



Infrastructural repair, ruins, and caring for railway trains in late industrial Mumbai

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ABSTRACT: This article looks at how Mumbai’s suburban trains, one of the most widely-used public transport networks in the world, are repaired and maintained at a railway car shed. Following the call for this special issue of *kritisk etnografi* to examine the infrastructure-environment nexus, my article pays attention to how these trains are safeguarded from unruly forms of matter that saturate Mumbai’s urban coastal environment, viewed through the optics of an ethnographic study. While water, dust, and crowd pose substantial risks to vulnerable technical systems, their harmful effects are contained by both material techniques and technical upgrades. I further contextualise such reparative interventions and maintenance practices within the broader rubrics of ruination and late industrialism. Both as a built structure and bureaucratic institution, railway car sheds exemplified early 20th century infrastructural modernity. However, they are presently characterised by a form of lively ruination where material decay and technological progress coexist, although uneasily so. Sites like car sheds thus provide a vantage to examine the contemporary Indian state’s infrastructural moment; wherein its policies and visions reproduce socio-economic inequalities, and in fact, incapacitate the very infrastructure of care which sustain suburban connectivity in cities like Mumbai.

Keywords: care, infrastructure, late industrialism, maintenance, repair, ruins

Introduction: Repair, ruins, late industrialism

“It’s water,” said Darshan sir, an engineer at one of Mumbai’s oldest railway car sheds. “It will find its way inside everything!” he admitted. We were standing in front of an electric multiple unit (EMU) rake, the technical term for Mumbai’s iconic suburban railway trains. Each day, these trains carry almost eight million commuters between the city and its extended metropolitan region and distant suburbs, for which reason they are popularly known as “local trains” and “Mumbai’s lifeline” (see, Masselos 2005; Rao 2007). It was a hot afternoon in early April 2022. Though the monsoon season was still a couple of months away, railway car sheds – sites where EMU rakes undergo scheduled repair and maintenance – across the city had already initiated the arduous task of water-proofing trains to prevent heavy rains from damaging sensitive equipment.

While the Indian Railways is still one of the largest public sector organisations in India, with most car shed staff being state employees, several important tasks, like seasonal pre-monsoon and monsoon maintenance, have increasingly been outsourced to contract workers. This year, it was Darshan sir’s responsibility to oversee these activities. This was precisely what the train in front of us was undergoing. He was a short, stocky man in his forties, who sported a neatly trimmed moustache and cheery demeanour. Along with the

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labour supervisor, Vinod, a short and lean man in his thirties, Darshan sir had spent the last few weeks instructing a cohort of contract workers – young men in their early- to late-twenties (endearingly called “boys” in Hindi and Marathi) – in various types of water-proofing activities within, above, and underneath train coaches.

These activities were part of the crucial “preventive maintenance” and “corrective maintenance” of trains. These two terms respectively refer to proactive measures undertaken during inspections, and repairs carried upon identification of faults or defects (Ministry of Railways 2003). In Mumbai’s suburban railways, preventive and corrective maintenance span the length and breadth of the network – overhauling workshops, car sheds, stabling lines, and even moving trains. In particular, railway car sheds are crucial nodes in, not only the maintenance, but also the management, of trains in the suburban network. Unlike overhauling workshops, trains maintained at car sheds are “in service”; that is to say, these trains operate, and are repaired and maintained, in conditions of high commuter densities, and in an environment saturated by forms of unruly matter, like rainwater, atmospheric moisture, dust, dirt, and even the densely-packed human bodies of the commuters. Such forms of matter pose constant risks to sensitive electrical and mechanical equipment.

Despite being part of a highly technical, bureaucratic, and hierarchical structure, the ways that car shed engineers and workers perform their care exemplifies some of the key insights of repair studies scholarship, such as Steven Jackson’s (2014) notion of “broken world thinking.” Accordingly, car shed engineers do not just recognise and assess technological vulnerabilities, but they also appraise the importance of caring for infrastructure (also, Graham and Thrift 2007; Henke and Sims 2020; Mattern 2018). And while such activities are generally invisible to most users (Anand 2020) – where colonial-era buildings nestled along railway lines are subsumed into the city’s green and concrete canopies, and the bodies of workers on tracks blend in the blurry backgrounds of suburban connectivity – it is precisely because of such relentless repair and maintenance that Mumbai’s trains “*mostly work, for most people, most of the time*” (Jackson 2017: 174, emphasis in original).

In this article, I argue that specific forms of repair and maintenance undertaken at the car shed, along with the history and sociomaterial nature of the very institution itself, shows how the nexus around infrastructure, environment, and late industrialism are animated, which is what this special issue of *kritisk etnografi* calls for. To do so, this article specifically engages with the keywords infrastructure and environment, ruins and ruination, and late industrialism. By looking at how car shed engineers and workers try to manage material and operational pressures in their care of railway trains, this article asks the following questions: What are the technical, material, and social engagements that shape reparative interventions and maintenance practices at the car shed? How do car sheds contribute towards urban infrastructural reproduction amidst material ruination? How do the economic policies of the contemporary Indian state affect the users and fixers of Mumbai’s railway trains? What is the place of public transport, and their repair and maintenance, in such conditions of late industrialism?

