaged by Clark; (b) that 'sellers' were included in the category of industrial workers in the censuses of 1881 and 1891, but not thereafter; and (c) women working in the domestic production sector were wrongly grouped with industrial workers. In Thorner's study data filtration to these ends confirms that the number of manufacturing workers stagnated at around 14.8 million between 1881 and 1931, although there was a decline from 21.1 million to 12.9 million in the set of raw data for the same period.

Census data are also used in Chattopadhyay's study (1975) although he relies upon the censuses of 1901–31 in view of certain methodological doubts about the previous series. He accepts the hypothesis of deindustrialization on the basis of the following findings: (a) that industrial workers as a proportion of the total population declined from 5.94 per cent to 4.50 per cent during 1901–31; and (b) that the proportion of industrial workers in the total workforce fell from 8.73 per cent to 6.65 per cent during the same period. In another study (Chattopadhayay 1981) he marshals similar data for the Bengal presidency, both by province and in aggregate. This study suggests that although the presidency as a whole reflected India's general trend towards deindustrialization, industrialization in new lines of production was discernible for the province of Bengal juxtaposed to reverse trends in Bihar and Orissa. While the number of male industrial workers shrank from 0.63 million in 1901 to 0.51 million in 1931 in Bihar, and from 2.55 million to 2.08 million in Orissa during the same period, the number rose

steadily for the province of Bengal from 0.99 million in 1901 to 1.25 million in 1921. The series for Bengal, however, nosedived in the census of 1931, but he attributed this to the contemporary great world-wide depression.

It thus appears that empirical studies on deindustrialization are seriously lacking for the province of Bengal, especially for the period 1750–1850.

III

For lack of reliable data at the macro level, this study chooses an industry-based approach to the verification of the deindustrialization hypothesis. For a couple of years, many commentators – for example, Morris D. Morris (1968), Colin Simmons (1985: 603, 606), Peter Robb (1981: 521) and Frank Perlin (1983: 53) – have been underscoring the importance of such studies in view of their advantages over the conventional macro approach. For one thing, a micro-level analysis directly reveals whether an industry under study declined over a specific period. In contrast, as Krishnamurthy (1976: 964) argues, a falling share of workers depending on manufacturing – a criterion of deindustrialization that most macro-level studies in India rely upon – may not represent deindustrialization in the sense of the output definition. Second, the underlying reasons for deindustrialization can be identified more clearly in an industry-by-industry study. Aggregate data, on the other hand, may obscure certain crucial factors specific to some individual industries, and/or may generalize an industry-specific factor (Roy 2000: 1443). Furthermore, such studies remove a serious deficiency of Indian historiography in respect of monographs. In addition to satisfying, following Simmons (1985: 603), collective and individual curiosity among academics, they enable comparative studies between colonial industries and industries elsewhere.

Our approach to the question of deindustrialization largely follows the methodology that Robb advocates.[7] We first seek to verify the basic assumption underlying the deindustrialization theses of both the mainstream and left-nationalist schools that colonial industries foundered in consequence of industrial development in presently developed countries. If this hypothesis is found empirically untenable, an alternative hypothesis in this field might consider that instead of building their fortunes on the ruins of colonial industries, Western Europe and North America carried out a parallel industrial development, securing relatively greater economic prosperity over time. If, on the other hand, the hypothesis is found true, we should seek to test whether the market failure explanation or the neo-marxian hypothesis is closer to reality.

Roy's definition of deindustrialization is adopted here with certain modifications in line with our previous discussion. An additional qualification is, however, that in the micro sense of the term, deindustrialization signifies the decline of an industry when it remains uncompensated by the growth of a modern industry in the same line of production. Such a qualification is not required in the macro framework of a study since the economic loss arising from an industry's decline is compensated when there is industrial growth in any line

of production. For the present study we thus define the deindustrialization theory as constituted of the following propositions: (a) there was decline of an industry; (b) the decline was caused by technological obsolescence or discriminatory colonial policies, or both; and (3) the industry's decline was not compensated by the growth of a modern industry in the same line of production. While verifying the occurrence of deindustrialization on the basis of this definition, its underlying causes are readily identified. We accept the left-nationalist explanation when an industry's decay was caused by adverse government policies, whereas the market failure hypothesis is accepted in the event of its collapse owing to technological obsolescence. If both the factors are found present, our conclusion should be that deindustrialization was initiated and sustained by market failures and imperial policy designs in either order.

