Bombay and Lahore. Colonial Railways and Colonial Cities: Some Urban Consequences of the Development and Operation of Railways in India, c. 1850-c. 1947

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Two images, two railway stations, frame this presentation: the first is Victoria Terminus in Bombay; the second is the station in Lahore. Many aspects of the post-1850 histories of Bombay and Lahore were deeply affected by the development and operation of the railways of colonial India. Each station, so different one from the other, tells us something about the history of each city and their railways; different histories, different growth trajectories within a shared context defined by British colonial rule in South Asia and the development of a system of colonial railways. Lahore is discussed later in the paper. I begin with Bombay.

Victoria Terminus is shown in figure 1 below. Commonly known as VT in a semiotic shift indicative of appropriation and familiarity, it opened in 1887 after nearly a decade of construction. This magnificent building ranks among the world's great railway stations.[1] Designed by its architect, F.W. Stevens, in what is sometimes labelled an Indo-Italian Secular Gothic style and echoing some elements of London's St. Pancras Station Hotel, Victoria Terminus dominated the cityscape of late 19th century central Bombay; it remains a formidable presence in the early years of the 21st century despite a cityscape now dotted with skyscrapers. Over 2 million passengers pass daily through the sumptuous interior with its marble floors, stained glass windows, and a great staircase lined with Corinthian columns of polished granite from Aberdeen, Scotland—a staircase that provided access to the upper-level, headquarter offices of the Great Indian Peninsula Railway Company (hereafter GIP), and now its successor, the Central Division of the world's fourth-longest (38,500 route miles) railway system and, at 1.75 million employees, the world's largest, single-enterprise employer: the state-owned and state-operated Indian Railways.

Figure 1: Victoria Terminus, Bombay

Victoria Terminus was a cathedral to steam locomotion. Richards and Mackenzie refer to it as "the greatest station ever built in India" perfectly representing "the immense complexity of British power."[2] Jan Morris suggests VT "could make a persuasive claim to

be truly the central building of the entire British empire."[3] Regardless, it certainly represented the transformative role the railways were playing in the economic and physical development of Bombay City. Railways, one can argue, were at the infra-structural heart of the making of modern India but railways had a particularly intense impact on Bombay City: an argument to which VT is both an emphatic conclusion and a part of the argument, a signifier and the signified, insofar as no other city in colonial India had such a redoubtable statement of the benefits of steam locomotion—benefits to which the upraised hand on the colossal 16' 6" statue representing 'Progress' surmounting VT's great central dome was an emphatic exclamation mark.

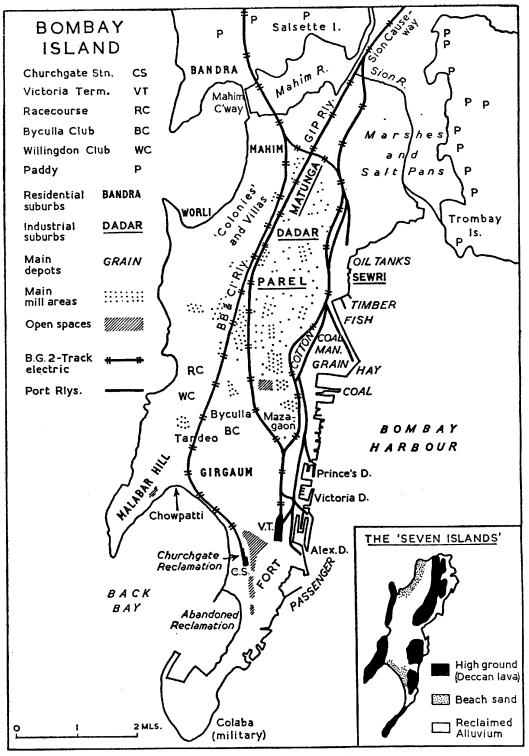
British colonial rule in South Asia and its greatest instrument, the railways, significantly affected the developmental course of modern South Asia's urban places and a good deal more to boot.[4] Indeed, one scholar, Arthur Smailes, writes about a period extending from the 1850s to Indian Independence in 1947 he labels "railway British" during which a "distinctive dual city form was diffused over the sub-continent and developed its full range of distinctive characteristics."[5] The dual city with its indigenous city alongside but physically distinct from the British annexes morphologically recreated the dual society characteristic of British rule in India.[6]

In this paper I examine some of the ways in which railways were important to the development of colonial Bombay and colonial Lahore. I argue that special factors present in the site and situation of Bombay coupled to the exigencies of British colonial rule in South Asia made the railways particularly important to the development of Bombay from the mid-19th century forward. I also will also show how a railway connection between Bombay and the western interior necessary to the further growth of Bombay City required one of the great and more costly feats of mid-19th century railway engineering—a project the colonial state underwrote for its own administrative, economic and military reasons. I then briefly place Bombay and its railway history within a wider-framework that encompasses other urban areas in colonial India and the effects railway development had on them. This discussion leads to a very different city, Lahore, deep in the sub-continent's interior.[7] I conclude with some reflections on the roles colonialism and colonial railways played in the history of the two cities. Map 1 provides the locations of Lahore and other places mentioned in this paper.

Map 1: India

The site of Bombay city is a small insular peninsula located just off the west central coast of India. What is now called Bombay Island is a man-made creation developed via centuries of land reclamation and in-filling such that seven swampy, malarial and sparsely populated islands gradually were connected and enlarged. North of Bombay Island and connected to it by causeways is the larger Salsette Island which in turn has connections to the mainland. Today both islands and parts of the adjoining mainland form a part of Greater Bombay. Located between the insular peninsula and the mainland and protected from the Indian Ocean by the former is the finest, deep-water anchorage on any coast of South Asia. However, the regional situation of Bombay held-back its full development as a great port-city. Some of the regional obstacles were political but they had been removed before the railway age. However, not until railways were built were the physical obstacles to the bulk transportation of commodities to and from Bombay effectively overcome. Maps 2 and 3 depict Bombay Island and its neighbouring mainland.

