

Tunnelling Into Our Lives

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Tunnels have got under Mumbai's skin. Much of last year went by with Mumbaikars having to adjust to the sudden increase in tunnelling work for the city's Metro.

As more and more sections of streets got boarded away, people had to recalibrate their estimation of travel time, to find new routes to walk and, for some, to get used to the throbbing sensation of tunnel boring machines (TBMs) crunching below their houses.

Not surprisingly, some didn't take this well. Parts of the Parsi community have been up in arms about tunnel work routed below two of their Atash Behrams, particularly sacred fire temples. After their demands were rejected by the Bombay High Court they approached the Supreme Court, only to be turned down again. They plan to continue their protests.

Further north in Santa Cruz, some residents worried about their buildings being undermined, waged a campaign to convert the underground into an elevated railway. The chances of such a major change happening at such a late date were remote, and in any case were opposed by other residents worried about an elevated line cutting in front of their windows. Others have tried to get tunnelling stopped, or at least limited in time, because of the noise and shaking – but as of now it continues apace.

Nor is it just the Metro. Last November the Brihanmumbai Municipal Corporation (BMC) announced that the next stage of its ambitious coastal road plan would involve going underground with twin tunnels running from the middle of Marine Drive to the other side of Malabar Hill. This would be done, apparently, with the help of a New Austrian Tunneling Method, though with its usual opacity no details were given of why this had not been used in the Metro.

Mumbai isn't the only place where buried issues are becoming public. In Los Angeles, tech visionary Elon Musk's ironically named The Boring Company has unveiled a nearly two kilometre tunnel, the prototype of his plan to revolutionise urban transportation with tunnels in which modified versions of his Tesla cars can zip at high speed or specially designed pods can carry people and other packages.

The real point of Musk's tunnel though may not be what he plans to send in it, but that he created it all. Tunnels are notoriously slow to develop, taking decades to get off (or under) the ground and, even then, can take years to inch along, usually with huge cost overruns. Musk created this tunnel in barely two years, apparently after getting infuriated at being stuck in LA traffic.

Musk tweeted that he was going to "just start digging" and soon enough was doing just that with a second-hand TBM that he dubbed Godot in a rundown suburb of LA called Hawthorne. (Perhaps not entirely unconnectedly all this came at a time when Musk was facing major problems at Tesla). It is far from clear if he will be able to expand this operation easily, but Musk's rapid progress has caught the attention of urban planners everywhere. He boasts that a city a day is getting in touch with him and is almost messianic in his belief that the future of transportation is tunnels.

One major city that seems to believe this is Singapore. Late last year the city state announced it would unveil an Underground Master Plan in 2019 to detail how, after decades of building ever higher, it now plans to go below ground to solve its acute space crunch. It doesn't (yet) plan to move housing below ground but wants to move utilities like bus depots and data centres into deep tunnels below the city, alongside existing underground sewers and reservoirs.

Space and transport are not the only reasons cities go underground. Increasingly

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Top: In a major landmark for the 32.5km underground Metro III corridor (Colaba-Bandra-SEEPZ), the breakthrough of the first tunnel boring machine was achieved in 259 days on Sep 24, 2018

Right: Lowering of the first TBM on Sep 21, 2017 in Mumbai

Below: The Eastern Freeway twin tunnels in darkness



extreme temperatures are another reason to dig deep. Northern cities like Montreal already have almost entirely covered networks to move through in winter. Australian cities, which now routinely suffer summers above 40 degrees, might want to follow the example of the country's opal mining town of Coober Peddy which is already largely built underground.

The historian Gillian Tindall notes "there have been legends concerning tunnels under cities for centuries, usually identified with smugglers, spies, eccentric noblemen or concealed deaths." This comes from her new book *The Tunnel Through Time*, about the building of London's new Crossrail underground link, and she speculates that these urban underground obsessions came from building works in large cities repeatedly uncovering the remains of older cities built before the current one.

But Tindall's book also shows how London's Metro, the first in the world, was the unexpected result of very much the same NIMBY (Not In My Back Yard) feeling that has led people to oppose Mumbai's Metro. When the railways first started building lines to London they were kept to the periphery by wealthy landowners who refused to let their central properties be demolished for the new lines.

Combined with the fact that the lines were privately built, without co-ordinated central planning, this led to a highly inefficient situation where three different lines terminated close to each other at three big stations: Euston, King's Cross and St. Pancras. Charles Pearson, a radical reformer and MP, saw the chaos this caused, with tons of travellers and goods disgorged onto the streets in a relatively small area, and came up with the solution of linking these stations underground to free traffic above ground.