Between 2021 and 2022, I conducted ethnographic fieldwork at one of the oldest car sheds in Mumbai, where I undertook an in-plant traineeship. It was a form of pedagogical instruction provided to new recruits, staff applying for promotions, and engineering students. In my time there, I followed engineers and workers across different “sections”; departments which were responsible for the preventive and corrective maintenance of technical systems,

like mechanical undergear equipment, electrical systems, electropneumatic braking, and so forth.¹ My fieldwork was also complemented by several site visits and interviews with senior engineers and workers who, like me and millions of others, commuted on these trains, and were more than aware of how local trains were Mumbai's lifeline. In addition to the traineeship, I also documented everyday experiences of urban commuting, including a series of public gatherings to protest against the induction of air-conditioned (AC) trains and fare hikes.² In this way, my approach to Mumbai's railway trains attempts to look at how both "fixers" and "users" experience these trains as technical objects and vital infrastructure (also, Chakraborty 2023).

In a marked departure from contemporary repair work ethnographies that usually follow repair workers rather than being embedded in repair sites or spaces (see, Anand 2019, 2020; De Coss-Corzo 2021; Denis and Pointelle 2015), the instant case of car sheds exemplifies how repair and maintenance are not only in situ, place-based practices (Lepawsky et al. 2017; Sormani et al. 2019); but are also part of everyday engineering practices, including design and improvements (Vinck 2009). Though the presence of local trains in a car shed, in itself is rather fleeting – they undergo scheduled maintenance in a span of hours – these institutions play a vital role in the production of urban spatiotemporal rhythms. For instance, car sheds also ensure safety standards and coordinate with institutions responsible for the operation, design, and manufacturing of EMU rakes. In this way, car sheds are not embedded in cycles of production or profit; rather, as sites of repair and maintenance, they are vital in a sort of sociotechnical reproduction (see, Henke and Sims 2020; Mattern 2018; Vindegg 2022).

For these reasons, car shed engineers and workers had to find ways to effectively manage both labour and time, whilst meeting critical safety parameters. The work of pre-monsoon and monsoon preventive maintenance exemplified some of these pressures. While extreme operational conditions like flooding and heavy rains exacerbated technological vulnerability, there were also trade-offs when it came to outsourcing work previously undertaken by Railway employees. Not only did this include practical problems like training new, inexperienced workers, but also involved a moral task of cultivating a sense of duty and responsibility among precariously-employed seasonal workers. So, if the contract boys were unable to undertake the required actions, or if they were absent at their post or absconded, Darshan sir explained, eventually the responsibility to fix trains would rest on the shoulders of Railway workers. After all, it was they who were accountable to the public.

These dynamics are explored in the first ethnographic section of this article. I show how reparative interventions and maintenance practices by car shed engineers and workers simultaneously recognise infrastructural vulnerability and attempt to make them durable. They draw on diverse forms of knowledge, expertise, and materials to secure technical objects from harmful effects of unruly matter – water, dust, crowds – that saturate the conditions in which these trains operate (see, Bakker and Bridge 2006; Bennett 2010; Law and Mol 1995). These interventions and practices underscore how such forms of matter can only be

¹ At present, there are six car sheds across Mumbai's suburban railway network. Car sheds are broadly divided into electrical and mechanical sections. Car sheds are staffed by bureaucrats, senior and junior engineers, master craftsmen (*mistris*), mechanical and electrical fitters, and helpers (*khalasis*). These staff are supported by trade apprentices and other contractual workers, like the boys described in the introduction, as well as workers employed by private multinational companies.

² The names of participants in my study, as well as the name and location of the car shed, have been anonymised to preserve confidentiality.

managed and not eliminated (Marder 2017), albeit within certain thresholds of safety and operability. In this way, repair and maintenance work toward not just finding faults and fixing failures, but also retaining the material and semiotic stability of infrastructure itself, in this case for these trains to continue to run as Mumbai's lifeline.

In the second ethnographic section of this article, I look at how such forms of managing/management go beyond the care for technical objects and apply to the very institution of the car shed itself, a site characterised by material decay and ruination. The earliest car sheds were commissioned in the 1920s and thus share a common historical and material heritage with other urban ruins in Mumbai, its old cotton mills (Finkelstein 2019). Most buildings are nearly a century-old, with several areas covered in vegetative overgrowth, hosting both discarded objects and wild animals. However, such ruination is not so much the result of neglect or atrophy but emerges instead from the vitality and liveliness of sites like car sheds. Inspired by Finkelstein's (2019) notion of "lively ruination," I argue that the ruinous landscape of car sheds, paradoxically, speaks to their indispensability and vitality as spaces of infrastructural repair and reproduction, including improvement and upgradation like "retrofitting" (Howe et al. 2016). As a site of lively ruination, car sheds exemplify a more literal dimension of "broken world thinking." Repair and maintenance not only foregrounds the "world-disclosing properties of breakdown" (Jackson 2014: 230), but are also fundamental to rethink technology beyond ideas of productivity, innovation, and paying attention to the ethics and politics of care (ibid.: 234–35).

Finally, my discussions framing materiality and ruination are contextualised around the political-economic and material effects of late industrialism on urban public transport systems. In the case of Mumbai's suburban railway network in particular, and in the larger context of the Indian Railways, such effects are characterised simultaneously by exponential increases in operational pressures and severe capacity constraints imposed by exclusionary financialization policies and divestment. To examine this, I look at recent commuter protests against air-conditioned trains and fare hikes. I argue that such forms of popular political mobilisation reveal further infrastructural paradoxes, such as between accessibility and social exclusion. I then take a closer look at the material practices of engineers and workers, and the ruinous landscape of car sheds to unearth certain politics of repair which, though increasingly rare and invisible, nevertheless animate how infrastructure like Mumbai's railway trains continue to be cared for.