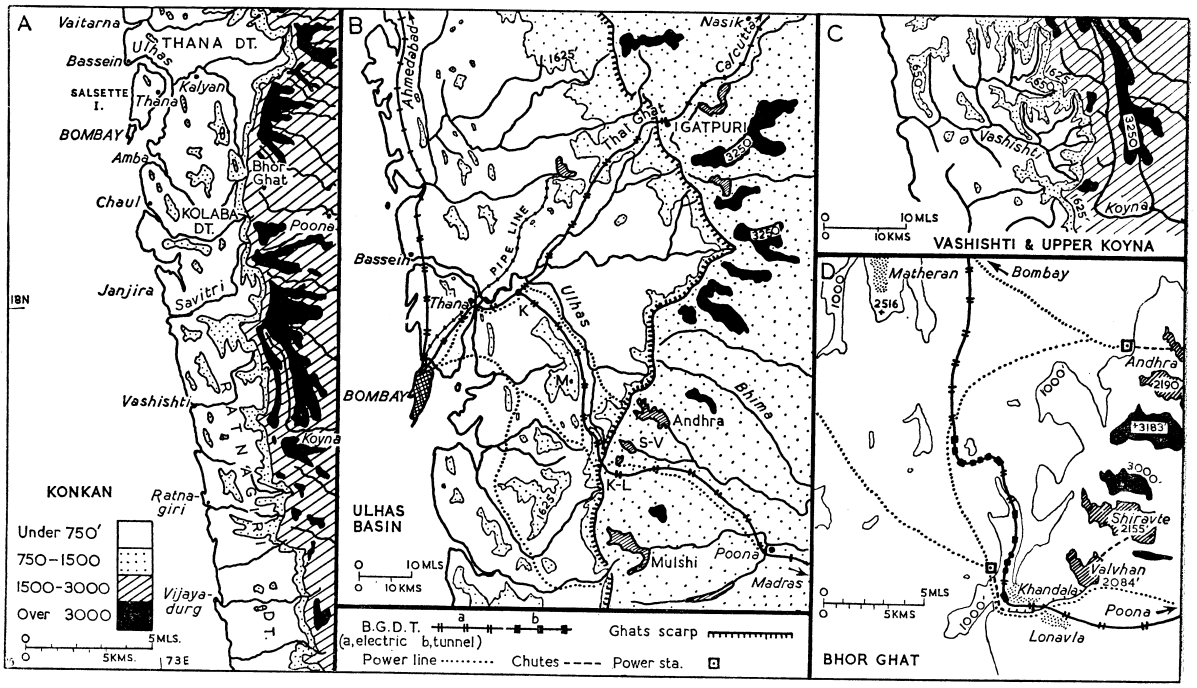
Map 2: Bombay Island, early 1950s



Thus, any consideration of the importance of the railways to Bombay's subsequent development must highlight the physical situation of Bombay located just off the narrow, coastal lowland of India's West Coast to the east of which stood the formidable range of mountainous terrain best known as the Western Ghats.[8] The Western Ghats are located, variously and abruptly, some 20 to 50 miles inland. Their eastward ascent takes one to the much higher elevations of the Deccan plateau whose gradient, in turn, generally slopes downwards to India's East Coast from the high points represented by the summits of the Western Ghats as shown in Map 3.. The Western Ghats are rugged and precipitous throughout most of their range and in the section east of Bombay City characterized by virtually no rainfall in the dry season and some 200 inches in the wet season brought on by the SW monsoon. The Ghats made east-west movement difficult while ravine-filled terrain and short, fast rivers and their estuaries (quite wide-estuaries north of Bombay) made north-

south travel difficult except by sea: sea-travel interrupted by the rains and winds of the SW monsoon.

Map 3: Bombay and Its Neighbouring Areas



Geography, therefore, restricted Bombay's land access to much of its hinterland which included the cotton growing tracts of Western India. Prior to the railway age bullock carts and pack animals had to make their laborious way up and down the Western Ghats through which improved roadways capable of handling wheeled conveyances were only slowly and very limitedly built. Sea access to Bombay via other West Coast ports, especially ports to the south of Bombay, also had to deal with the problems of getting to those ports via laborious land routes across the Ghats and transportation methods dependent on animate energy sources.

Viable railways to Bombay could only follow two routes. The more direct connections with the Western interior and with Eastern, Central and Southern India required demanding passage of the Ghats. A less direct route to all but North-Western India could strike directly north of Bombay and follow the coast until the valleys of the Tapti and Narmada rivers some 160- 200 miles north of Bombay provided easier access to the interior. This route did not face obstacles as severe as those presented by the Ghats but it was by no means easy particularly since many river estuaries had to be bridged—and it was a good deal longer to most destinations.

In the event the British colonial authorities decided in 1849 for administrative, military and economic reasons to build the initial railway lines from Bombay through the Western Ghats. Bombay was the capital of the Bombay Presidency, much of which was located east of the Ghats on the Deccan plateau. Poona, the major town of the Western Deccan and an important cantonment of the British Indian Army, was located some 50 miles east of the Ghat crest. After considerable surveying and discussion the passages of the GIP were located at the Bhore Ghat for the south-eastern line with the incline section built 1856 to 1863 and at the Thal Ghat incline, built 1858 to 1865, for the north-eastern line. The Bhor

line provided a direct railway link, some 120 miles long, between Bombay and Poona. Both inclines required formidable effort and skilful engineering. Although the crest of the Ghats at the incline locations was only some 2000 feet above the narrow littoral of India's West Coast the ascent was abrupt and devoid of gentle passes that could facilitate the construction of a railway. Map 3 displays some of the obstacles railway builders faced.

The Bhore Ghat's formidable physical and human challenge came early in Indian railway construction. Few obstacles were its equal anywhere in the world of mid-19th century railway construction. Colonel Crawford, the Bombay Government's Consulting Engineer for Railways claimed: "There is nothing as far as I am aware of in any English Railway which can be looked upon as a parallel undertaking. . . ."[9] Other comparisons made at the time showed that the Bhore Incline surpassed in difficulty major incline constructions undertaken in Europe.[10] Construction employed on the Bhore Ghat peaked at 42,000 in January 1861. The building of the Bhore Ghat incline was a great accomplishment but so was the cost: some £1,100,000 (over £70,000 per mile) and perhaps 25,000 lives.

The incline proper as finally determined began 196 feet above sea-level at Padushurree and traversed 15 miles and 68 chains of fiendishly difficult terrain in an ascent of 1831 feet to reach the summit at Lanowlee, 2027 feet above sea-level. The average rise of 1 foot in every 46 feet was achieved by gradients varying from 1 in 37 to 1 in 330 (the fairly level stretch at Khandalla station) but over 9 miles were at gradients of 1 in 40 or steeper. Four short sections of level and contrary gradients were placed at intervals throughout the incline to check the speed of descending trains. A reversing station was used at the eleventh mile to gentle the gradients and to provide a better approach to the steepest part of the scarp. The double track line included 10 miles of curves (the sharpest having a radius of 990 feet), 25 tunnels piercing hard basaltic rock, eight, arched masonry viaducts, 22 smaller bridges and 81 culverts. Cutting and embanking on a grand scale was almost continuous and reached depths and heights of 76 feet from the center line but whose outer slope, in the case of an embankment, could be in a valley 150-300 feet below the formation level. 54 million cubic feet of hard rock were cut and the embankments contained some 67.5 million cubic feet of material. The right-of-way clung to hill-sides into which the formation line was notched and whose embankments below and steep slopes above had to be buttressed, protected and drained to reduce slips and rock slides during the rainy season.

