

British Imperial Railways in Nineteenth Century South Asia

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The massive predatory and exploitative nature of the imperial railway project under the façade of Britain's benevolence to the people of India could not have been further from the reality of the material condition of the masses under colonial hegemony. This paper undertakes a comprehensive analysis of the British imperial railways during the second half of the 19th century. Such related aspects as the development of the colonial economy, the role of finance capital, the comparative spread effect, British monopoly and colonisation of the Indian economy, labour on the railway projects, colonial forestry, famine and disease, etc, are dealt with at some length.

In 1846, the revenue commissioner of Bombay, Thomas Williamson wrote to the chairman of the Great Indian Peninsular Railway Company in London stating that,

The great trunk-line, running by the Malseje Ghaut in the direction of Nagpur, would be most direct which could possibly be selected to connect Bombay to Calcutta. Commercially, it would be best for the cotton of Berar, while for the first 120 miles from Bombay we would proceed in the immediate direction of the military stations of Ahmednuggur, Jaulna and Aurangabad.¹

Nothing could be more obvious than the twin purpose of colonial railways stated so early and so clearly above, i e, commercial and military. These two objectives set the tone for the imperial railway project until the end of the British raj. Four years later, the same company undertook the construction of the very first 20-24 miles railway line from Bombay to Thana completed and opened in April 1853.² By 1900, over 24,000 miles of tracks had been laid.³ This enormous project was financed entirely by British private investment capital.

1 Imperial Finance and the Colonial Railway Project

Private British companies with the strong backing of the government of India not only built railways but also owned them. There were on average 1,405 miles under construction every year until the end of the century.⁴ Some 150 million pounds-sterling was invested in Indian railways by the end of the 19th century. This became the single largest investment in the British empire. The government of India became the guarantor to the railway shareholders who were mostly British. Private companies would build and operate their respective lines in different regions of the sub-continent with a guaranteed 5 per cent return on their stockholders' investment assured by the Indian revenues of the empire. And between 1869 and early 1880s, the government of India itself built railroads for private British companies. Fifty million pounds-sterling from Indian revenues were set aside by the colonial state to meet the guarantee irrespective of the company losses.⁵

The "guarantee system" promised its shareholders that if the companies performed poorly, the taxpayers of India would pay for the loss. Thus the entire profit went to the railway companies and their English shareholders while the loss was borne by the Indian people. Simply put, this was a "heads-I-win, tails you-loose proposition".⁶ The deployment of British capital in such a manner was an example of "private investment at public risk". By 1870s, the outflow of interest actually exceeded the inflow of fresh capital into India.⁷ And by the end of the 19th century, the total

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cost of Indian railways amounted to 350 million pounds-sterling, the largest outlet for the export of British capital.⁸

Under the guarantee system, all contracts were given only to British companies.⁹ The government of India provided free land and other facilities including recruitment of cheap labour.¹⁰ Almost all private capital spent on Indian railroads was raised in Britain. The railway shares for Indian investments could be traded only in London stock markets. Apparently, "It was the policy of the railroad companies, the East India Company, and the British Government to hire contractors and discourage Indian enterprise".¹¹ The absolutely risk free nature of the British investment meant that, "The railway profits, which could have financed India's own development, went instead into the pockets of investors in Britain".¹² The annual tribute of India to Britain amounted to about 35 million pounds-sterling and Britain's empire in India became a great asset to the crown.¹³ With a reliable debt service, the railway capital market in London thrived although investment in irrigation would have been far more productive than this kind of railway expansion.¹⁴

The guarantee system contributed substantially to the "drain" of funds from the subcontinent. It naturally prompted more spending on construction per track kilometre than local conditions warranted. It also created profitable conditions for even wasteful construction that further increased the subsidy and the drain. The unprofitable lines depended for their very existence upon the guarantee, which increased the drain. Had the drain not existed, it is unlikely that private capital on such a large scale would have ever been invested in Indian railway project. The money paid out of Indian tax revenues to British investors in subsidies was substantial. It is estimated that between 1849 and 1900, a total of Rs 568 million was paid out.¹⁵

Recurring trade surpluses for which the people of India received no return marked the steady increase in the drain throughout the 19th century. For example, just for the year 1882-83, the balance of payment based on railways alone amounted to 4.14 per cent of the Indian national income.

What happens to a country which year in and year out loses such a sizeable part of its GNP to another, as India did during the entire period 1858-98 (and, in fact, right from 1757)? The fact that India had to have a rate of saving of 4 per cent of its national income just to pay the tribute....Such continuous loss of savings had a crippling effect on the economy. Where would investments come from to stimulate any expansion of the economy, when the bulk of the possible savings was annually lost.¹⁶

India was a captive economy made to serve Britain's economic needs.