Infrastructure, vulnerability, durability

Managing materiality

How do car shed engineers and workers secure local trains from the harmful effects of matter like water or dust, especially when such forms of matter saturate Mumbai's urban environment? Indeed, it is difficult to even speak of water and dust as discrete or ontologically separate forms of matter. Not only do they congeal and cross over to form mud or dirt, but they also mix and mutate with the cumulative effects of commuter crowds; the sheer density of bodies even constitutes its own kind of matter – placing tremendous pressure on doors, seats, floorplates, while also producing biological waste and debris (like garbage, spit, and even shit) which stain trains and choke railway tracks. These forms of matter are deeply entangled with, inseparable from, and pose risks to, infrastructures like local trains.

Let's start with some of the most apparent ways that Mumbai's local trains are vulnerable to the city's coastal climate – the annual monsoons. Between June and September each year, the city receives around 2,500 millimetres of rain on average, while experiencing an average annual humidity of around 75 percent. The electrical traction systems in most EMU rakes in Mumbai's current rolling stock were manufactured by large European and North American multinational conglomerates and were thus built for operational conditions vastly different from the city's coastal urban climate. Although these trains undergo rigorous field trials and are upgraded with improved systems during periodic overhauling, rainwater still poses a threat to such complex electrical systems. These are housed in the driver's cab, the undergear equipment, and high-tension (HT) compartments in motorcoaches, and include semiconductor- and microprocessor-based systems responsible for crucial functions like traction and braking. As we saw in the opening pages, in the months preceding the monsoons, car sheds across Mumbai undertake extensive preventive maintenance works which include sealing all vulnerable spots with layer upon layer of sealants like epoxy and waterproofing sealants, a black tarry bituminous compound, waterproof tape, and silicone gel.

On one day in early April, Darshan sir instructed some of the contract boys to use a technique he called *panyacha haath* (wet hands), where they would shape and slope the base layer of sealants with a moist hand, before covering it with waterproofing sealant. He explained that this made the sealant *chikna* (smooth), and thus easier to apply and shape while also preventing it from cracking. In another instance, he told the boys to closely look for air bubbles which, when dried, could create micro gaps through which rainwater could possibly seep in. When some of the boys expressed their scepticism on whether such tiny gaps really mattered, Darshan sir explained that when trains run at speeds over a hundred kilometres an hour, they take the brunt of rainwater – which, to paraphrase another engineer, “hits like bullets.” Even water collected on the roof can inundate the lookout glass and doors like an “overflowing canal” (*naala sarkhya*). These engagements were also pedagogical moments, as Darshan sir and Vinod socialised workers into the sociotechnical work and world of repair at the shed. As we will see below, by the time the monsoons had arrived, these boys had acquired plenty of experience and expertise in sealing gaps.

“Now, if you tell them to put the [sealant] in their sleep, these boys will do it!” exclaimed Vinod. He and another colleague stood in front of a train that required additional sealing work. It was early-June. With most trains already sealed, the contract boys were deputed across different car sheds and depots so they could attend any leakages on the line itself. Vinod's statement illustrated how these young workers had picked up both skills and a sense of craftsmanship within a short span of time. Later that day, Omkar and Yash, two contract boys (though Yash was older than the rest by a few years), were tasked with sealing a leak on the lookout glass and head code (which displays the destination stations). Both workers adeptly and expertly identified the leak; they also had the right materials with them, which they promptly applied. As Yash headed to the other line, Omkar still lingered, ensuring an even application of silicone gel. Appreciating his colleague's diligence yet urging him to finish quickly, Yash turned to Vinod and me, and said, “On a salary of four thousand

[rupees], he's doing work that's worth twenty-four [thousand rupees]!"³

As these brief descriptions showed, car shed workers and engineers drew on situated expertise and embodied techniques of repair and maintenance. They were not solely dealing with material properties (Denis and Pointelle 2015: 352) but were attentive to the permutability of matter like water, dust, and crowds, of materials like sealants, and specific vulnerabilities of mechanical and electrical systems. The recursive relationships between repair, maintenance, breakdown, upgrades, and so forth, further underscore how repair and maintenance are implicated in a dynamic, processual understanding of the world. The serendipitous and anticipatory nature of repair is therefore not so much a paradox (De Coss-Corzo 2021: 241), as it is a result of what I call *managing materiality*. Accordingly, embodied techniques of repair and maintenance attend to, and devise strategies to work with, the durable and unstable properties of materials (Bakker and Bridge 2006: 14–15; Law and Mol 1995: 282).

In particular, the above accounts illustrated how repair and maintenance “*depends on and enacts material diversity*” and involve “material durability, manipulability, and scale” (Law and Mol 1995: 281–82, emphasis in original). The way engineers like Darshan sir instructed the boys to secure trains showed how both *matter* (water, dust, crowds) and *materials* (sealants, technical systems) manifest, mutate, and are modified in reparative interventions. These materialities were unruly, unbounded, but also vital and lively (Bakker and Bridge 2006; Bennett 2010). Managing them was part of the techno-bureaucratic arrangements of preventive and corrective maintenance, where workers were socialised to cultivate both technical skills and a caring ethos. Like the municipal hydraulic engineers Anand (2019: 158) writes about – who cannot prevent leakages but only manage them – the ethnographic accounts have traced the processual nature of such interventions, which both anticipate and respond to faults and failures, thus never quite being water-tight.