The Bombay, Baroda and Central India Railway Company (hereafter BB&CI) got a contract in 1855 to build a coastal line north from Surat through Gujarat to the city of Ahmedabad but permission to build southward for some 160 miles along the coast to connect Surat to Bombay was not granted until 1859 and the line not completed until November 1864. Thus, Bombay came to be served by both railway routes and, until state ownership and operation, two private, guaranteed railway companies each with its distinctive headquarters' building. The BB&CI's Churchgate terminus and headquarters opened in 1896, also designed by Stevens, may not equal VT but it was, and is, an impressive building in a city of impressive buildings and a further testament to the role railways played in the development of Bombay.

I add parenthetically that until very recently significant railway mileage south of Bombay along the coastal lowlands towards Goa and Mangalore did not exist until Indian Railways opened its new, high-speed Konkan line in the late 1990s. That 760 km line with its 171 major bridges, 1759 minor bridges and 92 tunnels was a considerable engineering feat in its own right.

Bombay was a colonial city; indeed it was a major example of the colonial port-cities that came to dot the coasts of Asia and Africa.[11] Bombay grew with the extension of British rule in India. By the time railed steam locomotion came to the Indian sub-continent Bombay had been a British possession since 1661. However, the site of the future metropolis remained for an extended period a collection of seven islands separated by tidal marshes. Sparsely populated by Indians the islands served best to protect the leeward harbour whose value as a naval base the British recognized by the construction of Bombay Fort—see the area marked "Fort" on Map 2—to command the harbour. Bombay Fort became the East India Company's West Coast headquarters in 1684. Insular security saw Bombay grow as a transhipment point where coastal vessels from Surat transferred their cargoes to ships destined for Europe. Ship building followed and during the last half of the 18th century Bombay supplanted Surat as the main port on the West Coast. However, powerful Indian states in Western India restricted the British presence and limited Bombay's hinterland until a series of wars in the first quarter of the 19th century led to British control and/or direct administration of most of Western India. As the administrative centre of the vastly enlarged Bombay Presidency—one of the major divisions into which the British divided their emerging Indian Empire—Bombay grew rapidly. From a population of some 200,00 in the 1820s it expanded to roughly 500,000 in 1850 at the dawn of the railway era.

Thus, prior to the railway age Bombay had become an important port-city and administrative centre but one whose additional economic and population growth required "a revolutionary step" to improve communications.[12] The limitations on growth imposed by Bombay's site and situation needed to be overcome and the benefits of the same site enhanced. For the great natural harbour to become a great port the ability to transport by land bulk quantities of commodities to and from the site was needed. Bombay's potential hinterland had to be made easily accessible. Moreover, any substantial future population and economic growth enabled by a railway-driven penetration of Bombay's potential hinterland had to be accomodated within the constraints of Bombay's narrow insular peninsular site.

The first railway line in India, the 21 miles from Bombay to Thana, opened in April of 1853. The transformation of Bombay into ever-greater Bombay is captured by the fact that the idyllic, pastoral-like setting through which the first railway passed on its way to Thana is now built-over part of an enormous urban conurbation that encompasses all of the original seven islands that became the Bombay insular peninsula, the adjoining mainland land mass, and a "new" Bombay built across the bay. Subsequent railway construction, including the Ghat inclines, resulted by 1871 in through lines between Bombay and various destinations within its hinterland along the routes of the GIP and BB&CI. Railway maps of Western India in the 1930s have a dendritical quality because much in-filling and feeder-line construction had taken place.[13] One also needs to remember that the port of Bombay as a destination of goods shipped to and from Europe gained additional importance when the Suez canal was opened in 1869. As one leading geographer puts it: "By the late nineteenth century Bombay had thus 'moved' from the periphery of India to a central position in terms of inland communications, and had become the 'Gateway of India' as far as overseas communications with the West were concerned."[14]

A formal census of Bombay in 1872 returned a total population of 644, 405 and that of 1881 a population of 773,196. The 1941 enumeration returned 1,489, 883 inhabitants. The solidification of colonial rule and the vast improvement in land transportation made possible by the railways had provided the basis for considerable population growth—growth that continued after 1947 placing Bombay at 15 million plus among the world's five largest cities and India's largest in the year 2000. Incidentally, the late 20th century , post-independence

population surge marked Bombay's victory over Calcutta after a century of what one historian labels the dual dominance of Bombay and Calcutta in India's colonial economy.[15]

The railways enabled Bombay's growth. Concomitantly, and most assuredly relatedly, another development early in the railway age gave the city a new growth engine in the form of another application of steam technology: the cotton textile industry. The first mill started in 1854 and within 20 years 15 mills employing a daily average of 11,000 workers and consuming 82,000 bales of cotton were in operation. By 1901 the number of cotton mills had risen to 76 and the daily employment exceeded 82,000. Raw cotton for the Bombay textile industries and for export overseas became a major cargo for the railways serving Bombay just as manufactured textiles from the industries of Bombay and overseas filled the goods' wagons heading out of Bombay for destinations throughout India.[16]

Cotton and cotton textiles, however, were only some of the bulk items carried to and from Bombay via the railways: some items being used or produced locally and others imported or exported through the port of Bombay. Agricultural products like wheat and oil seeds were major railway-born commodities into Bombay in 1888-89 while coal and coke were the largest component by weight although not value within the outbound traffic. Bombay was also the major centre for the receipt of parcels and letters from Britain and despatch to Britain. Mail was not, for the main part, heavy but it was an important part of the rail-born traffic. Map 2 suggests something of the great variety of products shipped in and out of Bombay by the 1950s.

The increased volume of shipping traffic made possible by the railway required the expansion of Bombay's harbour facilities. Not a decade went by during the last half of the 19th century that did not see an expansion of the physical facilities of Bombay harbour begun or completed although such was the capacity of the original harbour area that no completely new harbour was built until the1980s. Bombay's east coast "became one continuous complex of docks, basins, bunders, timber ponds and other facilities."[17] Reclaimed land provided much of the needed space for these facilities—indeed by 1920 the Bombay Port Trust controlled 1,880 acres, much of it reclaimed, equal to one-eight of the area of Bombay Island—but the ancillary requirements for wharves, sheds and particularly railways required the appropriation of existing albeit largely unused land.

The development of a transport infrastructure to serve the port culminated in the opening of the Port Railway in 1914-15. The Port and Port Railway, in turn, depended on the general development of the two major railway systems, the GIP and BB&CI, that provided the links to Bombay's hinterland. As one scholar puts it: "the track of the GIP cut a swathe through some of Bombay's settled areas , while the main stations, sidings, workshops and head offices of both companies required considerable space. This was partly gained from unused and reclaimed land, but also through the appropriation of residential land whose inhabitants had to find accomodation in the ever more densely populated districts to the north of old Bombay."[18] The development of the Port required railway development: the two intertwined developments shaped and reshaped the city's morphology.

However, a concentration on goods traffic ignores what rapidly became the most important item conveyed on most of India's railways, the human passenger. By 1900 the annual total of inward and outward passengers through the railway stations of Bombay reached nearly 19 million people.[19] Many of these were labouring men who flocked to the employment opportunities the City provided including the vast expansion of the port facilities described above and the cotton mills—men drawn from the regional hinterland of Bombay

now made accessible to them thanks to the railways. Many of these workers left their wives and children in their home villages to whence they returned for annual visits or festivals. However, an increasing number of the passengers that daily crowded the stations and terminii of Bombay island were commuters. The same railways that facilitated the economic growth of Bombay and shaped its morphology subsequently helped to reshape the urban morphology through the facilitation of suburbanization.