2 Colonial Economy and Railways

The foundations of this colonial economy were laid well before the introduction of railways. The railway only strengthened this foundation. "If we can cheapen carriage, we may greatly increase the imports of foreign articles into the interior; and in a corresponding degree, export cotton and other agricultural produce."¹⁷ This observation made by an East India Company agent in mid-1840s aptly sums up the fundamental characteristic of the colonial economy of India in the 19th century. It is not surprising that the cotton barons of Lancashire were the most vehement

supporters of the Indian railway project.¹⁸ They had a double objective: firstly, to sell their cheap machine made cloth to the millions of Indian masses and secondly, to secure a more reliable source of raw cotton than the United States. Karl Marx in 1853 prophesied, "...the English millocracy intend to endow India with railways with the exclusive view of extracting at diminished expenses the cotton and other raw materials for their manufactures".¹⁹

The railways pushed India into an era of classical colonialism. This was characterised by Indian exports of agricultural raw materials and imports of British manufactured products. India's economy was twisted to fit this classical colonial pattern. Throughout the 19th century, Britain enjoyed a trade surplus with India. But it had a growing deficit in its overall international trade with other nations, which were offset by substantial Indian export surpluses. These exports primarily constituted agricultural raw materials such as cotton, jute, tea, coffee, wheat, oil seeds, opium, sugarcane, tobacco, etc, while imports were made up of mostly clothe from English mills,²⁰ railway and military hardware. Thus Indian economy exclusively serviced British economic interest.

The British devised a rather clever way to transfer huge sums of money from India to England. Each year funds were transferred to pay off debt on secure and profitable capital investments on the railways.²¹ But this was just the tip of the iceberg. The colonial system required the annual transfer of funds from the colony to the metropolis to meet an array of "home charges".²² These were funnelled through India's rising export surplus. Home charges included the cost of the secretary of state's India office in London, costs of wars at home and abroad, purchase of military stores, pensions for British military and civilian officials and for servicing the guarantee system. By the end of the 19th century, the visible home charges annually amounted to between 17 and 18 million pounds-sterling. The chief items on the bill in order of magnitude were guaranteed railway interest, military expenses, interest on India debt, purchases of government stores and pensions. In addition to this, there were private remittances made by British officials serving in India and transfers of profit by British merchants and "invisible" charges for services, including shipping, banking and insurance.²³ All of this was extracted from the Indian peasants through heavy taxation in the form of land revenue, taking away resources that otherwise would have been used for investment in the economic development within India.²⁴ During the same period by contrast, Meiji Japan registered tremendous economic growth and its railroads were all indigenously financed and served the economic interest by helping to build a modern nation.²⁵ Consequently, the Indian nationalist writers of the 19th century like Dadabhai Naoroji, R C Dutt, G V Joshi and others refused to believe that India could not be industrialised without foreign capital.²⁶

3 Comparative Spread Effect of Railways

By the end of the 19th century, India had become the chief export market for British goods including textiles, iron and steel goods, and other products reflecting Britain's industrial strength. India in return supplied Britain with raw materials in the form of

unprocessed agricultural goods. The economy primarily became agrarian as the proportion of those dependent on agriculture grew to over 70 per cent. And the government of India ensured that the British business interests benefited from favourable arrangements for land and capital in India.

Commercial agriculture was made possible by the transportation infrastructure provided above all by the railway. By the end of the century India possessed the fifth longest railway system in the world. The pre-eminence of British export interests was clear in layout that focused on routes to the ports and a rate structure that disadvantaged inland transportation.²⁷

The railroads also became a captive and publicly subsidised market for English steel-makers and locomotive builders. British obsession and priority for railroads neglected all other public works projects. The railroad system consumed 13 times as much investment as all hydraulic works up to 1880. During 1877-78 famine, the pro-irrigation lobbyists Sir Arthur Cotton and Florence Nightingale raised their voices against the utter worthlessness of railways in relieving distress, while it cost the poor of India 160 million rupees. In the 20th century Gandhi also denounced the railroads as the main killer of traditional Indian handicrafts and depleting food stocks from the countryside. Imperial investment in irrigation complemented the railways in promoting commercial crops for exports rather than grain crops.²⁸

The government of India did little to aid or stimulate the development of heavy industry or management skills within India. The colonial state and the railway companies followed policies from which British industry and financial institutions were the primary beneficiaries. Indeed, the government of India urged the railway companies to “buy British”. India also “failed to reap the benefits of the spread effects to industry which would have occurred. Instead, the spread effects stimulated the British economy.”²⁹ For example, after the railways had depleted the reserves of wood to make charcoal, coal became the major source of energy used to run the railways. The needs of railways stimulated coal production but did not lead to the development of coal industry like it did in England and other countries. Expensive transport costs kept the delivered price of coal very high. Consequently, the spread effects from the increased production of coal remained limited.³⁰ This hindered the industrialisation of the economy.

