

Traditional Technology in Colonial Trap: Study of Handmade Paper Industry of Bengal

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***Abstract:** Paper has become an integral part of our modern lives. But, the kind of paper we use today has come a long way through the evolutionary process. From the twelfth century onwards we found kagjis in Eastern India were engaged in the manufacturing of handmade paper. The process of which remained more or less unchanged up-to-the Colonial period. But the advent of machine-made paper brought it face to face with the handmade paper of indigenous origin and finally destroyed the age-old industry. The present paper tries to explore the debate on how traditional technology was trapped under the colonial regime.*

Keywords: Paper, Kagji, Machine, Indigenous, Regime

Paper, one of the most valued materials of modern times had a long history of discovery, evolution, and dissemination in different parts of the world. The kind of paper we use today is machine-made, but before the advent of modern mechanized production, system paper was traditionally made by hands. Originated in China in the first century A.D. paper had found its way toward India from many routes and Bengal one of the most prosperous provinces had commenced its production from the late middle ages. It was until the Serampore missionaries built a paper mill in 1811, handmade paper entirely dominated the market.¹ However, this did not have enough potentialities to alter the situation. Although paper produced in the Serampore mill and those imported serve administrative and printing purposes. However traditional handmade paper to a large extent the unofficial purposes still then. But, the circumstances began to change since the 1870s when several machines made paper industries began to be floated in Bengal and produced cheap and good quality paper. In Bengal, Bally Paper Mill was floated in 1870, which was followed by Titaghur Paper Mill (1882), Bengal Paper Mill (1890), and Imperial Paper Mill (1892). The arrival of the machine-made paper industries had thrown the indigenous ones into a state of de-industrialization at the turn of the century.

In the given context present paper attempts to focus on to what extent the backwardness of technology plays the cause of their de-industrialization. Indeed there had been some scholarly work on the history of this industry; but most of the scholars had concentrated their focus on the paper industries in medieval India, while Sita Ramaseshan's article had extended the narrative to modern times.² Both in these researches regional variations of this industry and the experience of the producers connected did not crop up. In the case of Bengal, *Amit Bhattacharya* dealt with the state of handmade paper in the nineteenth century, colonial interest in the paper industry and setting up foreign mills, the rise of Swadeshi paper industries by the Swadeshi bourgeoisie.³ Although he mentions the state of de-industrialization it was not adequately addressed. The manufacturing process of traditional paper also did not find

its place. Hence, the purpose of this article is to show to what extent modern technology introduced by the colonial power had left a detrimental effect on the traditional industry. It has been divided into four sections, where the first traces the discovery of paper and its migration to India up to the early-modern period, traditional production system and the technology applied in the colonial era has been discussed in the second section, the third one deals with the traditional paper producing centers of Bengal and the effects caused by the introduction of modern paper mills, the last section concludes.

I

The word “paper” is derived from the name of reedy plant papyrus, which grows abundantly along the river Nile in Egypt.⁴ Scholars sometimes taken it for granted that paper and papyrus were of the same nature, which was wrong. Papyrus is made by lamination of natural plants, while the paper is manufactured from fibers whose properties have been changed by maceration or disintegration. Most of the scholars are of opinion that paper was invented in China at the close of the first century of the Christian era and rapidly spread all over the region within the third century.⁵ The Arabs learned the technique of papermaking from the Chinese captives at Samarkand as early as 751 AD. and then diffused it to other parts of the World. It is them who introduced paper to India at the same time.⁶ But, it will be wrong to think that the Arabs were the only ones who introduce the paper to India. In the course of our discussion, it will be seen later, that paper and papermaking were introduced to India over more than one route and at different times.