The problem was very simple and very acute. Bombay's narrow insular peninsular site, active reclamation notwithstanding, began to burst at its seams. As early as 1881 some central wards had population densities in the 500-700 persons per acre range.[20] Bombay's population, we noted above, grew steadily throughout the colonial period and even more rapidly in the last half of the 20th century. Space had to be found for the City's growing economic base—the port, the railway infrastructure, the cotton mills, government offices, financial establishments and a good deal more—and to house all the people employed therein and/or attracted by the prospect of employment.

A complex synergy operated to spur the City's population growth and spatial expansion. The railways helped to fuel growth but the railways also needed some of the limited supply of urban space. However, the same railways also provided the opportunity for a daily commute to and from places of work. The railways, therefore, facilitated the movement of people northwards to residences in the parts of Bombay Island beyond the commercial-industrial-adminstrative-port areas of the southern and narrower half of the growing island city.

The continued growth of Bombay subsequently led to the suburbanization of Salsette Island and then the adjacent mainland. The railways made this suburban development possible since they alone had the capacity in a lineal city squeezed into a narrow space through which their lines already ran to transport daily large numbers of people to and from work. Huge numbers of people continued to live in or near the main areas of economic activity but as Bombay's population grew only suburban sprawl could house the ever-growing numbers of people.

As early as 1909 the authoritative and semi-official Gazetteer of Bombay City and Island noted that traffic between the ten stations of the GIP on Bombay Island—VT to Sion—was extensive but that the most noticeable increase was between VT and suburban locations beyond Bombay Island.[21] The Gazetteer attributed this to the "acute" housing shortage in the City such that people were finding accomodation as far as 33 miles away at Kalyan.[22] To meet the transportation needs of the growing number of commuters the GIP had added 13 extra trains daily since 1900 and equipped them with the more comfortable, modern bogie-carriages and vestibule cars to replace the old-fashioned, four-wheeled coaches. A substantial inter-station traffic also existed between the eleven stations of the BB&CI located within Bombay Island. Pedestrian locomotion, bicycles, various forms of rickshaws which eventually included motorized forms, and electric tramcars, busses, taxicabs and cars came to provide more localized forms of transportation. Only the trains, however, historically and today, could provide the mass transportation the commuters of the ever-growing Greater Bombay needed.

Thus, by fits and starts and with setbacks suburban railways emerged as a major factor in the city's life. Indeed, by 1919 the GIPR produced advertisements encouraging people "To Live Out Of Bombay."[23] The daily rhythm of the city and many of its inhabitants came to be tied to the rush hour schedules of the commuter trains. If VT symbolizes the

monumental presence, indeed is a monumental presence as times overlap and merge into a coeval oneness, of the railways in Bombay's history and on-going life, it is in the crowded interiors of the carriages and of the stations that the railways became a part of Bombay everyday life. The 1973 Hindi film, the Locarno award winning "27 Down" captures something of this when one scene shows an empty VT platform swarmed in a split second by peak-hour passengers.

Bombay's insular peninsular site limited the development of new railway lines so the carrying capacity of the existing commuter lines—which also carried main line services—into central Bombay had to be expanded. Lines were quadrupled, new stations opened, old ones remodeled and improved to reduce station-time, and signalling was upgraded. A quantum-leap forward in the speed and frequency of service occurred in the mid-1920s when the service finally was electrified after almost two decades of advocacy and discussion.[24] The effect on suburban passenger traffic was electrifying: within a year the number of passengers carried jumped by 248%.[25] At the end of the colonial period in the reporting year 1947-48 the suburban lines of Bombay carried 236 million passengers.

I do not suggest that the provision of suburban railway services was a smooth, effective and uncontested response to Bombay's transportation needs. It was not. Nor was it a technological quick fix to Bombay's transportation problems. Technologies, railway or otherwise, Bombay or anywhere, are never divorced from their socio-political contexts. Recent work has shown how the political expressions of the combined forces of colonial rule and capitalist development within the governance of Bombay consistently directed Bombay's development along lines that favoured the economic base at the expense of a more livable, socio-physical environment.[26] What I do argue is that the railways made possible the Bombay that was in fact made from the 1850s forward—a Bombay made through a series of human decisions in which the interests of the colonial authorities and Indian and European capitalists predominated; decisions that often involved technological choice which, once made, helped to shape future options and decisions. There is a good deal of path-dependence in the transportation history of Bombay.

If we look beyond Bombay to the history of railways and urban places in colonial India we find much that is similar. Railway British was everywhere but the presence was selective. A British critic of the Raj, William Digby, captured that phenomenon well in 1901 when he compared the relatively favoured and prosperous "Anglostan" with the less-favoured "Hindustan, practically all India fifty miles from each side of the railway lines. . . ."[27]. Colonial authorities and British interests determined the pace and pattern of India's railway development until well into the second quarter of the 20th century when, and only slowly so, the representatives of the Indian national movement began to have a significant voice in railway-related decision making. Nonetheless, as late as 1939 over one-half of all positions designated superior on the railways were filled by Europeans while in the upper subordinate ranks Europeans and Eurasians were represented in percentages far in excess of their presence in South Asia's general population.[28] A preponderance of Britons in the senior railway ranks was matched by an overwhelming use of imported locomotives. Thanks to the life-long labours of Hugh Hughes we can state with confidence that only 2.75% of the broad gauge and 11% of the metre gauge locomotives were manufactured in India while, respectively, some 91% and 77% were manufactured in Britain:[29] an argument made more generally in Fritz Lehmann's classic case study of Indian railway locomotives and economic imperialism.[30] Whatever else India's railways were they were certainly colonial railways.[31]

The major cities of India generally received railway service sooner rather than later in the railway age.[32] Colonial authority and the colonial economy benefitted from the linking of the major population centres which also, in most cases, were centres of colonial administration and/or troop cantonments (like Poona) or the capitals of princely states made subservient to British paramountcy before the railway age. Thus, most of the major cities existent prior to the railway age benefitted from the colonial railways and came to exhibit the impress of railway development on their morphologies and cityscapes. Smaller urban places bypassed by railway development or to which railways came much later found themselves adversely affected. Conversely, industrial centres like Kanpur and Howrah which were also important to the emerging railway map benefitted as did a substantial group of towns that became important railway junctions.[33]