Any local industry using coal as a major source of energy found itself immediately handicapped. Indian coal became very expensive, not because of the costs of coal production but because of the East Indian Railway company’s monopoly over access to major coalfields. The company made it so expensive to transport coal by rail that imports from Britain could compete with Indian coal in Indian market. The high price of coal had a dampening effect on the expansion of industries since so many of them required it as a source of energy.³¹ This was more particularly so in the case of iron and steel industries. In Britain, the railways triggered the development of heavy industries such as iron and steel. But in India, this did not happen because the railways became an instrument of extracting raw material rather than triggering industrialisation.³² So the major project like the railways instead of becoming the leading sector failed to generate the “multiplier

effect” needed for India’s industrialisation. The layout of the track supported the extractive and market focus of British economic interests, linking the hinterland to the colonial port cities and those cities to each other. The classic shape of a colonial economy was only possible by the way the British built railways in India.³³ India’s loss from the purchasing policies of the railways blocked its progress in developing heavy industries. The spread effect of the railways instead stimulated the British economy. The British official policy also did not support the development of industry in India and the railways failed to act as a stimulant for heavy and machine-building industries as they did elsewhere in the world.³⁴

Unlike in Europe and United States, the colonial railways in India did not lead to the growth of urban centres. The railways just redistributed the urban population leading to the decline of old cities and commercial centres. For example, the major Mughal trading city of Mirzapur on the Ganges declined and the population simply moved to colonial port cities putting all the traditional industries located in such inland centres at a disadvantage.³⁵ The railways in particular brought about this new process of de-urbanisation in the 19th century.³⁶

The British industrial economy dominated every facet of the Indian colonial economy putting the latter in a disadvantaged position. Planned and constructed to serve the strategic and economic needs of the metropolis, the railways facilitated the movement of troops, dispersal of British manufactured goods, and the extraction of raw materials from hinterlands to port cities. The railways failed to stimulate the growth of other ancillary industries because most of the equipment and hardware was imported from Britain.³⁷ Solid rails, bridge girders and work engine were all bought and brought from Britain.³⁸ Locomotives, rolling stock, and other iron goods were also imported from Britain.³⁹ “India... became pre-eminently the land of large iron railway-bridges whose ironworks [were] largely prefabricated in Britain and then assembled and erected at the Indian bridge sites. This, of course, limited the technology and economic benefits India received from railway construction.”⁴⁰ Not just bridges, more than 20 per cent of all British-made locomotive engines were exported to India.⁴¹ In addition to railway machinery, platelayers, fishplates, points, rails, and sleepers, the colonial state also invited British skilled labour, management, equipment, and financial capital.⁴² “Two-fifths of the capital raised for the railroads were spent in Britain. Skilled workers, foremen and engineers were brought from Britain and paid twice the home rate, plus free passage, medical care and allowances.”⁴³ The planning and overseeing the execution of railway construction in India was entrusted almost exclusively to British civil and military engineers. This gave the Indian railways a colonial character.⁴⁴ Thus, Indian railways generated employment and industry for Britain rather than for India. Indian people paid for these colonial railways with their taxes while the profits benefited the English.

4 Monopoly over Railways

Indian railways did not experience any serious competition from alternative modes of transport. Neither the government of India nor private companies showed much interest in building canals,

roads, river channels for steamers, boats or carts. So the railways had a virtual monopoly on pricing and rates. There was no government regulation of the railway companies. Each company operated as a profit-maximising entity.⁴⁵ The total rail business was controlled by just five companies, which were all British. There was virtually no competition among them. The companies held territorial monopoly on lines. Customers had to do business with the company that dominated their region. This allowed customers few options as their demand for services were severely curtailed. The needs of potential customers were disregarded as priority was accorded to the military and commerce. Cotton growing districts were the first to be connected by the railway network. The government of India, in fact, encouraged cooperation rather than competition among these monopoly British companies. The companies divided traffic among themselves and established spheres of influence.⁴⁶ "The railways of the raj, it must not be forgotten, were built with and through the close involvement of the colonial government of India which was not a neutral, uninterested party standing above the construction process."⁴⁷