From a very early date in India, a great variety of hard and soft materials were used for documents, historical records, for personal communication. Stones, bricks, wooden boards, chips of bamboo, metal plates (especially those of copper), and above all palm-leaves and birch-bark, *bhurja* were all in use before the invention of paper. The earliest remains of paper found in India are from the town of Mansura in Sind, which is dated earlier to 1030 AD. Probably it was imported by the Arabs and not manufactured here. With the establishment of the Sultanate, paper manufacture arrived at Delhi by the thirteenth century. By the close of the century, we find Amir Khasru mentioning papermaking as a contemporary craft.⁷ Sultan Zainul Abedin brought papermakers from Samarqand and established the paper industry in Kashmir during the second half of the fifteenth century.⁸ Slowly after these early ventures, the production of paper become manifold and other parts of the country steps into its products in the face of growing demand. Papermaking under the Mughals had quadrupled in its volume and variations, even some of the Mughal paintings bear the detailing of the papermaking process.⁹ If the gunpowder had enabled Mughals to build up a highly centralized Empire in India,¹⁰ papers must have played a key role to sustain that. Papermaking was at the heart of the whole process for the smooth running of state machinery. A huge amount of paper was needed to deliver administrative instructions to every corner of the vast Indian empire.

Coming to our concerned geographical trajectory Bengal, the earliest reference of paper-making was of the fifteenth century, although paper manuscripts are found from the twelfth century onwards.¹¹ At the beginning of the fifteenth century when Ma Huan, the famous Chinese traveler who visited Bengal had noticed, "They (Bengalies) manufacture a white paper from the bark of a tree, which is smooth and glossy like a deer's skin."¹² If we closely examine this account from a technological point of view, it can be stated that; the art of paper-making in Bengal was at first directly learned from China and not from Muhammadan invaders of the Middle East. The process of paper-making from tree bark considerably differs from those practiced in western parts of the country where fibrous rag continued to be the raw material from paper.¹³ This is not hard to understand under the fact that in the early Middle Ages Bengal enjoyed a greater cultural connection with Tibet and Nepal, which had already started papermaking.¹⁴ While the two regions periodically exchange Buddhist scholars, it is quite obvious that with them the art of paper-making may have found its way to Bengal.

II

The workmen who earned their living hood by paper making and selling those in local markets to the petty trades were called *Kagji*. These Kagjis required very little capital and simple tools to produce handmade papers. The implements used in papermaking consist of some earthen vats, a *dhenki* for pounding the waste paper, a wooden mold, a bamboo sieve (*chhapri*) in Eastern Bengal it was called *bara*, a wooden frame for supporting the *chhapri* called *khoi*, some mats for drying the sheets, some *dhundul* fruits for applying the starch, and a piece of plank and a smooth stone for pressing the paper. *Chhapri* the most technically delicate tool was manufactured only in Serampore, Hooghly and had a life of about 2.5 to 3 months.¹⁵ As they employed rudimentary tools, therefore workmen's skill and experience play a major role in producing a good quality paper. Different kinds of raw materials were being used for producing paper pulp. It includes tree bark, hemp, jute, and *mesta* (*Hibiscus Sabdariffa*) as well as rags like old paper, gunny bags, cotton, ropes, etc.

Various accounts of different times stand to prove that the manufacturing process of indigenous papermaking remained more or less unchanged throughout our study. Though the details of paper production technology did vary in different accounts and parts of the province, some common steps may be pointed out here.¹⁶

At first, the bundle of jute, hemp, or waste paper was thrown into a large earthen vat and they are covered with a mixture of lime and water in which they are allowed to soak for a week or ten days. This time of soaking may vary according to the heat of the weather and the material that was being used for making pulp. In the case of the first precondition, the hotter that is, the less time is required. Normally old papers and rags required less time for soaking than their fresh fiber counterparts. For rags generally, two to three days was sufficient for this process. The lime was used at the rate of three or

four seers per *maund* of the raw material. This process of soaking may be repeated several times.

