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Railway Communication in Colonial India 1850-1870

Stereotype Contradictions and the Dilemmas in Railroad Management

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Abstract: This article deals with the problems in railway communication management that became evident in the initial phases of British-Indian railway in colonial India that ultimately revealed some contradictions and dilemmas of management in this sector. Arguably, the insufficiency on part of railway managers and their subordinates, and, moreover, an apathetic railway management revealed such contradictions and dilemmas which is the central argument of the present article. This article would examine some basic environmental and social issues involved in the beginning of the railway communication in colonial India. This article also shows the physical obstacles which impacted severely on the society. This great intensity for commencing of the railway communication in colonial India is the basic subject point of this article. Far from contradictions, the beginning phases of railway communication got accepted by the Britishers in an amicable attitude to solve this problematic issue. This paper undertakes a comprehensive analysis of the imperial railways in colonial India during the second half of the nineteenth century. Such related aspects and the development of the railway communication also effected nature severely, deforestation and changes in the water ways were the immediate result of this discourse.

Key words: Deforestation, guaranteed system, waterways, epidemics, navigation

The evolution of the history of railway communication in colonial India in the beginning phase was a severe contradictory phenomenon with a lot of dilemmas and ambiguities in its management sector. Despite that, there was alight of impression regarding the introduction of railway communication in British India. The act of introducing the railway system was faced with such contradictions towards achieving a lucrative completion and successful implementation of this public-private partnership project. However, such intensions of planning were highly influenced by the British policies. This impression was closely associated with the development of history of railroad communication. Therefore, such administrative inadequacy was seen from the beginning of the railway's implementation in colonial India. In the first phase of colonial railway in India, various difficulties were seen in thee level of physical obstacles. Nevertheless, long after the British Empire expanded substantially, railway provided administrators with accurate and detailed knowledge about the railway management. This article reveals such crucial picture of contradictions, based on connecting the rail road and had some bearing on the future trajectory and the pattern of the administrative management of the railways in colonial India. However, all these contradictions in railway management brought such complexities and a cloudy autonomy in railway management. It could be pointed out that the colonial perceptions and goals influenced the introduction and development of a diverse range of railway management.

In the first phase of nineteenth century the basic argument regarding problems of railway management had been the issue of deforestation. Due to the expansion of the railways, it was required

to clear such jungles and it had a deep impact on the environment. To expand railways it was necessary to cut down trees and jungles to create a pathway for the railroad. The deforestation primarily occurred at this juncture because it was easy to create a rail line through jungles and forests rather than creating it through the places of human settlements. Cutting down trees and jungles thus provided two-way solution; firstly, it would allow a comparatively straight line long way away from human settlements; on the other hand, the general safety of the rail line and its carrier could also be maintained without any such contradictory problems which arise because of the human civilization residence nearby the line. Thus, at once, the forest, which always had been the key to a balanced ecosystem, became the targets of those men trying to expand railways for the sake of facilitating transport communications. These phenomena in a quite obvious manner, contradicts with the position of human beings within the nature. Several historians have expounded the picture of the deforestation due to the expansion of the railways in colonial India. William P. Andrew was of the opinion that

"such a line for one half of its course to traverse a barren country, in many places covered with almost interminable jungle and totally uninhabited, beset with physical difficulties of the most gigantic description – there could be but one result, and that result fraught with disappointment to the government, the entire loss of the capital embarked, and the postponement for an indefinite number of years to India, of the inestimable boon of improved intercommunication"[1]

Deforestation was a big controversial issue raised in the beginning phase of railways by the colonial state. Pallavi V. Das's argument on the colonial state, made a response to deforestation which was due to the railway expansion in colonial India.[2]