The initial development radiated out from the three colonial port-cities, Bombay, Madras and Calcutta, which were also the capital cities of the three major divisions into which British India was initially divided. In addition, Calcutta was the capital of the British Indian Empire and the usual residence of the Governor-General until the capital was transferred to New Delhi in 1912. Karachi, a much smaller colonial-port than the other three, had an uninterrupted railway connection to the Punjab and onwards to Delhi by 1889 and thus became an important port for the export of grain.[34] However, the railway focus on Madras, Bombay and Calcutta reinforced patterns of colonial authority and enhanced the economic connections between Britain and India. As in Bombay railways spurred the growth of Calcutta and Madras which, along with Bombay, remained the largest cities of India throughout the colonial period. It remains to be determined with any confidence whether the railways altered in any major way the sizes and configurations of the hinterlands of the three great port-cities although one eminent economist believes any changes that did occur happened early—before 1870—and thereafter the hinterlands remained relatively stable with it being unlikely that Calcutta and Bombay, far and away the two most important ports, gained in relation to one another.[35]

More crucial is the fact that railway development focussed on the colonial port-cities altered the patterns of urbanization in 19th and 20th century South Asia in ways that remain profoundly present in the 21st century. One scholar summarizes the process as follows:

> The railways disturbed the traditional trade routes. The centripetal inter-settlement linkages which had evolved over time based on a by and large introverted road system, were replaced by the centrifugal pulls generated by the metropolitan economy through the establishment of new port towns and orientation of the railway network and internal commodity flows towards them. A process of urban atrophy was thus set in motion in the old towns and cities, affecting their population, size, industries and economic activities in general.[36]

Much of the same conclusion is present in the statement quoted earlier about the way in which railway development and other factors moved Bombay from a peripheral to a central position within India's networks of inland communications. A more nuanced approach based upon yet-to-be done, detailed local and regional studies undoubtedly will require some modification to a conclusion that sharply differentiates the old and atrophying towns from the new and rapidly growing although there can be no gainsaying the rapid growth of the colonial port cities after the advent of the railways. We do know, however, that railway lines often followed existing trade routes in order to tap that trade: sometimes trade was reoriented;

sometimes it was not.[37] We also know that a city like Poona initially maintained its position as the financial and intellectual centre of the Western plateau region despite its early rail connection to Bombay and the commercial/industrial predominance of the latter.[38]

In any case, and regardless of the fate of the smaller urban areas within colonial India after the construction of railways—railways, moroever, whose consequences often required many decades to take extensive effect—the concern of this paper must be with, in the first instance Bombay, and secondly with the few other great cities of colonial India. Only two cities in South Asia exceeded a million inhabitants in 1941, the date of the last decennial census prior to Independence in 1947. Calcutta had 2,108,891 inhabitants and Bombay 1,489,883. Madras was a distant third at 777,481.[39]

Calcutta and Madras, as one would expect, were positively (at least in the areas of economic and population growth) affected by the railways although considerations of site and situation made for a less dramatic impact than in the case of Bombay.[40] Neither Calcutta nor Madras were physically cut-off from their hinterlands in the way the Ghats restricted Bombay's access to the Deccan plateau in the pre-railway age. Nonethless, the two other colonial port-cities (and Karachi for that matter) found their morphologies affected by railway lines and workshops and their cityscapes came to possess impressive railway stations. They were, in short, cities that fitted Smailes' generalized description of "Railway British." In Calcutta, to be sure, the terminus of the line of the East Indian Railway Company was located at Howrah across the Hughly River from Calcutta but Howrah, Calcutta proper and a good deal else soon became a part of a wider conurbation that made Greater Calcutta India's largest city at every decennial census during the colonial period if one takes the conurbation as the unit of enumeration.[41]

Fifth in population size in 1941 was Lahore in the central Punjab with a population of 671,659. Lahore was an old Indian city whose importance long-predated British colonial rule. During Mughal times it was the administrative centre of one of the great provinces (subas) into which that empire was divided. An independent Sikh Kingdom controlled the Punjab for much of the first half of the 19th century until the area was annexed to British India in 1849 after two Anglo-Sikh Wars. Lahore then became the capital of the Punjab Province. In 1891 it was India's tenth largest city with a population of 176,854 from which it climbed steadily to 281,781 and fifth-place ranking in 1921—a ranking it retained for the rest of the colonial period.

If the great colonial port-cities already discussed were created entirely out of the exigencies of colonial rule (at best small villages previously occupied their core sites) Lahore was typical of existing inland cities onto which a British presence was grafted and whose subsequent growth or decline and spatial patterning was influenced by the railways. Map 4 depicts Lahore circa 1869. The map provides a cartographic expression of Smailes' generalized description of the dual city he argues became the characteristic urban form of India in the railway age: a congested, indigenous city with its network of narrow streets, lanes and cul-de-sacs often contained within the remnants of a city wall existed alongside but distinct from the neat, spacious, planned area of the troop cantonment, the areas of public buildings, wide streets, shops with European goods and bungalow residences of civilian Europeans ('civil lines"), and finally the area occupied by the railway station, railway workshops and colonies of railway employees.[42]

The railway station at Lahore shown in figure 2 opened in 1862 provides an eye-catching expression of the connection between railways and the colonial state at a time when

the latter was threatened. Unlike the luxuriant, confident almost triumphant VT the Lahore station was built as a defensible structure at a time when the British in India were just recovering from the greatest threat to their rule in India, the widespread troop mutinies and civil uprisings of 1857-58. Security of the emerging railway network was seen as vital to the maintenance and strengthening of British colonial rule (hearken back to Gandhi). The Lahore station was both an expression of the need for security and a physical contribution to security.

Railways and railway workshops at Lahore date from the early 1860s when the Sind, Punjab and Delhi Railway Company constructed lines linking Lahore to Amritsar (formally opened 1862) and Lahore to Multan (operational in late 1864). Amritsar and Delhi were linked in 1870, a through connection from Lahore to Karachi was established in 1878 as the result of the completion of the Indus Valley State Railway, and the Punjab Northern State Railway joined Lahore and Peshawar in 1883. Thus, by 1886 when the unified, government owned and operated North Western State Railway (whose name was soon reduced to the North Western Railway and which is referred to in this paper as the NWR) was created by amalgamating most of the railways in Punjab and Sind the workshops of Lahore repaired locomotives and built and repaired carriages and wagons for a far-flung network whose route miles totalled nearly 2000.[43]

The physical dimensions of the Lahore workshop complex and the size of its labour force testified to the magnitude of the work created by such a large railway network. Initially located in the area of the City known as Naulakha (see map 4) the lines, workshops and the adjoining railway station covered an area of approximately 126 acres.[44] By the early 1880s over 2000 men found regular work in the shops where, in the words of the District Gazetteer, they could be seen "busily employed in the care of huge machines which require constant vigilance and intelligent adjustment, working with an accuracy formerly undreamed of. . . ."[45] Workshop employment may have increased to nearly 4000 men by the early 1890s.[46] Compared to the great colonial port cities with their many and increasing industrial work opportunities the railway workshops joined to other forms of railway employment including clerical work dominated modern-sector employment in a smaller, inland city like Lahore.