The railway companies also charged differential rates to maximise profit. Lower rates were charged for shipments from the ports to the interior than for shipments of similar distance between two inland points. Similarly, costs were reduced for the transport of raw materials and finished products.⁴⁸ Railways clearly encouraged classic colonialism in India. The layout of the lines favoured shipment to the ports rather than encourage internal trade. Similarly, it favoured raw material export and finished goods imports. It also favoured agriculture to industry. Its colonial status deprived Indian economy of any protective tariffs, but gave the advantage of low transportation costs to foreign producers in addition to low sea-rates to and from India.⁴⁹ The British imperial structure tried to keep India agrarian for the most part and the manner in which the railways were constructed and operated increased India's dependence on agriculture.⁵⁰ And agriculture failed to prove to be a growth sector. It failed to stimulate other sectors of the economy. It failed to create a large enough demand for inputs from other sectors. Increases in output came not so much from increases in productivity but largely from the extension of acreage. The colonial government showed no interest in any kind of land reforms. Large-scale absentee landlordism continued to flourish until the end of the British rule in India. "Insufficient linkages were at the root of agriculture's failure to encourage the growth of industries that could service it."⁵¹

Subjugated by the first industrial nation in the world, the Indian economy offered a classic case of the colonial remolding of a pre-modern economy.⁵² In fact, India's economy was twisted to fit a classical colonial pattern.⁵³ The British empire was built and maintained as a collaboration project between the state and private capitalism.⁵⁴ This was slightly different from capitalism in Britain, where the parliament provided protection to British commerce and industry. In India, however, the imperial state did not provide any such protection. Instead, it worked towards the advancement of British economy. "Development itself was intended solely as a means of providing London with an uninterrupted flow of dividend returns on capital investment."⁵⁵

Steamboats and railways were largely initiated and financed by private merchants for the expansion of trade. And during Dalhousie's reign (1850s) the British military and economic hold was strengthened, the colonial state was advantaged as huge troop movement could be accomplished in a very short time. This was shown clearly in quelling the 1857 rebellion whereby the sepoys lacked the advantage of railways.⁵⁶

5 Colonisation of Indian Economy

In one sense, the railway construction of the second half of the 19th century completed the colonisation of the Indian economy, pulling all its erstwhile isolated segments inside the net of British free trade imperialism.⁵⁷ This new phase of British imperialism actually began with the triumph of railways in England in 1840s. But in the Indian context, this free trade stage of colonisation began immediately as the physical conquest was completed in 1850s. Railway was the kingpin of this new free trade regime.⁵⁸ Far from industrialising the Indian economy, it led to a dependence on British industry. In the process, many of India's traditional handicrafts withered away. The craftsmen thus deprived of their employment began to flood the cities, where few industries were growing to give work to the unemployed.⁵⁹ But more importantly, the railways were used for the progressive subjugation of the Indian market for English industry. First, the British destroyed India's worldwide exports in handloom textiles and then invaded country's own home market and destroyed the domestic industry. "This dual economic assault upon India marks the second stage of British colonialism in India, set by the progress of industrialisation in England."⁶⁰

In 1882, the Lancashire lobby in Britain succeeded in completely abolishing customs duties on British goods entering India, while London slapped countervailing excise duty on Indian manufactured textiles. This deprived protective tariffs to the marginal infant textile industry centring on Bombay and Ahmedabad. This also stunted the industrialisation process in India and prevented the rise of a factory-based textile industry at a time when the artisanal industry had already suffered serious setbacks.⁶¹ Thus in a colonial setting, the railways functioned as an imperial technology serving the raj as a symbol and

...as an essential strategic, defensive, subjugators and administrative 'tool'....It can well be argued that the formal imperial nexus, with its associated location in London of the controlling Boards of Directors of the private railway companies and their influential Consulting Engineers, as well as the India Office's Stores Department, stifled the emergence of a truly 'national' technology.⁶²

6 Indian Labour on Railway Projects

Rapid commercialisation of agriculture brought about by colonial railways converted large numbers of peasants into landless agricultural labourers.⁶³ India remained predominantly an agricultural country. The percentage of the total workforce employed in the railway industry remained small and did not increase. Since the railways caused a decline in handloom industry by making imported factory cloth available at prices lower than local weavers could offer, the proportion of workers in agriculture and non-agriculture did not alter significantly because India was reduced

to an agricultural country. Loss of jobs as a result of decline in alternative mode of transportation⁶⁴ added further to the landless agricultural labouring population.