When sufficiently softened, the mass was pounded under a *dhenki* over a stone mortar after clearing the lime adheres to it. It was the most laborious part of the business. The *dhenki* used for this purpose was very much like that used for husking paddy, only somewhat larger and heavier and the head of the pestle was more strongly bound with iron which falls on a stone has no hole in it. The stone mortar was slightly grooved and consists of a large piece of basaltic stone, some three feet long, one-and-a-half feet broad, and a foot high.

The pulp produced after pounding with the *dhenki* was next thoroughly washed, and then it was thrown into a vat full of water for the second time. The contents of the vat were constantly stirred with a rod to prevent the pulp settling down and a little was dipped up at a time in a rectangular skeleton mould, resting on a fine sieve known as *chhapri*. It measures 23" by 18" and its slips were strung together with horse-hair (ropes were also in use). The *chhapri* or sieve is stretched over a wooden frame and was held firmly in position by the *declé* or rectangular mould pressing on its four edges. On withdrawing the mould from the vat in a horizontal position the water within the *declé* drains off, leaving the *chhapri* covered with a thin film of fibers, the operator meanwhile shaking the mould to evenly distribute the film.

After that, the *Kagji* separated the paper from the *chhapri* and piled them over a slanting piece of stone covered with a piece of gunny cloth or, a paper that he had already made. This process was repeated several times until the total pulp gets finished. The layers were then dried separately in the sun on a mat.

At the last stage when the layers were becoming perfectly dry both sides were successively smeared with a starch obtained by boiling sunned rice in water and applied with the spongy fibrous shell of a *dhundul*, and dried. This operation was called *tulat*. Often arsenic was added, to preserve it from the depredations of insects. Each layer thus becomes a sheet of paper, which is then polished with a stone.

Both men and women labour had been employed in this paper making process. Generally, the duty of beating the pulp in *dhenki* and applying starch on the sheet, then pressing them with a smooth stone was left for the women. As we can see from this, in the traditional paper-making process family labour plays a crucial role for the *Kagji*'s. This ultimately helped them to keep their production cost as low as possible. Not only the *kagjis*, but some pundits could make paper on their own house for making horoscopes, etc.¹⁷ The paper produced was generally white, but sometimes coloured blue or yellow. The blue colour was imparted with indigo dissolved in the pulp vat from which the films are dipped up with the *chhapri*. The yellow colour was given by dissolving turmeric in the starch. As far as the report goes yellow paper was only produced in the Hooghly district.¹⁸

III

From medieval times Murshidabad and Hooghly were the major paper-producing centers of Bengal. At a later period, Pabna, Chittagong, Manipur, Burdwan, and Dinajpur also started paper manufacturing. At the beginning of the nineteenth century, Doctor Francis Buchanan Hamilton had found that paper-making in the district of Dinajpur was entirely dominated by the Muhammadans. At that time there were nearly 80 to 100 families employed in the paper-making in the district. Following the traditional handmade method, they were adequately catering to the local demands, although the quality was inferior to that of Calcutta. It was "brown, rough, uneven, spotted, fibrous, full of holes and brittle, ink sinks into it, and insects devour it with avidity."¹⁹ About fifty years later we find another survey upon the eastern part of the region, and it was by James Wise. He also pointed out that "Papermaking is exclusively a Mussulmán trade, carried on in the low lying tracts of country where the plant used in the manufacture grows."²⁰ Bikrampur was the prominent seat of paper manufacturing in Eastern Bengal and the village Arial Khan, there were four to five hundred houses occupied by these craftsmen.

It is evident from the above discussion that handmade paper was one of the most thriving traditional industries at the turn of nineteenth-century Bengal. Amit Bhattacharyya had shown that before the establishment of colonial rule, capitalist manufacture made its appearance in the paper industry of Bengal. But, the leap from manufacture to large-scale industry did not take place.²¹ It was at this juncture colonial rule intervened with its superior technology and flooded the domestic market. Different scholars put forward the theory that colonial administration and its policies had played a handy part in the decline handmade paper industry but, an objective analysis would reveal that technological backwardness, at last, proved to be the major cause for its decay. The handmade paper industry with its age-old technology failed to meet the growing demand of the time.