The continued expansion of the NWR eventually forced the Lahore workshops to move to a larger site where a bigger, more modern physical plant could be built capable of constructing and repairing the rolling stock and other equipment of a railway system which exceeded 4000 miles in 1905; a system with 756 engines, 2399 coaches, 11,622 goods vehicles and more than 63,000 employees.[47] An area of some 1000 acres was acquired on the eastern edge of Lahore (see map 4) NNW of the Mian Mir Cantonment between Shalamar Road and the main railway line to Delhi via Amritsar. At this Moghulpura site new carriage and wagon shops were opened in 1910 while new locomotive shops, begun in 1910, were available for use in 1914.[48] By 1929 the locomotive shops had 14 acres of covered accomodation and the carriage and wagon shops 27 acres.[49] Table 1 provides estimates of the numbers employed at the workshops at various intervals from 1870 to 1960.

Map 4: Lahore, <u>circa</u> 1869

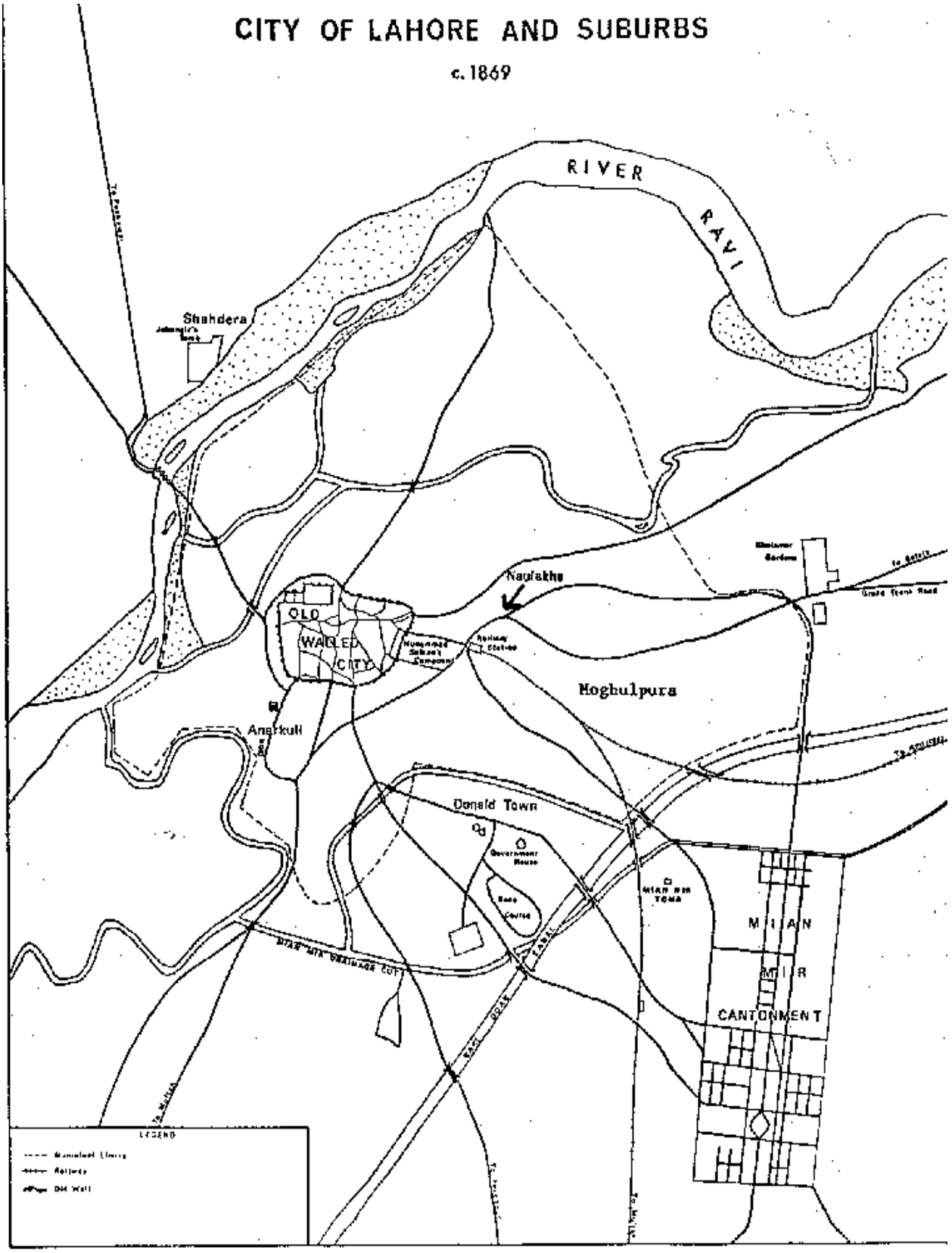


Figure 2: Lahore Railway Station

Physically, the railway and its workshops had a major influence on land use patterns in the colonial Lahore that grew up around the old, walled city. The railway was both a magnet and a divider: the tracks divided while the station and workshops at Naulakha and later the workshops at Moghulpura were strong magnets that attracted not only railway workers and their families--many of whom, especially Europeans and Eurasians, lived in railway colonies adjacent to the lines and the workshops--but also some small businesses whose customers included the railway company, railway travellers and railway workers. It was, in fact, the railway workshops and the station, along with the cantonment and the civil lines, which represented the nodal points around which colonial Lahore grew.[50] As early as 1866 a Lahore newspaper commented on the filling-in of the hitherto largely empty area between Anarkuli and Mian Mir (see map 4) and stated: "The Railway, an entirely new and separate Department, with its large staff, and bringing with it an enormous following of workmen and their families, filled-up another great gap in the new site."[51]

Table 1: Employment in the Railway Workshops of Lahore, 1870-1960

Approximate Date	Approximate Numbers Employed Daily
1870	1000
1880	2000
1890	2500
1906	4500
1911	7000
1916	10,000
1925	10,600
1929	12,200
1960	18,000

Sources: Great Britain, Parliament, Parliamentary Papers (Commons), 1870, vol. 52, Cmnd, 163, p. 10; Gazetteer of the Lahore District 1883-84, p. 182; Gazetteer of the Lahore District 1893-94, p. 298; Punjab District Gazetteers, Vol. XXXA: Lahore District, Statistical Tables, 1916, Table No. 28; Punjab District Gazetteers. Vol. XXXA: Lahore District with Maps, 1916, p. 249; Government of India, Railway Department (Railway Board), Report of the State Railways Workshops Committee 1926 (Calcutta: 1926), pp. 7 and 9; The Railway Gazette, November 11, 1929, pp. 12-13; M.B.K. Malik, Hundred Years of Pakistan Railways (Karachi: Ministry of Railways and Communications, 1962), p. 143. I include the 1960 figure to demonstrate the continuing importance of workshop employment in Lahore. The 18,000 figure in 1960 does not invalidate the 20,000 to 30,000 figure for 1947 given in the opening paragraph. The pre-partition NWR system was much larger.