Adding to the after-effects of deforestation in colonial state, it was found that the outbreak of various diseases and epidemics were closely related to the deforestation. Deforestation throughout centuries caused several changes in nature and deforestation always had the capability to uproot human settlements. Deforestation, as argued, causes great natural disorder like flood, drought, irregular and limited rainfall. Due to the increasing amount of deforestation for railways, the outbreak of diseases and epidemics became almost a regular and parallel development during this period of time. Cutting down of trees for timber from dense forests also resulted in affecting the human lives which were closely associated with forestry. So, it was necessary to explicate the existing railway expansion theories which influenced and created a lot of controversies. Although it was also stated that deforestation had a thumping impact either positive or negative in colonial society on their certain economical changes. Even though, the colonial state emphasized the development of railway technologies. Controversies basically depended on the impact of deforestation on the colonial society due to the expansion of the railways. It should be noted that the expansion of railway needed raw materials from the forest under direct or indirect supply. Such natural resources were demanded for railways which were closely associated with deforestation. Thus it was also a necessary aspect in expanding railways to use wooden logs to build up the railway and consequently thousands of trees were chopped down and deforestation had no option to avoid in order to achieving the desired end in expanding railways.

However, the basis of this technological revolution was the railway steam power which helped in producing railway machinery and transport system. Aruna Awasthi pointed out that in 1880s, when steam power was extended from production to transportation it caused profound economic, political, social and ecological changes. Indeed, one might say that the ecological implication was closely linked to the deforestation because of railways. However, due to provisions of long distance and need of natural resources for expansion of railway transportation, deforestation was a necessity. Consequently, there was a huge demand for resources to expand the railway transportations. Apparently, it was inevitable to say

that fuel (such as wood-fuel) and wood (for sleepers and carriage) were the main resources for the railway expansion and transportation. Varied usages of trees had always been crucial in the history of human civilization since ancient times, and likewise in other aspects, trees were also used extensively to meet the need of railways in the time of its expansion. Awasthi opines that, "... mechanization of production and transportation idea to transformation of resources from one from to another and their transport over large distance."[4]

Among many consequences of British imperialism in India, one of the most threatening was the environmental degradation like deforestation. The English entrepreneurs played a major role in developing Indian railway system through the colonial states that came under the direct rule of British Raj, debarring the princely states. Laxman D. Satya has pointed out —

"the railway classical colonialism was characterized by Indian exports of agricultural raw materials and imports of British manufactured products. Throughout the 19th century, British enjoyed a trade surplus with India. These exports primarily constituted agricultural raw materials. Thus, Indian economy exclusively serviced British economic interest."[5]

On the other hand, Awasthi shows that,

"Great Britain's, the leading industrialized nation, lacked a 'forest sense' and neglected forestry to an extent that 95% of the timber requirements came from foreign countries. By 1860, own wood supply began devastating the forests of Ireland, South Africa, and North East USA, Canada and India for ship-building, iron-smelting and farming and on some occasions to symbolize political victory."[6]

Apparently, the deforestation for railways in colonial India seriously affected the natural state of the society such as flood, drought, irrigation and food production and diseases. Hena Mukherjee has also expounded with example that how much deforestation has occurred because of railway expansion and the amount of land acquisition by it. She has clearly documented that:

"for EIR line between Howrah and Pandooa, roughly 43 bighas of land per mile had been acquired for permanent, and for example, 1,633 bigha, 2 kathas 14 chhatacks of land in total along with 12,266 trees, 20,556 bamboos were destroyed and 2,789 bighas, 17 khattas and 1 chhatacks of land with 21556 trees, 32766 bamboos had been taken over for temporary occupation."[7]

On the other hand, Smriti Kumar Sarkar shows how various trees such as mango, jack fruit and coconut were cut down for laying of railway lines. The colonial railway management faced ambiguity, contradiction and dichotomy while laying those lines. In the context of the forest conservancy, the selective harvest through scientific forestry was the subsequent development to meet the amount of timber required for the railways and other public works of the state. Moreover, the forests, during the colonial period, were changed in two ways due to the introduction and development of technology in the form of railways. In the context of colonial railways, it was comprehended that the beginning phase of the Indian railways started in the 1840s which was the crucial part of the colonies maximizing their profitability which was associated with the efficient use of natural resources. Considering the global economy during the mid nineteenth century, it could also be argued that this deforestation might have arisen from the risk of the entire part of the colonial railway expansion.

Apart from the impact of deforestation vis-à-vis the railway management, the entire process of railway building was associated with the colonial society. The expansion of railways did not only take away things but also gave opportunities to people who made their living and secured some financial aids, while working in railways.