Pearson's scheme would become the genesis for the whole Underground; by the time the first station was opened in 1963 the city

had got hooked on the idea of digging deep to travel. Voices against, which warned of suffocation or, as now, destabilising the foundations of the city, were disregarded, with the largely problem free creation of the first line the best proof.

The Underground railway was cheap, allowing working class people, the means to travel easily from distant houses to their place of work – a fact not lost on the capitalists building the railway, who wanted both the labour, but also to keep it far from more expensive areas. European visitors to London were impressed and took the idea to other cities, as far as Istanbul, where the Tünel track was opened in 1875 to zip up to the premium neighbourhood of Pera (it is still functional, the second oldest after London).

At almost the same time tunnels of a different kind were transforming Bombay. Tindall, as it happens, has also recorded this history in her book *City of Gold* which shows how an obscure west coast port, mostly seen as a drain on the resources of the Calcutta based East India company, transformed in the mid 19th century. The process was started by the opium trade, but consolidated with cotton, especially once the American Civil War cut off supplies from the southern states of the USA.

Providentially for Bombay this happened just as the first train lines crossing the Western Ghats were built, bringing cheap cotton from the Deccan. The principal connection came over the Bor Ghat, a monumental building feat that, as the railway historian Christian Wolmar records in *Railways and the Raj* "required twenty-five tunnels, the blasting out of 54 million square feet of rock." By January 1961 more people were employed there than at the Suez Canal, which was being built at the same time.

The Bor Ghat enabled Bombay to grow and the British made sure to emphasise their role in it. In his speech at its comple-

tion in Khandala the governor of Bombay Sir Bartle Frere rather crassly compared how "the works of our English engineers on these Ghats will take the place of those works of their demigods, the great cave temples of western India, which have so long, to the simple inhabitants of these lands, been the type of superhuman strength, and of more than mortal constructive skill."

Frere's remark was a calculated put-down of the amazing system of cave temples and monasteries of Western India whose rediscovery from the 19th century well into the 20th made clear what an extensive social system had existed in the region, tunnelled into the hard rock of the Ghats. In an essay published in the *Times of India (ToI) Annual* in 1961, the scholar D.D. Kosambi had noted how there was a tendency to see these in religious terms, but this could be a mistake: "the emphasis on all these caves, as far as we can judge, was on secular art, with the thinnest religious disguise."

Kosambi pointed out that the caves of Western India "follow the trade routes, and the largest caves are invariably at the junction of such trade routes, or in the later period, near the ports as at Kanheri, Kuda and Mahad." He argued that they

were evidence of the extensive trade network through the region, with the monks and local tribes supported by gifts given by merchants for safe passage as they took their pack animals over the steep hills. Shifting patterns of invasion and new networks to the north and south might have disrupted these routes, but the past evidence of cave and tunnel based prosperity was clear.

Wolmar notes how Frere, in his speech, made little note of the labour of the Indians who had actually built, and in many cases died, to create the Bor Ghat's tunnels and bridges. He only mentioned in passing how it would enable 'coolies' to come to the city to find work. This tendency to emphasise British achievements and benevolence in building tunnels would be repeated across India.

In 1890 *ToI* noted a particularly egregious example with the opening of the Khojak tunnel in what is now Pakistan. This was an extraordinary feat for that time, blasting and building – since this was before TBMs came into wide use – for almost four km under the Khojak pass to connect Quetta with the Afghan border. The report noted that the task had appeared to be beyond the skills of local labour so "nearly a hundred Cornish miners were from time to time imported from England and their services were highly spoken of by all."

The Khojak tunnel has another distinction, along with the Ramboda Tunnel in Sri Lanka. Both countries have featured these tunnels on their currency notes –

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Pakistan on a now discontinued five rupee note and Sri Lanka on their one thousand rupee notes. India, by contrast, has never really celebrated its tunnels, even though we have since built some truly amazing ones, like the over 11 km long Pir Panjal tunnel that was opened in 2013.

Tunnels are, admittedly, by their nature not easy to display, since all you can show of them is their openings (which is what the Pakistan and Sri Lanka notes do), or perhaps a curve from inside. The London Underground has made its schematic map a symbol since its almost abstract arrangement of lines shows what an underground can do – make irrelevant the actual topography of the city, in favour of its functional layout. As the Metro tunnels its way into Mumbai's history, and similar projects change cities across India, perhaps we need to find ways to acknowledge how deeply tunnels of all kinds can dig their way into our lives.