The impact of workshop employment on the social composition of Lahore was considerable. It meant, for example, that European society in Lahore contained a significant leavening of Britons whom one could label the technologists of Empire; men who came to India to create and to manage the new kind of work force which operated the transplanted railway technology. Eurasians and Parsis also came to have a noticeable presence in Lahore since the railway soon found them to be useful surrogates--cheaper and equally loyal to the colonial enterprise--for Europeans. By 1916 the Europeans housed in the railway colony numbered some 1100.[52] A Lahore city directory of that year testifies to the extent to which Europeans retained their supervisory presence in the workshops.[53]

Most of the workshop employees, of course, were Punjabis among whom many had migrated to Lahore in the hope of finding employment with the railways.[54] And it was in-migration rather than natural increase which contributed most to the substantial population growth of Lahore from the 1870s onwards and to the city's rise in the population ranking of India's colonial cities mentioned earlier. Furthermore, since those seeking employment in the workshops and elsewhere in the railway system were almost entirely male, the lure of such employment contributed to the increasing imbalance in the sex ratio of Lahore as males came to far exceed females.[55]

The workshops and their employees also had a significant economic impact on Lahore as did the entire presence of the railway system for which Lahore was both the communication hub, the headquarters and the site of by far the largest concentration of railway workers of all sorts--managerial, clerical, and skilled and unskilled manual labourers--to be found in northwestern India. The workshops themselves were the single, largest employer of industrial labour in Lahore and in the Punjab during the colonial period and beyond.[56] Wages paid to railway workers had substantial direct and multiplier effects on the economy of Lahore.

What, then, can one conclude from this brief examination of the effects railways had on the development of Bombay and Lahore and, more briefly still, on other towns and cities in colonial India? It is clear, first, that the railways significantly affected many dimensions of the growth or atrophication of India's towns and cities from the demographic size and social composition to the built environments. However, this in-of-itself is not a surprising conclusion. Railways affected urban areas everywhere: Europe, Latin America, North America, everywhere. Indeed, I write this passage in Winnipeg, Canada—a city that grew with the railway presence and which might today be a small town if the Canadian Pacific Railway had crossed the Red River 30 miles to the North, as originally projected, at Selkirk. As it is Selkirk has remained a small town and Winnipeg grew but did so heavy with the impress of railway development including a marshalling yard that bifurcates the city into a more privileged southern half and a less privileged northern half—the proverbial "other side of the tracks."

What distinguishes the Indian case particularly from that of Europe and the Americas is the fact that India's railway development took place within a context shaped by formal colonial rule. India's railways were colonial railways; they were developed and operated to satisfy administrative, commercial and military needs defined, in the first instance, by the colonial authorities and metropolitan interests. Hence, most of India's urban places and their connecting railways were developed between the 1850s and 1947 within the context Smailes aptly labels "Railway British." And, with due allowance for individual differences, Bombay, Lahore and the other cities discussed in this paper came to possess the distinctive dual form identified by Smailes to be typical of "Railway British" urbanization. Lahore was the more emphatically dual because there the British annexes clustered around an existing indigenous city. Bombay's indigenous population—and that of the other colonial port-cities—lived in an urban place that grew with the growth of British control, indeed they lived in an urban place brought into existence by the British presence. Nonetheless, Bombay clearly had its European and Indian areas although the peninsular site of Bombay required a different, largely lineal spatial pattern.

Thus, we have two levels of argument and conclusion. First, urbanization in post-1850 India, especially rates of growth, were heavily influenced by the pattern of railway development.[57] The railways, in turn, were built to accomodate colonial interests. Colonial interests expressed through the pattern of railway development, therefore, were an important determinant of the growth and decline of India's towns and cities in the "Railway British" era. Bombay's great natural harbour and its position as the capital of the Bombay Presidency made it a vital focus of British colonial interests and a starting point, along with the other major colonial-port cities (which were also colonial administrative centres), of railway development. The enormous resources—70,000 pounds per constructed mile—the British invested in the railway conquest of the Western Ghats in order to turn Bombay's situational disadvantages into advantages were a direct consequence of the administrative and economic role Bombay City was expected to play in colonial India.

The rapid development of railways to and from Lahore were also dictated by colonial concerns. The Punjab was annexed to British India only in 1849 after two bitterly-fought wars (1845-46 and 1848-49); it then became the provincial capital of the Punjab, a rich agricultural area; it was a close, but not too close, troop staging area for the protection of British interests on the turbulent north-west frontier and beyond into Afghanistan. Indeed, the Punjab Northern State Railway rapidly was pushed northwestward from Lahore to Peshawar with a through line in place by 1883.

Which cities got railway lines and workshops, how many lines, and whether those lines were broad gauge (5' 6") or metre gauge were decisions saturated with colonial concerns.[58] Once built the railways had significant consequences for the physical, social and economic development of the cities and towns they connected. This paper has described the intimate connection between the railways and the development of the site on which the city of Bombay was located. Indeed, I argued that only railways, given the constraints of Bombay's insular peninsular site, could have enabled the massive population growth beyond the original core areas that took place and continues to do so. Victoria Terminus as a centre of main-line and suburban traffic was an apt symbol of the important role the railways played in Bombay's colonial history.

British Lahore, grafted on to indigenous Lahore, was differently but no less significantly impacted by railway development. Born out of colonial wars and colonial uprisings, military and administrative considerations bulked large in the early presence of

Lahore on colonial India's emerging railway map. The fortress-like station symbolized and actualized those concerns of the colonial authorities. But whatever the initial motivations for Lahore's railway connections the railway became an engine for the economic growth, and related demographic growth, of the central Punjab and the city of Lahore. Railways made the bulk shipment of grain and other agricultural products to the colonial port-cities (and the line to Karachi came to offer the shortest route to the sea) possible. As the centre of a great network of railways Lahore then became an urban area in which substantial railway-related employment was located thus stimulating in-migration and a city morphology significantly shaped by the growing demands of the railway presence in the forms of workshops, marshalling yards and offices. Like Bombay and most of the cities of colonial India discussed in this paper Lahore was very much "Railway British."

ENDNOTES

[1] The British Library in London holds an enormous watercolour of VT painted by Axel Hermann Haig dated 1878. It is housed in a climate-controlled sub-basement as part of that Library's Oriental and India Office Collections (hereafter OIOC). My discussion of VT is based on personal observation and the following works: DAVIES (1985); LANG, DESAI and DESAI (1997); MORRIS (1983); RICHARDS and MACKENZIE (1988).

[2] RICHARDS and MACKENZIE (1988), p. 70.

[3] MORRIS, p. 133.

[4] The leading figure of the Indian national movement, Mahatma Gandhi, fiercely attacked British-directed railway development in Inda and in so doing testified to the widespread effects the railways had on colonial India. But for the railways, Gandhi wrote, "the English could not have such a hold on India as they have." GANDHI (1997), chapt. IX. An extended prolegemenon to a full-scale examination of the many ways in which railways contributed to the making of modern India can be found in my lengthy introduction to KERR (2001).