Historically evident is the fact that there were two major epidemics that spread due to the deforestation for railways. We could also point out precisely how the situation was and what the precautions were that the railways had taken in this regard. Moreover, what inconveniences did emerge at that time?

In the context of Malaria epidemic in colonial Bengal, it is worthwhile to mention that during 1850-1891, approximately 4000 km of extension of EBR progressed, and, in 1860, a large part of Burdwan district was ravaged by this epidemic in severest form. Local Civil and Medical Officers' unanimous opinion was that the obstruction of drainage by road and railways had adversely affected people's health in certain districts. The Eastern Bengal Railway did in no way interfere with drainage. Therefore, the Magistrate of 24-parganas pointed out that the railways and roads might have contributed to the intensity of epidemic fever in Haleeshuhar and Barasat by obstructing drainage in those places. In conformity with this argument, the Burdwan Commission considered to maintain the railways with the help of the local officers. Magistrate of Hugli pointed out that drainage in Hugli district had suffered with the opening of the railways. Furthermore, the year 1884 has referred to the similar cases in Murshidabad, Dacca and Mymensingh as well. There was an outbreak of malaria fever and malaria epidemic during railway construction. Due to the deforestation and railway constructions, the drainage system of rivers, channels, khals had severely affected. On the other hand, the conditions of humidity in the village areas increased the chances of the epidemic outbreak in many parts of central and western Bengal. There were cases of blocked water courses that provided optimum conditions for the breeding and multiplication of anopheles mosquitoes.

So far as cholera was concerned, during 1878-85 the railway construction became the site of the cholera epidemic. As gang of laborers moved along the railway lines in temporary encampment of huts, they were susceptible to cholera. For instance, during the construction of the Great Indian Pennsular Line, which almost bisects the provinces associated with the subsidiary lines of Khamgaon and Amraoti, similar cases happened to be regularly seen in-and-along the construction sites. During the colonial period, a large number of labour forces associated with the railway construction moved from one place to another place and, thus, spread over larger areas throughout British India. For example, between 1860 and 1866, there were thousands of workers, who were involved in the railway construction, lost their lives to cholera. In Berar, during hot weather, cholera was very much destructive to the human body. An 1862 report shows that 4870 persons died due to cholera. Thus, the railway administration as well as the state authority lacked the necessary sympathy towards the lives of the workers, involved in the railway construction. Proper scientific action, on instant service basis, was not taken at that time when most of the workers died on account of cholera and other diseases. However, in case of Purna Valley, the cholera mortality was 45,004 between 1863 and 1869, followed by an approximate number of 227 deaths per mile of railway line.[12]

In the first phase of the railway communication in India it was seen that the waterways conflict with the railways. Such problems were created due to the ill-management of the branches of direct railway line. From the outset of the railway expansion, there had been strong comparison between railways and waterways. These comparative effects had an impact on the railway administration. It needed to be expounded that the railway establishment cost, interest, and capital outlay were the crucial argument behind this contradiction. Despite that discussion, it could be precisely said that railways were essential in colonial India to the evolution of communication history. It is also noteworthy to point out that waterways were provided with cheap produce and cheap transit. However, it could also be pointed out that railways did not water the land, and consequently delivered cheap produce. The palpable failure

Of the railways to yield return for the capital at that moment was a hindrance to the application of British enterprise to India. Daniel Thorner has pointed out the guarantee interest railway contract for promoting "enterprise" which was called private but whose risk was made public and this development provided art of political manipulation which gave aid to the craft of enterprise.[14]

The basic and favourable argument behind the railway establishment in colonial India depended on a comparatively cheap and the speedy transport service vis-à-vis the other communication means. "Ample speed for every purpose required in India, in fact, if it were necessary, at high speed as those at which the railways are now worked. But indeed, speed above 10 or 12 miles an hour is in the present state of India a matter of almost perfect indifference. Such rates and speeds, their value for irrigation is so great as to allow for direct returns of 20 or 30 percent, if required, while their indirect returns will be 100 or 200 percent."[15] Significantly, it could be argued that the management of railway improvement should be necessitated. Such assumption was created by British capital and enterprise in India and it was powerful and effectual due to enormous direct returns. Daniel Thorner gave argument that British capital followed the European government bonds and continental railways, rather than to colonial possessions. The establishment in London of the steam shipping and railway companies later revolutionized India's communications and began the opening of Asia to the West by some completely new means of communication system.[16]