Unruly matter

Unlike rainfall, atmospheric moisture and dust pose a more pernicious form of risk to technical systems in trains, requiring constant preventive measures during scheduled maintenance periods, as well as technical upgradations. One such technical object is called the air dryer, which is attached to the compressor that pumps atmospheric air into the electropneumatic (EP) system responsible for crucial functions like braking. Saurabh sir, a senior engineer, explained that this machine was not part of the older generation of trains. Moisture inside the EP system of older trains would often condense into water droplets and cause damage, even oxidising the mild steel pipes and tanks. Air dryers thus emerged as a provisional solution, and eventually were included in the design of newer trains (Figure 1). Similarly, there exists a complex array of filters that prevent dust from getting into sensitive equipment in the high-tension compartments. However, these filters tend to choke up, which could also increase heat and lead to electrical failures and require more maintenance than anticipated in the design process. Prakash sir, another senior engineer, called dust “the most dangerous thing” for this reason.

³ While I lack the space to have a more in-depth discussion, I believe Yash's comment aptly illustrates how feminist and ethnographic scholarship on care have foregrounded both the devaluation, and the invisibilisation of care, and how it continues to remain vital and how care workers continue to care (see, Anand 2020; Jackson 2014, 2017; Mattern 2018). I thank one of the reviewer's for drawing my attention to this.

Thus, even preventive features like filters and air dryers required embodied techniques of maintenance. At the car shed, maintenance contracts of traction systems were awarded to the multinational companies that manufactured them, which include visual inspections, diagnoses, and cleaning. Even so, as Prakash sir conceded, these activities can only get rid of “fifty percent” of the dust, which is usually blown out with forced air pressure – deferred and displaced, rather than being eliminated (Marder 2017: 52). Yet, when I spoke to a representative of one private company, he cautioned against my conclusion that trains were vulnerable to faults. He said that my assessment of their company’s products was not completely accurate as I was writing about older technologies. He also downplayed the recurrence of failures, saying that most preventive and corrective maintenance practices are within the purview of the Railways and not the company.



Figure 1: An air dryer ejecting moisture. Unless specified otherwise, all photos by the author.

This view asserted a dominant design perspective, and relegates the constant need for repair and maintenance as an afterthought, or a series of *ex post facto* interventions that are assumed not to have much bearing on the assessment of the technical system itself. Railway engineers, in contrast, had a more grounded appraisal of vulnerability and the care trains require to operate safely. “Failure never knocks,” explained Saurabh sir. “It just shows up.” This was why preventive maintenance of even preventive technologies required a meaningful material engagement with both matter and technical objects, showing how a “certain degree of vulnerability is necessary to create space for learning and adaptation” (Bijker et al. 2014: 1).

In one instance, I observed Amar, a young worker, overhaul the air dryer. After disassembling the machine, all bolts, discs, caps, and valves were thoroughly cleaned with air pressure, washed with kerosene, and then wiped clean with static-free cloth and air dried again, before being assembled, tested, tagged, and put into storage. In other cases, workers’ reparative interventions accounted for how different forms of matter tend to congeal and pose risks—something that was apparent when Vinod, the supervisor for monsoon-related works, fixed a gap in the floorplate of a coach. Vinod sat cross-legged on the floor while I stood outside, observing. He pointed out how rainwater could flow into the gap and enter the transformer below. Because thousands of feet stand, walk, and stomp on these surfaces, workers need to ensure that sealants not only keep water out but can withstand such pressures. While cleaning the gap, he noticed that some dirt was lodged in, which would make it difficult for the sealant to stick. Vinod ejected the dirt with some cotton, applied a layer of epoxy sealant, ensuring the gap was sealed and stable, after which he instructed the boys to apply another layer of waterproofing sealant (Figure 2).



Figure 2: From left to right—cleaning dirt from gap in floorplate, sealing the gap, and applying waterproofing sealant

In contrast to ethnographies that foreground the unknowability of breakdown and importance of perception (Anand 2019; De Coss-Corzo 2021; Denis and Pointelle 2015), the above ethnographic accounts have emphasised how diverse engagements with matter and materials are part of a wider bureaucratic framework of responsibility and accountability. The reparative interventions and maintenance practices of car shed workers and engineers stemmed from an intimate and embodied, but also institutionalised and socialised, awareness of the unruliness and vitality of matter and materials. Efforts toward securing the trains from the effects of these matter and materials also revealed how engineers and workers understand technological vulnerability and fragility, a fact that also underscores why and how such efforts tend to be successful – or are, more accurately, *agentic*. Agentic capacity, as Bennett (2010: 34) puts it, is distributive, confederate, congregational, emanating as it does in the vitality of materials (and humans).

For engineers like Darshan sir, the work of securing rakes from water during the monsoons was agentic not because leaks are successfully sealed; indeed, as he humbly admitted in the opening account, water “will find its way inside everything” – a fact illustrated in the several leakage complaints they received during the monsoon season. What was important, as Darshan sir would explain, was to put adequate care and embodied expertise into reparative interventions and maintenance practices. Toward the end of my fieldwork in 2022, for instance, he reported that monsoon work at the car shed was eventually successful because their sealing work had substantially reduced potential damage, and their re-sealing work had been effective *enough* – something Darshan sir inferred from the lack of complaints or memos – a fact they attributed to due diligence, skills, and expertise that ensured their interventions held steadfast.