However, this capital-intensive technology did not change the basic structure of labour process. Indian railway project was a good example of colonial capitalism whereby productivity was raised without mechanisation and a capitalist labour market developed in a pre-capitalist labour relations of organisation involving Indian gangers, sirdars, muccumdums, mistris, etc.⁶⁵ Little mechanisation was employed except basic earth moving and stone shattering processes like the pick and head-basket with rail dumping truck.⁶⁶ Abundant labour availability became an excuse to keep the level of technology low so cheap labour could be profitably exploited. Majority of the workers remained unskilled as manual labourers, diggers and movers. Indian railways until the end of the raj remained a heavily labour-intensive operation in which men, women, and children sold their labour power. The organisation of large bodies of workers into gangs was a central feature of the imperial railway construction project. The gang-labour system was in fact recruited and controlled by Indian labour contractors in a classic colonial policy of divide and control.⁶⁷

Often entire families were employed with children as old as 10 years. Work was divided along gender lines with women carrying earth, bricks, rocks and men doing heavy work of laying rails, hauling timber, etc. Neither the railway companies nor European contractors took any responsibility for taking care of workers and their families. The government of India also did not bother because it protected the interest of railway companies and European contractors rather than that of labourers.⁶⁸ Most labour came from rural areas and from landless agricultural labouring and marginal peasant classes. There were also many 'navvies' or families who specialised in construction labour. Chief among them were the 'waddars' who specialised in digging earth ('mannu waddar') and moving stones ('kallu waddar'). Waddars became an important source of railway construction labour and the railway companies used them heavily, often moving their entire families over long distances. It was primarily a labour-driven capitalism whereby abundant labour-served the needs of capital in a situation of low technological initiative.⁶⁹

Often the railway work was extremely dangerous and accident-prone. Construction accidents were common and led to many deaths. Working on cliffs to drill and blast into rocks often sent workers down with suspension that dashed into rocks or snapped taking life. Blasting with powder resulted in considerable loss of life from flying rocks, slips, cave-ins, etc. Deaths of Europeans was reported in great detail and greatly mourned. But when Indian labourers died, it was either ignored or merely mentioned as a cold statistical figure.⁷⁰ Sometimes European supervisory staff physically assaulted Indian workers driven by their position of power and racial hatred. In such a situation the labourers hardly got justice from the colonial legal system and all white juries who freely acquitted the English.⁷¹

In the absence of redress from the imperial legal system, the labourers struck work when Europeans perpetrated violence on them. However, most of the labour resistance was directed

against oppressive working conditions and low wages. Conditions in railway worksites were brutal and exploitative. On average 180,601 to 221,253 persons per annum were employed between 1859 and 1900 with 126 to 155 persons per mile.⁷² The labour demand often revolved around better working conditions and wages. Strikes occurred on this issue. Demand for higher wages was coupled with demand for freedom to leave and resume work at convenience. Withholding of wages often-triggered riots. "Wage issue brought the workers to collective action; brutality pushed them into making that action violent."⁷³

The British in India distinguished between mental and manual work. Driven by the same racial prejudice, they reserved mental work for themselves and delegated manual labour to Indians. Railways did not become the training ground for skilled personnel for other sectors of the economy. Indians came to be hired as lower-level personnel in such jobs as engine drivers and guards. All management posts continued to be held totally by Britons. This was a reflection of racial discrimination.⁷⁴ Indian labourers were organised into small gangs of 12-13 men under the immediate charge of an Indian mistri (ganger) who in turn were subjected to close superintendence by British inspectors and sub-inspectors. Most labourers were unskilled with 40 per cent of the workforce female and put under the strict supervision of imported British engineers.⁷⁵ Britons also held the best jobs as station-masters of large stations, drivers of express trains and administrators. The first class passengers were also all British, while Indians had to travel only third class.⁷⁶ "The era of the new imperialism was also the age in which racism reached its zenith. Europeans,... began to confuse levels of technology with levels of culture in general, and finally with biological capacity. Easy conquest had warped the judgment of even the scientific elites."⁷⁷

Racial prejudice also guided European thinking. They believed that Indians were incapable of making decisions on their own, were unreliable and did not possess the ability to direct Europeans. This intense racial prejudice prevented Indians from advancing⁷⁸ and only increased after 1857 rebellion when the railways were streamlined to defend the strategically important parts of the Indian empire.⁷⁹ The rail line was also seen as the main strategic defence for the European population.⁸⁰ The railways did not offer very many social benefits to the people either. The government of India did not seriously consider encouraging or undertaking alternative investments. The capital expended on much of the railway system would have yielded higher social rates of return had it been spent on other projects⁸¹ such as health, education, housing, sanitation, food, local industry, skills, etc. But this was not the government's priority. Its priority instead lay in how best to make the natural resources of India available to British railway companies. One such important resource was the forest.