[5] SMAILES (1969), p. 179.

[6] SMAILES (1969), pp. 179-180.

[7] Because of considerations of space and other reasons (for example, the development in the 20th century of New Delhi, next to but distinct from, very long-standing, old Delhi as the capital of the British Indian Empire in replacement of Calcutta), I provide no discussion of Delhi(s) in this paper. Suffice it to say that railways did influence the development of Delhi/New Delhi in ways consistent with many of the arguments made in this paper. KING (1976), esp. pp, 217-218 provides a brief summary. Railways, however, have not played much of a role in Delhi's suburban transportation—indeed contemporary Delhi's roads are choked with vehicular traffic and its atmosphere poisoned by the emissions of internal combustion engines.

[8] These facts are well known. Read SPATE (1957) for additional information. Maps 2 and 3 are extracted from this work.

[9] BOMBAY RAILWAY LETTERS (1855).

[10] BERKLEY (1859-60), p. 595.

[11] Colonial port-cities have been the subject of a good deal of scholarship. For example, see the contributions in BASU (1985).

[12] KOSAMBI (1986), p. 35.

[13] RAILWAY GAZETTE (1929), p. 115.

[14] RAILWAY GAZETTE (1929), p. 115.

[15] MARKOVITS (1995).

[16] These and many other statistics in this paper about Bombay prior to 1909 come from GAZETTEER OF BOMBAY CITY AND ISLAND (1909).

[17] BROEZE (1992), pp. 256-257.

[18] BROEZE (1992), pp. 256-257.

[19] GAZETTEER OF BOMBAY CITY AND ISLAND (1909), vol. I, pp. 348 & 355.

[20] KOSAMBI (1986), p. 197.

[21] GAZETTEER OF BOMBAY CITY AND ISLAND (1909), chapter V.

[22] GAZETTEER OF BOMBAY CITY AND ISLAND (1909), chapter V.

[23] AWASTHI (1994), p. 174.

[24] The suburban service of Bombay and other Indian cities needs a full, critical study. For now and for Bombay see ARORA (1985) and AWASTHI (1994), chapter six.

[25] AWASTHI (1994), p, 177.

[26] HAZAREESINGH (1999).

[27] DIGBY (1901), p. 292.

[28] PRASAD (1942), pp. 161-164.
[29] HUGHES (1990); HUGHES (1992). Canada, Germany, and the U.S.A. provided most of the rest.
[30] LEHMANN (1965).
[31] HURD and KERR (1998).
[32] Railway construction in 19th century India can be followed in Kerr (1995).
[33] KIDWAI (1991), p. 167.
[34]Karachi grew considerably after the 1947 creation of Pakistan. It had a population of 359,492 in 1941. In 2001 it has some 6 million and is the largest city in Pakistan--a further example of the influence of the colonial past, colonial railway policies, and the colonially-mediated establishment of tighter-links with the global economy on the urbanization of modern South Asia. A book with some description of the early impact of the railways on Karachi is BAILLIE (1975).
[35] BAGCHI (1976), pp. 252-253. Insofar as there was a change Bagchi thinks it likely Karachi took some of the grain exports formely destined for Bombay.
[36] KIDWAI (1991), p. 154.
[37] GUMPERZ (1974).
[38] GUMPERZ (1974).
[39] These and other figures regarding the overall growth and rank ordering of cities, unless otherwise specified, are drawn from the still invaluable DAVIS (1968), esp. chapt. 15: "Urbanization. The Growth of Cities."
[40] Madras had much the smaller hinterland and a poor, exposed harbour until massive works were undertaken in the second and third decades of the 20th century. Site and situation thus limited the growth potential of Madras despite early railway connections. Railways alone could not fully overcome other handicaps although without the port and the railways Madras likely would have slipped from the ranks of India's major cities. As it is Madras has built on its colonial origins and at some 5 million people in 1991 it remained India's fourth largest city (Delhi vaulted into 3rd place) although the 2001 Census may well show it being overtaken by the very fast growing Bangalore. The latter is a southern inland city anchored in the colonial period but remaining small throughout British rule: an urban area not even among the fifteen largest in 1941.
[41] A more narrow definition of Calcutta still leaves Calcutta as India's largest city of the colonial era at all but the 1891 and 1921 decennial censuses when Bombay was first.
[42] See also the discussion and maps in SPATE and AHMAD (1950) and TANEJA (1971).
[43] More detailed accounts of the development of the NWR can be found in MALIK (1962), pp.1-21 and BERRIDGE (1969).
[44] A good description of the Naulakha shops as they appeared in the early 1890's can be found in LATIF (1892), pp. 286-289.
[45] GAZETTEER OF THE LAHORE DISTRICT (1884), pp. 184-184.
[46] LATIF (1892), p. 287.
[47] ADMINISTRATION REPORT ON THE RAILWAYS IN INDIA FOR THE CALENDAR YEAR 1905 (1905), p. 84 and p. 100.
[48] PUNJAB DISTRICT GAZETTEERS (1916), p. 249.
[49] RAILWAY GAZETTE (1929), pp. 12-13.
[50] RUDDUCK (1964), pp.117-120; MUSHTAQ (1967), pp. 24, 32-33. This argument can be further supported by the cartographic record--for example a comparison of the "Plan of the City and Environs of Lahore showing the Civil Station of Anarkulee and the Cantonment of Meean Meer," c. 1869 with "Lahore and Surrounding Country," c. 1912 which are to be found in the map collection of OIOC.
[51] LAHORE CHRONICLE (1866), p. 180.
[52] PUNJAB DISTRICT GAZETTEERS (1916), p. 250. The significance of the "colonization" of European railway labour in India is examined in ARNOLD (1983).
[53] ROY (1916).
[54] PUNJAB DISTRICT GAZETTEERS (1916), p. 142.
[55] PUNJAB DISTRICT GAZETTEERS (1916), p. 34 stated that migration into Lahore was large with 436 per thousand having been born outside the District. "The chief classes of immigrants are railway employees, domestic and Government servants." The growth of the railway workshops provided the main promise of employment with the NWR. "The nature of the immigration has led to a preponderance of males, and the proportion in the city is only 596 females per thousand males."
[56] ROYAL COMMISSION ON LABOUR IN INDIA (1931), p. 23 refers to the absence of "big scale industry, saving the North-Western Railway workshops at Lahore...."
[57] Two seminal articles by Daniel Thorner remain important to an understanding of India's pattern of colonial railway development: THORNER (1951) and THORNER (1955).
[58] Metre gauge lines were built and operated as State Railways from the early 1870s forward in order to reduce the costs of railway construction—costs ultimately underwritten by the Government of India, hence Indian taxpayers, thanks to the 5% return guaranteed to the investors in the origiinal, private guaranteed companies. The Punjab Northern State Railway, an expensive line to build through an area unlikely for a long time to return

an operating profit, was built as a broad gauge line because of the concerns of military authorities about delays to troop movements through Lahore as the result of break-of-gauge.

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