Serious obstacles came up in the formation of canal collateral of the river. A waterway such as general canal and fine canal, but general canal was taken off especially high up and fine canal was also taken off below. These canals were related to irrigation. The openings of canals facilitated the trading transactions in India as well. At that time, the climatic conditions were unhealthy in our country. Waterways, such as, navigation had a great impact on the climatic conditions. There was lack of management of the development of waterways in colonial India.

However, there were unhesitating conditions in commencing a hurtful error of the objective. The basic error occurred in obtaining a free ascension towards the river itself. The formation of canals and lack of maintenance had arisen such obstacles such as surmount of canals. However, a careful supervision was needed to build their levels of canal. In most of the cases, these water levels also depended on the water of the main river navigation. Subsequently, it might have caused dangerous situation of floods due to the huge volume of water. Moreover, a comprehensive attention was necessitated to provide better management.

The intention of the waterways was inconvenient but not rigid. The necessary official funds for navigation were trivial. In this situation, the idea of railway introduction became a zeal for India. In the context of the waterways and railways, we could observe that they were entirely essential for traffic ways. Moreover, river's primary path was not harmonized for the passing of traffic. It can also be pointed out that Indian rivers were once again struggled and the basic impact was noticeable on the environment itself. Therefore, the financial loss in maintenance of navigable canal was less than the cost of the maintenance of railway connecting in colonial India. It was evidently and significantly stated that railways created a relationship with the neglecting part of the communication.

The first phase of the construction of the railways in India had prepared and organised under several provisions. It can be pointed out that expenditure of the capital for railways was enormous. The idea of the railway contract under British company revealed such contradictions. Huddleston has stated**:**

"EIR prepared to sanction the construction in different provinces to grant the land for the railway

free of all cost for ninety years and to advance interest at four percent per annum for fifteen years, on the capital to be employed not exceeding £3,000,000 sterling to commerce paying such interest so soon as the contract should be arranged and to receive repayment thereof when the profits of the line should exceed four percent."[21]

However, behind this argument, it was pointed out that the important object was financial credit behind the introduction of the railways in colonial India. Hence, the supreme essentiality for railways in India occurred along with the waterways.

Apart from the inevitable consequences of the railways, it can be said that the 30 to 40 miles of railways might have been laid by the same amount of money. But in a reverse picture, the revenue and traffic interest got increased. Significantly £600,000 was spent on the line of railway passing. It can be pointed out that there was a ridiculous and notorious impact on the society by these spreading of railway lines. Points were to be observed that the speed per mile was most essential for railway traffic. Thus, steam velocity and cost of the maintenance of the permanent railway becomes an important part for discussion. It was noted that- "the idea of railways and with a true instinct has ever declared the paramount necessity for water in India, both for irrigation and navigation."[23]

Financial and physical difficulties in circumstances were followed in the case of waterways. Experimental steam power was not an early provision to apply in colonial India. Despite that it was not something to be quickly overcome of. Administrative function of the railways had a great impact on the debating issues of 'waterways vs. railways'. There emerged a lack of administrative issue to transit from waterways to railways. We have seen several problems of treaties from the beginning of the railways. Railway and state authorities had also taken several decisions to overcome these situations. In this article we revealed such administrative inadequacies, which always linked with the beginning conditions of the colonial railways. Under these circumstances, several negotiations and provisions of the administrative function were accomplished with certain limitations. Huddlestone also points out that:

"…very great caution was therefore needed in conducting the preliminary negotiations for the construction of so great a national work, involving so large a capital outlay, in a country so distant and at the time so little known. Terms were proposed in the first instance, which would now seem to have been sufficiently liberal, though the Board did not think so, and ultimately obtained conclusions for substantial modification. The first conclusions of the EIC and what they were prepared to do towards the introduction of a railway system in India."[24]