7 South Asian Forests and Railways

One of the main reasons for the depletion of forests in the 19th century was the railways and British engineers were the prime movers of this project.⁸² Wood was used not only for sleepers, but also as fuel for powering engines. The railways also used enormous quantities of bricks. Bridges, culverts, station buildings and

workshops consumed bricks in astronomical numbers. For example, in the 17 miles of Hullohar division of the East Indian Railways in the second half of 1858, some two million bricks were burnt and 4.5 million were in kilns ready for firing while another seven million were molded. In this division alone there were 50 brick kilns and 16 lime kilns. These kilns were kept continuously burning with firewood supplied from forests. Brick making was a major part of Indian railway construction and was tightly controlled by the railway companies and supplied by the government of India.⁸³

Wood from Indian forests was also used for railway sleepers.

The forests of India were searched and ravaged for supplies of sleeper wood...Indian wood would be felled in a forest, possibly quite distant, by foresters in the employ of timber contractors,...it is clear that the demands for the railways for wood – prime wood for sleepers, buildings and carriages, and lesser wood for firewood for kilns and for fuel for early locomotives-increased the exploitation of India's forests and the pressure on forest-dwelling people.⁸⁴

In fact, when the forests were declared as "reserved" for government and commercial use only, the forest-dwellers were forced to move out. This triggered serious clashes between people and colonial foresters as the former resisted state encroachment on their age-old customary rights to the use of forest resources for sustenance.⁸⁵

Indian forests were well known for its hardwood. There were many different varieties of it found in different parts of the Indian subcontinent, i.e., teak, sal, deodar, cedar and even chir pine timber was used. Since railroads sprawled throughout the subcontinent, none of the forests were spared. It all began with the teak forests of Malabar coast and the Western Ghats. Long before the beginning of railways the Malabar teak was severely reduced to meet the needs of British royal navy.⁸⁶ The railways only further decimated the forest. By 1870s, the teak of Malabar coast was already depleted and the great teak forests of upper Burma began to be harvested for export to India. When the railways were extended into the Indo-Gangetic region, its impact was felt on the Himalayan forests. Similarly, the rich sal forests of the submontane areas stretching for thousands of miles from western tarai down into Bengal became the target for the railway project because of its tough fibres that were particularly resistant to white ants. These rich sal forests got rapidly depleted for the production of sleepers and no one took any responsibility to regenerate sal trees. Consequently, sal production dipped in the late 19th century.⁸⁷

In the 1860s, faced with the depleted stocks and rising costs of both sal and teak, the colonial railway builders of northern India set their gaze farther into the mountains on deodar stands.

Exploitation of the deodar forests soon became the central focus of the first half century of Forest Department's work in the Himalayas, first for the continuing depletion of the deodar stands and later for the gradual stabilisation of commercially valuable timber lands in the system of Reserved Forests.⁸⁸

When the construction of major lines was undertaken in north-western India, in the decades of 1870s and 1880s, the commercial exploitation of deodar reached its climax. In the early 1870s, for example, the single largest project that stretched from Delhi into

Rajasthan required 8,00,000 sleepers. For this enormous undertaking, the deodar forests of the Punjab hills, Kashmir, upper Ganges and Indus basin were requisitioned. Similarly, the longest line from Lahore to Karachi was designed primarily to export Punjab wheat to Europe. The annual harvest of trees for railways in western Uttar Pradesh alone fluctuated between 78,000 and 1,47,000 in 1870s. And by early 1880s it rose to double that figure.⁸⁹ A one mile track required 1,700 sleepers and 1.5 tonnes of wooden keys with a single sleeper standard size of 10' by 12" by 6".⁹⁰ This meant that each sleeper required one fully-grown hardwood tree to be brought down.

Dietrich Brandis, a German forest agent was appointed as an inspector-general of Indian forests by the colonial state. He made extensive surveys and wrote many reports recommending commercial use of Indian forests. In his 1878 report, Brandis observed that tree stands in the Himalayas were a good source for maintaining a steady supply of sleepers to the railways. He estimated an annual railway demand of over 5,00,000 sleepers. By 1880s, as many second-generation sleepers as new ones were required for replacing those that had deteriorated on original lines.⁹¹ However, the railways in fact, used nearly double the number of sleepers estimated by Brandis. But even before Brandis, the colonial forest department was created (1864) to ensure a steady supply of timber for railway construction. The formation of the forest department was no coincidence,⁹² as the railway project was central to the imperial agenda of early colonial forestry in India.⁹³ So the creation of the colonial forest department and the expansion of imperial railways were intimately connected.⁹⁴