Our study period is 1757–1857, which falls between two great events, the Battle of Plassey (1757) and the Sepoy Mutiny (1857) (what Marx called the First Indian War of Independence). Bengal was then under the governance of the English East India Company, barring a few years at the outset when their 'puppet' kings were on the throne. This is an important phase of Indian history. Its age-old industries were predominant, with tea planting, coal mining and some modern manufacturing industries just emerging. This was also the first century of the industrial revolution when British industries went through various technological and organizational breakthroughs to acquire global leadership. Therefore, a pertinent question is: how did the glorious industries of the pre-1757 period in Bengal respond to competition from British industries in the alien economic environment of colonial rule? This period thus provides an appropriate opportunity for the verification of the deindustrialization hypothesis. Two new elements were introduced into Bengal's industrial history during this period: (a) technology-based competition from Great Britain; and (b) alien rule. The debate on deindustrialization seeks to establish the importance of the one over the other as an explanatory factor.

This period is also important from the neo-marxian viewpoint of the global capitalist system, which, according to Wallerstein (1986: PE28), incorporated the Indian subcontinent during this period. He argues that the period distinguished itself from the previous epoch of 1500–1750, on the grounds of two major qualitative changes: (a) the reorganization of productive structures such that they could participate in the international division of labour; and (b) the reorganization of political structures such that they promoted economic participation. While the former change was effected in 1800–50, the latter took a longer time, 'bracketed by the classical dates 1757–1857' (ibid.).

This study starts with an analysis of bullion movement in Bengal during 1660–1860 (Chapter 2), which determined the contemporary trend of prices in this province of India. Since the comparative advantage of domestic industries depends to a good extent on their respective domestic prices, this deliberation helps us to understand whether the movement of bullion affected the competitive edge of Bengal industries during the Company *raj*.

The following chapters (Chapters 3–7) cover five major industries of contemporary Bengal: cotton textiles, silk textiles, salt manufacturing, shipbuilding

and indigo dye manufacturing. For each industry the analysis starts from the pre-1757 period, so that the effect of colonial rule can be properly identified. To an extent, these deliberations also give some impression of the pre-colonial industrial economy of Bengal. Our analysis sometimes goes beyond 1857 for the sake of proper examination of the events during the study period. Second, we seek to capture the development aspect of each industry on the basis of production level, investment and employment. Where data are not available we estimate (and, in certain cases, proxy) them using contemporary information. Instead of relying upon a uniform methodology of estimation, greater emphasis is laid on the appropriateness and reliability of the available information that might be used for these purposes. The question of employment is, however, discussed at greater length in view of its importance in the study of deindustrialization. In addition to the employment structure and wage rate, the question of job quality is also examined in a few cases. Third, the technological aspects of individual industries are given due attention because of the conjectural focus of the existing literature on this issue. Fundamentally, the discussion seeks to verify whether a particular industry incorporated any technological progress produced successfully elsewhere. Fourth, global competition is one of the significant areas in this study. The competitiveness of Bengal products is studied in terms of both relative quality and comparative cost advantages. Since most of the industries under study faced competition from their British counterparts, our comparative analyses recognize the British industries as the standard of reference. The only exception is indigo dye, for which the Carolina and Guatemala indigoes are used. These comparative analyses help us to form industry-by-industry judgements about the role of market forces at the time. Lastly, we seek to review in detail contemporary industrial and trade policies, both at home and in England, and assess their impacts on Bengal industries so that the role of imperial policy designs is properly apprehended. It should be noted here that my articles on these industries were published in various academic journals. But almost all those articles have been thoroughly revised in this book.

The concluding chapter (Chapter 8) summarizes the events affecting each industry in such a way that we can form a judgement on certain crucial macroeconomic issues relating to Bengal's industrial history during 1757–1857.