Here one can question why *Kagjis* failed to mechanize their production? The answer would be a hypothetical one, that they did not have enough capital for using new technology, drive for cheap labour, and absence of institutions that of Europe in pre-industrial times for channeling scientific research ultimately proved to be its major obstacles. For these reasons manufacture of paper was mainly carried out in cold seasons and on average one man can produce 175 to 200 sheets per day. This was not sufficient in the light of growing administrative works, the spread of education, and of course for printing, which was introduced at the beginning of the nineteenth century. Handmade paper was thick and thus makes it unfit for printing. Under this objective condition, the colonial government was compelled to introduce modern paper-making mills to the country, so that it could supply adequate as well as modern paper required for different purposes. C. A. Bayly in his study pointed out that the decline of papermaking in the lower Doab was in part caused by the desuetude of the traditional Indian paper varieties, but it also reflected the growth of new papermaking industries at Serampore in Bengal.²²

That the introduction of modern paper mills left a detrimental effect on the traditional paper making industry was reflected in various contemporary accounts. In the first half of the nineteenth century, Hooghly happens to be a prominent place for native paper production, which was not only engaged in supplying the local demands but also the government. Serampore gave its name to a special kind of paper manufactured in that region. The paper made at Pandua was not only the best but also the cheapest. We found that the magistrates of Sylhet and other districts were constantly asking the magistrate of Hooghly to procure and send them the paper from Pandua. When its manufacture was introduced into the jail at this and other stations, the doom of this industry was sealed. But it 'receives its final deathblow from the mills of Bally and Titagarh.'²³ When D. N. Mukherjee, visited the papermaking centers at the beginning of the twentieth century, he noticed that "Papermaking is a dying industry in the province. Only a generation ago it was still in a flourishing condition. Within this short period, it has completely disappeared from many districts." That the technological backwardness was the major obstacle for the development of handmade papers also drew his attention. He mentioned that "So far as the paper industry goes the crude hand tools in use in this country have no chance whatever against machinery."²⁴ In Eastern Bengal J. N. Gupta also noticed that as a result of competition with the mill-made papers, jute paper had been thrown out of the market. The native paper industry at Serajganj in Pabna, Chittagong, and other villages of Areal, Manipur, and Bogra was decaying at the time of the survey.²⁵

IV

It would be wrong to hold that the indigenous paper makers were wiped out from the scene in the face of the growing import of mill-made papers and the establishment of new paper mills in Bengal, as well as India. Instead, the survey report on the cottage industries mentioned that there were still some kagjis engaged in their hereditary profession even in the thirties of the twentieth century.²⁶ They generally sell these papers to Marwari Mahajan and zamindars who used them for their account books. It was nearly impossible for the handmade paper to compete with mill-made paper, both in terms of quality and volume. The growing demand for paper acted as a push factor to introduce new technologies from abroad. Traditional papermakers being far from adopting these new technologies were thrown out of the market. Unfit organizational structure, lack of economic resources, and colonial constraints were duly responsible for their failure. Unlike British manufacturers, the kagjis of Bengal failed to step into large-scale mechanical production. This gap was then filled by British entrepreneurs, who stepped into this arena with their superior economic and technological resources.

Notes and References:

1. There is a controversy upon which was the first paper mill of Bengal. Whilst most of the scholars are of opinion that the Serampore paper mill begun the first mechanized production, Sita Ramaseshan suggested that Calcutta Paper Mill established approximately in 1789-90 should be crowned with the title. But under the light of no direct evidence of the technology and the paper produced therein, here we stuck with the popular belief.
2. A. Rahaman's chapter on 'Paper Technology in India', Syed Ali Nadeem Rezavi's article 'Paper manufacture in medieval India' falls in the first part and Sita Ramaseshan's article was titled 'The History of Paper in India up to 1948'. Further information regarding these has given in the later sections.
3. Bhattacharyya, Amit, *Swadeshi Enterprise in Bengal: 1921-1947*, Kolkata, Setu Prakashani, Second Enlarged Edition, September 2007, pp. 3-37.
4. The New Encyclopedia Britannica, 1975, Vol. 13, p. 966.
5. Traditionally, the invention of paper was attributed to Tshai Lun early in 105 AD., but after that discoveries of very ancient paper fragments in North and Northwest China had pushed back the date of this invention at least some two to three centuries before him. Needham, Joseph, et al. *Science and Civilisation in China, Vol. 5, Part. 1*, Cambridge, Cambridge University Press, 1985, p. 2.
6. For the early history of paper and its migration, see Needham, Joseph, *op.cit.*, Gode, P.K., *Studies in Indian History, Vol. Cultural III*, Poona, 1969, Part I, pp. 2-6.
7. Habib, Irfan, *Technology in Medieval India, 650-1750*, New Delhi, Tulika Books, 2008, p. 63
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9. Habib, Irfan, *Op.cit.*, p. 65.
10. McNeil, William H., *The Pursuit of Power: Technology, Armed Force, and Society since A.D. 1000*, Chicago, The University of Chicago Press, 1952, p. 98.
11. Ramaseshan, Sita, 'The History of Paper in India up to 1948' in *Indian Journal of History of Science*, 24(2), 1989, pp. 105.
12. Ma Huan, *Yang-Yai Sheng-lan: The Overall Survey of the Ocean Shores*, translated from Chinese by J.V.G. Mills, Cambridge, 1970, p. 163.
13. Habib, Irfan, *Op.cit.*, p. 64.
14. Nepal was then under Tibetan suzerainty and the art of papermaking was introduced to Tibet in the middle of the seventh century. Needham, Joseph, et al. *Op.cit.*, p. 357.
15. Mookerji, D. N., *A Monograph Paper & Papier-Mache in Bengal*, Calcutta, The Bengal Secretariat Book Depot, 1908, p. 5.
16. Mookerji, D. N., *Ibid*, pp. 4-5, Buchanan(Hamilton), Francis, *A Geographical, Statistical and Historical Description of The District, or Zila, of Dinajpur, in The Province, or Soubah of Bengal*, Calcutta, The Baptist Mission Press, 1833, pp. 272-273, Wise, James, *Notes on the Races, Castes and Trades of Eastern Bengal*, London, Harrison and Sons, 1883, p. 81, Gupta, J. N., *A Monograph on Paper-Making & Papier Mache in the province of Eastern Bengal & Assam*, Eastern Bengal and Assam Secretariat Press, Shillong, 1909, p. 5.
17. Bhattacharyya, Amit, *Op.cit.*, p. 9.
18. D. N. Mookerji, *Op.cit.*, pp. 5.
19. Buchanan(Hamilton), Francis, *Op.cit.*, p. 272.
20. Wise, James, *Op.cit.*, p. 81.
21. Bhattacharyya, Amit, *Op.cit.*, pp. 9-10.
22. Bayly, C. A. *Rulers, Townsmen and Bazaaras: North Indian Society in the Age of British Expansion, 1770-1870*, New Delhi, Oxford University Press, 2002, p. 292.
23. Toynbee, George, *A Sketch of the Administration of the Hooghly District From 1795 to 1845 with Some Account of the Early English, Portuguese, Dutch, French, and Danish Settlements*, Calcutta, The Bengal Secretariat Press, 1888, p. 98.
24. Mookerji, D. N., *Op.cit.*, p. 3.
25. Gupta, J. N., *Op.cit.*, pp. 4-6.
26. At that time a few *kagjis* of Hooghly, Dacca, Chittagong, and Pabna were still struggling to survive competing with cheap mill-made paper. *Report on the Survey of Cottage Industries in Bengal*, Calcutta, Bengal Secretariat Book Depot, Second Edition, 1929.