The story of forest depletion was repeated all across India. The establishment of Madras Railways, for example, triggered the large-scale depletion of forests in Madras Presidency. Madras Railways primarily used firewood more than coal. The simple reason being that wood was cheaper than coal. However, more wood was required to run the railway engine than coal. The average consumption of wood per engine mile in 1870s was 89.53 lbs, while that of coal was only 26.75 lbs.⁹⁵ After depleting "reserve" forests, the colonial government purchased large quantities of firewood from private forests. The idea of protecting forests was not so much for conserving the ecological balance or protecting the environment, but for the constant supply of firewood to the Madras Railways. Protection of the forests by the forest department primarily meant protecting the commercial interest of English railway companies and the government of India. For forests were protected and reserved only to be cut down for railway use.⁹⁶

The pressure on forests to service the railway demand was generally quite heavy. For example, in the revenue year of 1859-60 some 2,45,763 berths were supplied to Madras Railways and all were made of wood.⁹⁷ No forest could possibly stand a drain of that nature, especially in a situation, where the colonial government did not take any serious measure towards conservation. In fact, the forest conservator Brandis himself recommended that in Madras Presidency the railways should be encouraged to first extract fully from private forests before working the government forest reserves.⁹⁸ Thus the legacy of colonial forestry in Madras Presidency was that in the 19th century the colonial state

extracted large quantities of timber from both private and government forests.

8 Railways and Disease

In 1859, a local East India Railway engineer relayed to his boss the cholera epidemic that decimated thousands of labourers working on the railroads as they arrived from far off places in Bengal.

Large masses continued to arrive almost daily, the utmost exertions of the Engineers failed to get together materials for at once hutting them, and a large proportion had no shelter for many days after their arrival and when cholera was raging among them.⁹⁹

Apparently, in that epidemic some 4,000 coolies died on site. However, cholera was not the only killer of labourers building the colonial railroads. Malaria, smallpox, typhoid, pneumonia, dysentery, diarrhoea, ulcers also attacked coolies. In some longer sections sometimes as much as 30 per cent or more of the workers would succumb to disease epidemic. For example, in 1888, on the Bengal-Nagpur line across the subcontinent, some 2,000-3,000 workers died in a single stretch and their bodies were strewn all along the line and rotted with no claimants. Apparently, the stench became so unbearable that the bodies were dragged into a pile and lit in a mass funeral pyre.¹⁰⁰

The deaths of large bodies of labourers were not very surprising considering the living conditions at worksites. There was lack of proper housing, sanitation, cooking facilities, drinking water and protection from extreme weather conditions like rain, heat and cold. Generally, large bodies of workers were mobilised on construction sites, hence, the epidemic spread rapidly on outbreak. Once begun, it would spread quickly among the assembled workers and then move into near and far villages. The construction techniques provided favourable conditions for the breeding of malaria carrying mosquitoes. Earth for railway embankments often was dug from borrow-pits along the line of works. These abandoned pits filled up with water and vegetation during the rains and became mosquito hatcheries.¹⁰¹ The railway lines were laid on raised beds that often interfered with the natural lines of drainage and created unwanted ponds and waterholes that became breeding grounds for malaria vectors.¹⁰² A British medical agent who studied malaria in India in 1927, came to the conclusion that railways were one of the major causes of malaria in India.¹⁰³ However, yet another factor of malaria proliferation was the colonial irrigation projects that led to serious environmental consequences like waterlogging, salinity, and most of all malaria deaths.¹⁰⁴ "Cutting down hundreds of trees for every mile of railway ties for every mile of trackage laid, left poorly rooted trees nearby open to buffeting by winds which soon toppled them over. These collapses greatly increased the area of thin soil exposed. Blasted during the dry season by the rays of the sun and by torrential downpours during the rains, these laterite-based soils were soon leached out, forming water-filled cracks and potholes which female mosquitoes intent on laying eggs found irresistible."¹⁰⁵

The highly mobile nature of construction work brought diseases to the worksites from distant parts, and in turn, carried newly acquired diseases onwards to other sites. The labourers

often shuttled between colonial plantations and railway worksites travelling by trains and steamers. The migrant labourers often went to work for months and years through disease-infested region, where railways had spread its tentacles. Many of them perished from neglect and diseases either on journey or upon arrival.¹⁰⁶ Malaria was by far the biggest killer. It was said, "a death a sleeper" and some 1,700 sleepers were needed for each mile of track in the Ghat section of the Great Indian Peninsular Railways.¹⁰⁷ The environment at the worksites created conditions for the repeated outbreaks of malaria and cholera. The life was grim and hard for the poverty-stricken, malnourished, weakened, disease-ridden men, women and children. The labourers lived in crowded, unsanitary and unhealthy conditions.¹⁰⁸ And there was no effort made to improve their lot. In fact, heaviest construction years coincided with famines, 1897 (2,732 miles) and 1898 (2,962 miles)¹⁰⁹ and the railway companies and the colonial state exploited cheap famine gang labourers.