Repair, ruins, and stabilising/socialising technology

Pride and beating heart

“EMU is Mumbai’s *shaan* (pride),” said Vibhavari ma’am, a car shed official. “And our car shed is its beating heart!” She stood on a stage that had been assembled in the open warehouse at the car shed, as part of the institution’s anniversary celebrations. In a few years from now, Indian Railways would be celebrating the centenary of EMU rakes, which started operating in Bombay in 1925 – also the year when the first car shed was commissioned. It was a dry but cloudy late evening in February 2022. Mumbai’s mild and temperate winter was almost waning. Nearly a hundred chairs were assembled in front of the stage, almost all of which were occupied. Having just finished their shifts, most workers had changed into civilian clothes and took their places in the celebration. I left the celebration halfway, hoping to avoid the evening rush hour crowds. As the shed receded from my view, I noticed local trains zooming past on the main line tracks. I wondered whether someone peeking through the windows could discern not just this celebration, but also the large and quotidian materials around the shed – empty trains, stacked equipment, old and weatherworn government buildings, and workers’ bodies. And that the mechanical and electrical entrails of these very trains, which were just now ferrying commuters’ bodies anywhere between eighty and hundred kilometres per hour, were laid bare just a few meters from the tracks?

Car sheds were commissioned when EMU rakes were first introduced in Bombay when the railway lines were electrified in the 1920s. In addition to existing older railway workshops, car sheds played a vital role in the maintenance of the new electric traction system that included maintenance workshops and sub-stations that supplied electricity to the network (Lydall 1932; Prasad 1933). Sites of repair and maintenance like sheds, workshops, and yards, are an important part of public transport assemblages but have curiously received less attention in ethnographic studies of the same. In their ethnographies of the Tokyo subway and New Delhi metro, for instance, Fisch (2018) and Sadana (2022) only have cursory mentions of repair and maintenance, even as they persuasively argue how urban public transport infrastructure plays a vital role in producing both urban flows and subjects. Repair figures more prominently in Ureta’s (2014) study of the Transantiago network in Chile, where he explores how reparative interventions were largely insufficient technical solutions to the political problems posed by neoliberal transport networks.

My ethnographic approach to the car shed as both a built, material structure, as well as a technical, bureaucratic institution, departs from contemporary ethnographies of urban public transport. The metaphor of the “beating heart” is a productive idiom with which to think about sites or spaces like car sheds and transport networks. First, this metaphor clearly resonates with the fundamental nature of public transport in large metropolitan cities – the circulation of trains, and the objects and people they carry; and how care plays a vital role in ensuring the health of individual trains and the network at large. Second, this metaphor also draws attention to the inner structures and functions of vital organs in a circulatory system – a rhythmic, unceasing flow vital for the (human or urban) body’s survival, and one that also requires considerable care.

This is where the sociomaterial nature of repair becomes salient, especially the possibility and potential of repair as a space- and relation-making practice that draws “connections between things, places, and people” (Lepawsky et al. 2017: 57). Accordingly, sites like car

sheds are not simply technobureaucratic zones, but are important sites where EMU rakes are stabilised as sociotechnical assemblages (Akrich 1992). This means that the interventions and practices by engineers and workers are structured according to specific schedules and protocols, of which safety is the most paramount – of rakes, workers, and commuters. Part of such stabilisation is predicated on a recognition of the vulnerability of technological systems in terms of risks posed by *external* factors and *internal* defects (Boholm and Corvellec 2011). While the discussions of water, dust, and crowds in the preceding pages have troubled such dichotomies of interiority-exteriority, the technically exacting work of repair and maintenance still relies on understanding causal relations, which are important for finding faults, fixing failures, and preventing breakdowns. These technical interventions are also inflected by ideas of bureaucratic accountability and social responsibility. Thus, a common phrase that almost all engineers articulated was “safety cannot be bypassed!”

Kishore sir, a senior engineer who oversaw the inspection of mechanical equipment, once told me, “The Railways provides a service to the city.” If there was a serious failure, it meant that “someone’s life could be in danger.” These failures were not simply technical. While services would be disrupted, so too would public life. “Railways are the lifeline of the city,” he concluded. We both stood next to the pit line. An EMU rake was moving up and down the line, so that workers could inspect the health of moving parts and identify any faults. Worker gangs waited patiently for the train to come to a halt, so they could safely access the undergear equipment – look for slacking bolts or cracks, release jammed joints, refill oil in empty dashpots. In later conversations, Kishore sir often emphasised how caring for trains involved not just technical expertise, but also *dhyān* (attention) and *imandaari* (integrity).

Unruly liveliness

Even though engineers reiterated their commitments of safety and responsibility, they still endured the material realities of their place of work. After all, the car shed was a large government institution consisting of weatherworn, and at times crumbling, buildings, vegetative overgrowth, piles of broken and discarded objects, and wild animals, including venomous snakes. Earlier during fieldwork, Bhavin sir, another engineer, drew my attention to what one can evocatively call *the maintenance of maintenance*. The Railways, he said, plans the maintenance of trains, often to the most meticulous detail. But what of the “background” of infrastructure – the old buildings, the waterlogged tracks, snakes in offices? How do you refurbish a 100-year-old building, which houses the most advanced and latest traction technologies? Could you shut the whole section down? Where would you relocate the equipment – from both trains, and those used for testing and repair? “Even a homemaker knows when the house runs out of flour and asks the husband to buy more,” he remarked, perhaps unknowingly but accurately underscoring the gendered and socially reproductive dynamics of care.