It needs to be understood that in India, less than 1% of the capital was contributed by the natives. Moreover, railways were not entirely understood, and they were not acclimatized to the country. Mr. Hyde Clarke observed that the "whole of Europe and the whole of America at this moment adopting not only canals, but railways and road as a means of improving the transit of the country and why not India should do the same?"[25] Indeed, the answers laid in the conspicuous perplexities of our economic condition which was more important than the European scientific revolution. Apart from that, Dadabhai Nawroji has drawn the attention of the masses to the matter that the railway could have relieved famine-stricken districts by bringing reliefs during the time of necessity. It was also pointed out that it might require some power of mind to steam the popular idea of railway infallibility. Irrigation works could be found quite as capable as railways, and far more profitable in giving work to PWD. Hence, it can be said that such facts proved the ambiguity and turbidity in the policies of the railways. Significantly, it could be pointed out that a great danger of menace was partly associated with the beginning of the railway communication. Apparently, such questions were referencing to associate the development of Indian railways. Therefore, such concept of native components was a close part of it. Hyde Clarke had argued that a saving in time by railway conveyance was the effect of a higher rate of speed than by either land or water conveyance. Therefore,

the advantages of steam freight on the Ganges meant that the transit would be restricted.

Apart from this discussion, therefore, several other defects came into notice from the beginning of the railways. Insufficiency of construction and maintenance was the chief point of discussion in the railway administrative management. Stephenson mentions:

"among the prominent defects of the particular system, and the errors to be especially avoided, are the excessive loads and strain to which the Railways are subjected, by the needless weight of the engines recently constructed, far exceeding the powers of continued resistance of any permanent way that can be laid down – the insufficient regard paid to the essential element of complete success in a Railway, viz.: that its cost of constructing, maintenance and working should be regulated with reference to the wants of the community, as to admit of establishing the lowest possible rate of fares."[28]

In spite of these defects and insufficiency of construction it can be argued that, there was convenience of distant communication. Cheapness of production and prices were also the integral contribution of the railways. Stephenson precisely stated that "the establishment of a system of internal communication, unexampled in any age or in any country; a concentration of power for governmental purposes, of incalculable political and military importance; a facilitating and economizing of personal transit and mercantile traffic, which has augmented individual and national wealth, the rapid conveyance of troops, police and intelligence – of the highest consideration for the maintenance of peace against foreign aggression or disturbance." Hence, it can be pointed out that, railway communication was needed in the different parts of the country due to the great social activity. At that time railway communication had a deep impact upon the military and political importance than the waterways in British India.

In the beginning of colonial railways in India, there was always an endeavour to understand the public mind. There was a scarcity, among the masses, of a proper understanding of how the railway would function. But there was also strong endeavour to accomplish the goal. The public mind, getting acquainted with the significance of railways, was gradually perturbed; so far as the introduction of railways in British India was concerned. Stephenson further elaborates, in this regard**:**

"the public mind became familiarized with the operation and advantages derived by other countries from the application of this mode of transport, which had already introduced a strong feeling in favour of the early introduction of similar measures in India. With a view to provide necessary material for duly estimating the relative advantages of the different lies upon which from the known extent of trade, it appeared probable that a railway would prove remunerative."[30]

In the context of public works, it would adequately define the accomplishments of the railway in British India. Railway communication throughout India could also be simultaneously justified. Unfortunately such mismanagement created crisis in the beginning phase of the railways. However, it can be said that administrative inadequacy was closely associated in this beginning part of railway management. Stephenson also clearly pointed out that "there was mismanagement in the working body. Advisable that management of important undertakings should not be vested in Calcutta Boards. The single evil to which to attribute the want of success in most of the measures referred to is mismanagement, to which, in most cases, the disastrous consequences are palpably and directly traceable." It can be explained with evidence that with the beginning of functions in the railway management, there was a precise accomplished idea for the development of the waterways. Stephenson, moreover, explains:

"we have a similar map in course of preparation for the purpose of showing the canal and river

navigation of the country – the improvements already in contemplation or operation – and the advantages which would attend the cutting new canals, and by directing the sources – by dredging – or by other means, improving and rendering the rivers more securely navigable than they are at present."[32]

However, the initial years of railway communication in colonial India was apparently evident by the mismanagement and hopelessness of the preceding scheme of railway functions which caused the delay in assurances of railways and other favourable or advantageous measures. Edward Davidson, in this context, analyses:

"Railways, which had gone far in England to annihilate distance, were in India to reduce to a manageable extent the vast distance of the continent; were to strengthen the Government; to bind races together; and by giving in impetus to commerce, to vivify and give such a bias to the character of the peoples of India, as ages had not effected, and ages would not efface."[33]

However, the conveniences of railway speed became necessity and provided impetuous to the field of inter-communication within the expanding railway networks. Pertinent, in this context, was the opinion of Davidson that "there actually is a parallelism between the material progress of a nation in wealth, power, and civilization and advance in easy and rapid intercommunication."[34] Clearly, such waterways were tortuous, and created dangerous, unhealthy conditions, revealed its great disadvantages and drawbacks. Notwithstanding, the railway communication was a crucial part of the British imperialism in India. Other foreign countries apart from Britain, a more extensive railway network than waterway communication like canals were seen existing. In Indian context, it was completely different and various circumstances also distinguished the Indian railway networks from the other European and North American countries. Hyde Clarke mentions "that we find the whole of Europe and the whole of America at this moment adopting not only canal but railways and roads as a means of improving the transit of the country."[35] Technological superiority was the associated part of the railways, and encouraged the development of the communication system in colonial India. In India, precisely evident was a competition between the railways and other means of transports, like waterways. Consequently, railways also demolished other communications as well. Tirthankar Roy has stated that railways started to get dominant over the older system of transport without much resistance. Apparently, it was seen that huge growth of trade adversely affected the market due to the intersecting of the railways. The arrival of steam technology also created various kinds of competition.

Moreover, the selection of en routes of imperial railway lines, in advantageous and disadvantageous circumstances, provided the initial ground from where the stages of railway industry started its journey and culminated, by the end of the nineteenth century, into the chief transportation means in India. But, the inconvenience in regard to the route of the waterways and railways was considered under the imperial customs. Davidson had identified the advantages, the route by the valley of the Ganges that could be brought forward to counterbalance these drawbacks and it was eventually established, but the wisdom of the decision had been often questioned. The fact was that as an imperial line for India, the direct railway was always better. But as a provincial line, promoting especially the interests of Bengal, though not ignoring those of the Empire, the Ganges was always preferable. Experience proved that the trade of the country required both.[37]

To conclude: the railways played a crucial role for a larger pattern of the development of communication grid and matrix in colonial India. The expansion of the railways in colonial India did not only abandon and destroyed several natural objects and its order, but at the same time, it helped immensely in connecting people of colonial India. The expansion of railways brought with it a bigger

and greater dynamic picture in colonial India. A great effect on railways by the trading and commercial model was seen during the time under study. Thus a narration of the contradiction of characteristics for the formation of the railways in India was associated with traverse dilemmas. However, the beginning of this idea of railroad difficulties as well as the construction and administrative management had carried out several trends of management. This also resulted in so many new inventory ideas and ways coming into functionality for proper maintenance of this expanding railway in colonial India. The British imperial policies and communication velocity were the significant criteria for connecting railroads in India which faced great management deficiency and difficulties in the entire railway communication process. However, in the way of the railroad communication with the interior was as great as a picture of insurmountable conditions. Several railway administrative departments played important roles initially in the construction of the railways. Railways in India should be regarded as an experiment with an aim at economy, rather than perfection in their construction. The possibility of mismanagement under any circumstances in the beginning phases of railways in colonial India diminished the development of the railway object. It could be expounded that the apprehensions of the railways development precisely depended on the sagacity of the British imperialism. Objections and speculations originated by the process of the administrative management of the colonial railways. Despite various contradictions, it could be said that the initial phase of railway communication should be discussed in the light of great comprehensive possibilities of technological revolution. In addition, the intentions of political and financial imperialism by the British were also associated with this part. The whole tendency of the railway communication should not be discussed with their permanent embarrassment, stereotyped as indolent and apathetic as seen in preparation of railway communication. That is why such contradiction and dilemma had arisen.