Proliferation of so many diseases leading to deaths clearly indicated that the colonial development of railways and canals was fundamentally flawed and environmentally unsound. Ecological transformation was the principal reason for the scourge of killer diseases such as malaria and cholera. Railroads were one of the biggest factors in that transformation. Although cholera had existed in India from the time of the Indus Valley civilisation, it had never been as widespread as it had become during the 19th century. It had always been endemic to small geographical locales. The movement of conquering imperial armies and the colonial railways transformed these endemic diseases to epidemic outbreaks spreading throughout south Asia and even beyond. Wherever the railways went, cholera bacillus went with it.¹¹⁰ *Vibrio cholerae* lives for several days in tanks of water such as those carried aboard railway carriages.¹¹¹ Thus the modern transportation network provided invasion routes for diseases such as cholera and malaria. "Modernising works created serious 'obstacles' to water flows, caused river systems to become 'silted up' and 'moribund,' deprived soils of enriching nutrients and damaged crop yields, drainage and sanitation."¹¹² While cholera slaughtered millions thus, the British government continued to invest heavily in railways and not much in public health.¹¹³

Imperial Railways and Famines

Commercialisation of agriculture and railroads went hand in glove. Commercial crops absorbed pasture and grazing lands putting cattle at risk. Inflation in the price of grass led to the use of cattle dropping for fuel. Scarcity of cattle manure led to declining productivity of land and increased the pace of soil exhaustion. Dams and canals might have safeguarded the rural population in the event of drought. But the colonial state had all the investments in railroads and very little on social projects.¹¹⁴ The natural result of this artificial phenomenon was famine. And the railroads were directly and indirectly responsible for it. Driven by the official doctrine of free trade and non-interference, the government refused to bring food to feed the starving. It did nothing to prevent grain speculators from using railways to transfer food reserves held in places stricken with dearth to another part of the country, where they would fetch a higher

price.¹¹⁵ The colonial telegraph built alongside railways ensured that price hikes were coordinated in hundreds of towns at once. Modern markets accelerated rather than relieved famine. Railroads hiked the price of grains everywhere during famines and made it beyond the reach of the common people. The peasantry that was already groaning under the crushing weight of taxes to finance the railroads was now hit with high grain prices that brought starvation and death.¹¹⁶ And not just the railroads, Indian agriculture also paid for the British military machine and civil bureaucracy that kept India under its heels until the end of the British raj.¹¹⁷

The colonial railroads not only created conditions for grain speculation and profit-making, but further aggravated famine in India by facilitating the export of grains abroad. Substantial amounts of both food and non-food crops began to be shipped overseas. It is estimated that as much as 13 per cent of the wheat produced in India went to Britain. By 1886, India was supplying 23 per cent of Britain's wheat imports.¹¹⁸ Throughout the cotton-exporting districts of the Deccan including the puppet princely state of Hyderabad, forest enclosures and displacement of gram by cotton greatly reduced local food security and put in place a classic colonial economy.¹¹⁹ Much of the wheat and rice surplus was exported to England. Londoners were in effect eating India's bread. And on the eve of 1896 famine, the wheat belt of northern India had been depleted by massive exports to make up for the previous year's terrible harvest in England. Millions of famine-stricken in India died along the railroad tracks starving and exposing the hollow imperial claims of the life-saving benefits of steam transportation.¹²⁰ But the British continued to believe that

some regions of south Asia they construed to be endowed with rich soil were immune from famine. However, this colonial construction turned out to be false because massive famines marched across the land almost every decade since the introduction of railroads with 1890s being the worst decade of all. At the turn of the century a colonial administration report for the cotton-rich province of Berar Deccan vividly captured this falsity stating, "The idea that Berar enjoyed immunity from famine was dispelled by the experiences of 1896-97 and 1899-1900. The former year was one of scarcity, amounting to famine in parts of the province, in the latter year the famine was severe, and affected the whole of Berar."¹²¹ And Berar was only a microscopic reflection of British India.

9 Conclusions

So despite the British claims of railways as the "light of civilisation" to India, or Britain's benevolence to a backward people for their "moral and material progress", it is argued here that the colonial railways in fact had a regressive impact on the land, environment and the people of south Asia. The Indian nationalists in the 19th century decried not so much the railways per se, but its colonial and exploitative character.¹²² Nevertheless, the British imperialists till the end had the "illusion of permanence" and continued to believe that they were in India for the welfare and security of its people and to maintain law and order.¹²³ They continued to believe in the beneficial effects of railways and canals. But the post-colonial scholarship on south Asia has established that the impact of British imperial railways was quite contrary to the official ideology of the raj.

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