Such grounded idioms of care and responsibility, as well as metaphors that liken trains to Mumbai’s “pride” and posit car sheds as being its “beating heart,” animate the reparative interventions and maintenance practices that take places in these sites. And although workers and engineers inhabit a space of material ruin, such ruination does not signify infrastructure that are in a state of “suspension” (Gupta 2018). Rather, following Finkelstein’s (2019: 31) archival-ethnographic work on Bombay’s mill lands, I also think of the car shed as

“an anachronistic vitality in the centre of the city, hiding in plain sight.” As Finkelstein further argues, “These older declining spaces may be sites of ruination, but these ruins are lively and vital” (2019: 48). Car sheds have proven to be lively ruins in crucial moments of infrastructural upgradation, such as when Mumbai’s suburban network was electrified with 25,000-volt alternating current (AC) in the 2010s. During this time, a more advanced train was inducted into the rolling stock, which could operate on the older 1,500-volt direct current (DC) and 25-kV AC power, and were called AC/DC EMU rakes. However, DC trains were still operational but had to be modified to operate on AC and DC power – a process that was known as *retrofitting*.

Retrofitted trains exemplified how car sheds were lively infrastructural ruins in the sense of producing and stabilising sociotechnical assemblages, of adapting new technologies and extending the lives of older ones. However, I also think it is productive to extend the notion of lively ruination beyond built or material forms and think of these trains through the lens of socialising technology. I am particularly inspired by Julian Orr’s (2000; 2006) analogy between Mary Shelly’s *Frankenstein* and modern machines. Orr argues, “Technicians’ work is both socializing the engineers’ creations and dealing with that wilful ignorance on the part of both the creators and the society that uses those creations” (Orr 2006: 1808). Following Orr, I see retrofitting as an extension of the socialising (and stabilising) effects of repair and maintenance, albeit one that also engages in forms of trial-and-error experimentation.

Though closer to their end-life, these older trains were transplanted with another kind of beating heart (or hearts) – traction motors, transformers, rectifiers, microprocessors, and so forth. Deviprasad, a senior worker at one of the electrical sections, described the “retro *gaadi* (car)” as *jaandar* – bursting with life. These cars “roared like a bullet,” he said, referring to the Royal Enfield motorbike which has a reputation of being loud and noisy. Suraj, a senior *mistri* (master craftsman), added that these retro cars were “a nightmare for fitters.”⁴ For one, car sheds had to reverse-engineer the dual-voltage system from AC/DC EMU rakes, creating new assemblages and new routines, so as to maintain suburban timetables and schedules and, by extension, flows of trains and people who commuted in them. Second, the process of retrofitting involved creating new sociotechnical assemblages, drawing on electrical and mechanical engineering expertise, as well as cooperation between car sheds, workshops, private vendors, and state and private sector manufacturing companies. And it involved a constant negotiation of failures like burnt coils, electrical shorting, jammed wheels, and so forth, until the operational and maintenance routines were stabilised. This exemplifies the paradox of retrofitting, which makes technical objects endurable while also revealing their vulnerability (Howe et al. 2016: 553).

In his formulation of socialising technology, Orr writes about a triad-like relationship he calls the triangle of service between users, fixers, and machines (Orr 2006: 1808). However, specific interventions like retrofitting, and more broadly, the work of preventive and corrective maintenance, precludes any such direct interactions between engineers, commuters, and trains. Still, commuter wellbeing and the viability of the suburban network deeply inflect the repair and maintenance of trains, exemplified through a different triad of “safety, reliability, and punctuality” – a motto that senior engineers at the shed often reiterated. Accordingly, both retrofitting and routine repair were as much about fixing

⁴ The term “fitters” refers to junior- and intermediate-level mechanics, viz., staff at car sheds who are responsible for dismantling and installing electrical and mechanical systems in EMU rakes.

technical problems as they were about ensuring the capacity of the rolling stock to move millions of bodies every day. Indeed, retrofitted trains served Mumbai’s commuters for nearly a decade, working alongside their newer and more advanced counterparts.

This view of socialising technology was well-summarised by Prakash sir. “Retrofitting was important so that there were trains for passengers,” he said, explaining that it was a way of “experimenting while running [services].” He added, “We have to work within the system. Services shouldn’t be affected, but modifications must also be done.” At present, a few of these trains served commuters in smaller cities outside Mumbai, with some of them still playing a significant role in repair and maintenance. At car sheds, for instance, retrofitted trains shunt coaches from the pit lines to heavy repair lines; on the mainlines, these trains transport debris and waste collected during track maintenance or construction (Figure 3). However, except for these non-commuter services, and one rake that still carries commuters (Figure 4), most retrofitted EMU rakes have been decommissioned. Stripped for their technical entrails, the outer husks of these trains have become ruins themselves. Empty, rusted, and overtaken with weeds (Figure 5), subsumed as it were within the environs of the car shed’s ruinous landscape.



Figure 3: An AC/DC EMU rake carrying track debris.

Infrastructural care in late industrialism

Working at saturation

From its beginning in 1853, to electrification in the 1920s and upgradation in the 2010s, Mumbai’s suburban railway network has exemplified how trains have been vital in the production and sustenance of industrial urbanism and modernity (Fisch 2018: ix). Writing at the turn of 20th century, writer and political activist Sandeep Pendse’s (1996) evocative essay on the “toilers” – the labouring, invisible classes of the city – highlights the entanglements



Figure 4: An AC/DC EMU rake in service.



Figure 5: A scrapped AC/DC EMU rake.

of capitalism and urban spatiotemporality. Like Finkelstein, Pendse also traces the city's transformation from industrial Bombay to post-liberalised Mumbai. The overcrowded coaches of local trains exemplify the toilers' plight, who rely on cheap but inadequate public transport to commute from distant suburbs to the city centre (Pendse 1996: 14–15). In such conditions, it becomes important to untangle what role public transportation – including how trains are used, repaired, and maintained – plays in the political economy of production and consumption under late industrialism, which is characterised by infrastructural degradation and complex socioecological problems (Fortun 2012).