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16. Cited in "Investment in Empire: British Railway and Steam Shipping Enterprise in India 1825-1849"
17. Tyrrell,Col. F, Lieut, "Waterways or Railways, Or the Future of India", London, 1874,P 9-10, See in detail, "There is another part of India, where the West and East can be joined by a canal that is by the junction of Jamunna and the Sutlej. The Wurda can be joined to the Taptee by a canal down the valley of the Poorna or the Weingunga could be led to the Wurda across Nagpore. To the south of the Poorna Valley, there is a range of hills that excludes the possibility of a canal going south in that direction. A most simple means of connection between the southern rivers running to the eastward and the two rivers Taptee and Nerbuddha running to the westward. The Wurda takes rises in central India, west of Baitool, and flows south from the Chickuldah Hills between Woon and Chandah, where it falls into the Peningunga, these rivers are joined further east by the Weingunga, whence under the name of the Prenheeta they flow to the Godavery."
18. Ibid, see in detail, "The area drained by the confluents and Godavery proper, may be roughly stated at 600 miles by 400 miles, 240,000 square miles."
19. Ibid. p. 13 see in details, "the whole of the vast region is particularly level: from the Sunderbonds to Delhi and to close below the hills, there stretches one vast plain, traversed by large rivers, that have their sources in the Himalayas or in the highlands of central India. Underneath the Himalayas there is a subsidiary tract of low hills, where the most favourable sites for the storage of water could be obtained."
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29. Ibid, p. 61
30. Stephenson, Reports on Railways into British India, London, 1846, .P 1
31. Ibid, P8, see in detail, "that there are, and always will be, exceptions to the rule there is no doubt; but it may be assumed with considerable accuracy that no undertaking of magnitude in which other than local capital is invested should ever be embarked in, of which the sole and impossible control is placed under Calcutta management."
32. Ibid, see in details, "the object in both cases is to elicit such an unprejudiced and faithful account, supported by full and authenticate statistical details, of the comparative advantages to be derived from the adoption of the one or the other means of extending the facilities for intercommunication between the vast productive regions of the interior, and the natural outlets for their produce – the nearest and most eligible shipping ports. A more detailed map embracing the geological and mineral features of the country – and the several districts arranged with a view to the explanation of the accompanying papers."

33. Davidson Edward, The Railways in India : with an Account of Their Rise, Progress, and Construction" pp. 3-4, London : E. & F. N. Spon, 48, Charing Cross, 1868
34. Ibid, pp. 13-14, see in detail, "the first great point to which a railway naturally tends is a commercial port, and of them, for its extent of coast-line, India has few. Along the eastern shore, from the northern extremity of a Bay of Bengal to Cape Comorin is really commodious harbour. Madras is the seat of a government, of presidency, and from some other fortuitous circumstances has been forced into a position of some commercial celebrity; but it has no pretention to be called a harbour. From this remarkable want of a port, the trade of the country, seeking an exit, was attracted to the numerous mouths of the Ganges, and one of them called the Hooghly, which some 100 miles or so inland has a deep and broad steam affording a good anchorage, the adventurous fiof North-eastern India. it was natural, therefore, that Calcutta and Bombay, as the great outlets to the trade of India, should become centres of commerce, which requires civil and military protection; and consequently, that those cities should become the political, as well as the commercial, capitals of the greater divisions of British India. From like reasoning it is clear that all trunk lines of railroads would be necessarily directed to these cities, and an examination of a map will indicate that the line first in imperial importance would be one connecting Lahore with Calcutta, and that the second line, even if it be second in value, would be from some central point between Delhi and Calcutta to Bombay. A third line possessing high political advantages is also required to afford to Madras speedy means of communication with Bombay."
35. Cited in, Clarke, Op. Cit., PP 142-144
36. Roy, Tirthankar, "The Economic History of India1857-1947", Oxford University Press, 2000
37. Cited in "Davidson Edward", op. cit. pp. 21-22

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