2 Bullion movement to and from Bengal, 1660–1860

For a couple of years a lively debate has been examining the global distribution of precious metals from the new world and its possible impacts on recipient economies in the pre-modern era (Richards 1983; Tracy 1990; Attman 1986). Because of their importance as recipients, the Indian Ocean nations are at the centre of the debate (McGuire *et al.* 2001). Scant information on the movement of this trade through the Levant, a major channel of distribution alternative to the Cape of Good Hope, complicates the issue. It is further complicated as silver mined in Japan was also exported to those countries (Gaastra 1986). However, specific interest has focused on Bengal by virtue of its predominant share in this flow. Here the issue is debated in the context of two distinct periods, prior to 1757 and after 1757. For the former period, there is no disagreement on the tact of bullion inflow but the scale of the flow and its economic impacts are hotly debated. While scholars such as Moreland (1923: 179–82) underscore its inflationary effect on the economy, comparing it to the 'price revolution' in Europe (Nef 1937; Gold 1964), Chaudhuri (1993: 241–8) and Prakash (1988a: 234–40) reject the hypothesis. Prakash in particular believes the trade to have propelled economic growth since the export surplus that was exchanged with bullion was more likely to be associated with higher output and income than with reduced absorption in the form of consumption and/or investment (Prakash 2001: 73–4). All these studies, however, suffer from an implicit assumption that all the imported bullion must have been retained domestically. Recognizing the scale of its outflow from Bengal, this chapter seeks to assess the net inflow of bullion that might have had local economic consequences in the long run. It thereby also enriches our understanding of the further distribution of imported specie from Bengal. For the post-1757 period, disagreement centres on the direction of the movement of bullion itself. While scholars like Habib (2003: 111–12, 118–19) argue that there was a reverse flow of specie from Bengal in this period, Datta (2000: 194–200, 220–9; 2003) refutes this possibility, and argues in favour of a constant inflow throughout the second half of the eighteenth century. The present chapter seeks to resolve this issue as well. Once the question of fluctuations in money supply is resolved, we could make a fair judgement on the direction of price movement in contemporary Bengal. This is a *sine qua non* for understanding the competitive edge of its industries in the global context.

Bengal's demand for silver stemmed from the metallic standard of currency that it had been following from time immemorial despite the absence of any silver mines in the vicinity.[1] Evidence has been gathered to establish that Ali Mardan first struck the silver *tanka* (rupee) in this province during 1208–10, and issued the coins under the authority of Iltutmish around 1217 (Deyell 1990: 213–16).[2] Contrary to the contemporary West Asian tradition of handling coins by weight, the *tankas* were used on counts, and hence closer conformity to the ideal weight was required. The currency subsequently swept all of Sultanate India and lasted down to the Mughal period. Perhaps satisfied of its efficacy, the English East India Company adhered to this metallic standard during its *raj* without any substantial reform. Consequently the greatest challenge that Bengal encountered over these centuries was to acquire silver on the strength of its competitive edge in long-distance trade. During the Mughal period foreign traders used to pour silver into Bengal every year (Lees 1863: 157–65). But part of it leaked out as tribute to Delhi while some of it was hoarded. Given that the outflow of specie on such extra-economic grounds was a regular feature, the efficiency of Bengal's currency system hinged greatly on the inflow of silver. Similar conditions prevailed during East India Company rule because of the continuing outflow of silver, though in different forms and scale. Analysis of the movement of bullion in Bengal during the pre-British and the early British period thus helps us to understand its relative state of money supply during the company *raj*.

Five sections follow. Section I analyses the inflow of bullion prior to the rule of the East India Company and its impact on Bengal's currency system. Section II details the outflow of bullion before 1757. Since there were two major channels of outflow, tribute to Delhi and hoarding by the Nawab of Bengal, both of which primarily came from land revenue, this section deals mainly with Bengal's land revenue system during the Mughal period. The inflow and outflow of bullion are analysed in section III for the period 1757–93 and in section IV for the period 1793–1860. Section V sums up the discussion by way of conclusion.

I

Much contemporary evidence indicates that prior to the advent of the British rule, bullion flowed into Bengal from different sources. A mid-eighteenth-century company document thus narrates,

> Bengal … might be considered as the central point to which all riches of India were attracted. Its manufactures found their way to the remotest part of Hindustan, and specie flowed in by a thousand channels.… All European companies formed their investments with money brought into the country; the Gulps poured in their treasures into this river; and across the continent, an inland trade was driven to the westward to the extremity of Gujerat.
>
> (WBSA 1767)