The Indian Railways, though still a publicly-owned entity, has suffered economic

and political shocks during India's transition to neoliberalism in the 1990s. It has become what Laura Bear (2020) calls an infrastructural asset class – a means of leveraging national assets to support the current Indian state's debt-fuelled growth of building world class infrastructure, like high speed trains or metros, through private-public partnerships (Sadana 2022; see also Björkman 2015; Buier 2023) The pernicious effects of such economic policies in late industrialism are felt on social relations both at the shed and outside. For instance, take the contract boys who were engaged in pre-monsoon and monsoon preventive work. Their labour of repair and maintenance was important in illustrating how young and novice workers become socialised to the work and world of car sheds, where they learn to care for trains in embodied and affective ways. Yet, the possibility of secure and stable government employment was increasingly becoming inaccessible to young and semi-skilled men like them, as several thousand entry-level jobs, such as helpers (*khalasi*), in the Indian Railways are being abolished (Times News Network, 14 May 2022).

Even the outsourcing of specialised technical maintenance to manufacturing companies is part of such divestment in public transport, as company workers were not provided the same benefits as government workers though they possessed the same skill, training, and were engaged in the same work of repair and maintenance. Many senior engineers recognised the long-term effects that such divestment can have on capacities of repair and maintenance – a fact that's been apparent in Mumbai's civic services, which has led to a loss of embodied knowledge and expertise (Björkman 2015: 19, 119). As a senior official had once told me, "When the Railways employed one person, they were taking care of one family." Evidently, this was changing. But what implications did this have on the work of repair and maintenance?

These economic measures were also responsible for the continuing material ruination of car sheds, which sit outside of revenue models of late industrialism. On the one hand, because these spaces are still vital sites of repair and reproduction, it is currently unviable to exploit their real estate value like mill lands (though, with plans of commissioning new car sheds, this appears to be changing). On the other, sites like car sheds are vital to ensure the health of the traction rolling stock, which is an important factor in ensuring that the suburban schedule, and not just individual trains, stays on track. For this reason, car sheds cannot be shut down; any repair, maintenance, or improvements must happen in situ, while the scheduled maintenance is ongoing. This is also true for the suburban network itself, where maintenance blocks usually take place in a few hours before the first or last services, or during Sunday afternoons to avoid the peak rush hour. As Prakash sir once mentioned, "Mumbai's railway [network] can never be shut down, can never be overhauled. We have to stay with this [...] work at saturation."

These operational pressures reflect how Fisch (2018) also characterises the pressures of Tokyo's subway trains through the ideas of "operating beyond capacity" and "operating without capacity." The former refers to how Tokyo's trains need to accommodate dense crowds to ensure that there are adequate gaps between services, as failing to do so would mean delays, congestion, and even more over-crowding. The latter refers to how neoliberal logics and imaginaries of frictionless connectivity impose profound structural constraints by paradoxically removing the constraints of capacity. While Fisch's discussion on capacity is relevant, it focuses on the operation of trains, whereas the car shed engineers I spoke with, invoke saturation to explain how any increase in the network's capacious limits is often

immediately saturated by both crowds and maintenance schedules, which is characterised by perennial conditions of density and crowdedness.

The “public” of public transport

But it is not only the relationships between workers, engineers, and trains that are being rendered precarious under late industrialism. The current Indian state’s economic reforms are also altering the very idea of who the subject of public transport is. In August 2022, for instance, several regular train services were converted into air-conditioned (AC) local trains, which were considerably more expensive for average commuters. While AC local trains had a limited roll-out, introduced in 2017, the number of services were increased in 2022 and replaced non-AC local trains. Despite a fare decrease, these trains remained inaccessible to most fare-paying commuters, and altered the carefully constructed spatiotemporal flows that commuters were familiar with for decades. As a car shed worker responsible for overseeing AC locals once remarked, exclusionary services like AC local trains effectively meant that commuters would be divided into a different, more exclusive “first class,” while the rest would constitute the modern-day underclasses. This notion was not very different from the “natives” whose impure and racialised bodies were simultaneously surveilled in, excluded from, and hierarchised by, colonial-era trains (Bear 2007). To me, his statement also illustrated how public transport now served consumers, rather than commuters.

Within days of introducing new AC local services, spontaneous commuter protests erupted in the suburbs on the Central Railway network of Mumbai, which is more widely used and served a more diverse demographic living in the rapidly urbanising peripheries of the Mumbai Metropolitan Region. In one case, commuters had occupied the tracks outside a car shed after a regular service had been replaced by an AC one during the morning rush hour. In another instance, a group of commuters had surrounded the offices of the station master. These actions are part of the long history of commuter protests (Masselos 2005), particularly against poor services and delays, which – paradoxically – articulate commuters’ dependence on the lifeline by destabilising it. Toward the end of August 2022, I attended a meeting called by an umbrella organisation of commuter groups in Mumbai. During these public meetings – which also included an opposition party politician and legislator – all commuter groups demanded that AC services be withdrawn (the threat of further agitations had already led to the cancellation of these new AC services), and that routes for suburban and freight and express services be segregated to reduce delays caused by congestion.

Interestingly, these commuter meetings articulated the contemporary Mumbai commuter as a normal middle-class person who was making by in Mumbai’s late industrial economy. The commuter subject was also explicitly classed and feminised – a young working mother who must balance her duties toward the family, the job, and endure crowded trains and infrastructural delays. As the politician said in his speech, this grind of urban life had “turned people into machines.” A commuter association representative said that the introduction of AC services, a single ticket for which cost as much as a monthly season pass from the central suburbs, was insulting to the “middle class’s self-respect” (*madhyam vargi chya atmasamman*). A delay in reaching one’s place of work would not only lead to the middle-class worker being humiliated by the boss, but also lead to economic hardship in the form of wage losses. Other voices in the protest, including the politician, likened the implementation of AC local trains as the tyranny of “Railway Board” and “New Delhi,”

and not understanding the plight of “Mumbaikars” (Mumbai’s inhabitants) – effectively critiquing the breakdown of centre-state relationships that have characterised India’s current federal government.

The framing of the commuter subject as “middle-class,” however, precludes the diversity of commuting experiences that are characterised by vernaculars of “adjustment,” where it is not only bodies that are densely packed within trains, but that Mumbai’s trains also hold together the diverse and antagonistic socialities – most notably of caste, religion, class – into a sort of functional coexistence and even vibrant sociality (Rao 2007: 232). And unlike the “toilers” in Pendse’s writings about the city and its working-class commuters, the “normal” (*samanya*) commuter in such scripts is often concerned with the encroachment of undesirable bodies into the coaches of railway trains – ticketless travellers, second class commuters in first class coaches, vendors, beggars, *hijras* (local word for eunuchs, who usually beg for alms, and move in the trains both individually and collectively), and so forth. While such middle class anxieties over undesirable bodies reframe commuter subjectivity from citizenship to consumerism, they are further embedded in exclusionary (and violent) hierarchies of caste and gender (Sadana 2022: 168–69), but also religion, most notably Hindu majoritarianism (Rao 2007).

During the 2022 commuter protests, for instance, which were concentrated in particular suburbs outside Mumbai, there were fissures among the commuter associations along religious identity. A gathering organised in a predominantly Muslim town saw a significantly large deployment of armed state police units. Members of the commuter association who had organised this gathering later indicated why it was important for them to mobilise alongside other associations and opposition political parties, given the Indian state’s historic hostility toward Muslims. Had there been any agitations like occupying railway tracks, one member reasoned, it would be construed as an act of violence since this was a “minority area.”

While these fissures problematise the homogeneity of Mumbai’s commuters, despite what the spectre of the crowd might tell us, the protests were somewhat successful in cancelling the new AC services, which reverted to the regular trains. Still, the articulation of middle-class identity is perhaps not entirely antithetical to desires of modern and world-class amenities like air-conditioned travel, a fact that was borne out when the Indian Railways suddenly announced in 2023 that Mumbai’s local trains would be upgraded to the so-called “Vande Metro” trains. These would be based on the “Vande Bharat” series of semi highspeed trains with substantially expensive fares, which were being regularly flagged off by Prime Minister Narendra Modi. Many commuter associations that were otherwise critical of AC local trains appeared to celebrate this development. However, this Vande Metro policy was abruptly withdrawn, citing issues around technical and operational feasibility. Importantly, these new train sets were supposed to have been manufactured under a public-private partnership, thus removing the monopoly of the state-owned Integral Coach Factory (ICF).

Still, a more troubling part of these plans was to devote two upcoming car sheds in the suburban peripheries of Mumbai to the maintenance of Vande Metro trains, without clarifying whether these sheds would be privately operated and continue to service the existing rolling stock. When I spoke with car shed engineers during follow-up fieldwork (July 2023), they were decidedly ambivalent about the future. Some engineers reasoned that car sheds located on the network’s peripheries would in fact be beneficial, as commuter

densities were also concentrated in these regions. Others remarked that it might have been more feasible to repurpose existing railway yards into car sheds to reduce operational costs and times. A few senior engineers, however, speculated whether existing car shed sites in central Mumbai were likely to be opened for private redevelopment, thus exploiting their commercial value in the city's real estate economy.

As I write this article, Modi has since inaugurated several new Vande Bharat trains, the promotional images of which dominate the Indian Railways' presence on social media (and is also praised by the commuter associations that were otherwise calling for suburban and express services to be desegregated). There is still a lack of clarity regarding the future of Mumbai's local trains, even as minor and major upgradation works on several important railway stations are underway – also signified through ideas of speed, efficiency, and the ushering of what the Indian state is now calling “Amrit Kaal” (age of prosperity),⁵ while being conspicuously devoid of “the continuing realities of communities [...] of packed trains or crowded platforms” (Fisch 2018: 113).

Conclusion: Caring for a lifeline

In this article, I have looked at how the repair and maintenance of Mumbai's suburban railway trains entail complex and, at times, contradictory sociotechnical interventions and practices that stabilise EMU rakes in the face of environmental, operational, and political pressures under contemporary late industrialism. Like the efforts of engineers and workers, I concede that my arguments are leaky and far from watertight, perhaps even reflecting the unruliness of machines like EMU rakes. Nevertheless, my analysis has shown how the infrastructural care of Mumbai's local trains – and the suburban network at large – is a means of stabilising and socialising technologies, often *in situ* and in moments of upgradation and transition. Such interventions and practices illustrate how “matters of care can be found in every context”; even, and especially, in spaces like technical-bureaucratic sites like car sheds where “caring seems to be out of place” (Puig de la Bellacasa 2017: 55).

First, I looked at how car shed engineers and workers draw on a range of embodied techniques to protect sensitive and critical technical systems from the harmful, entangled, and cumulative effects of water, dust, and crowds (Marder 2017; also, Bakker and Bridge 2006; Bennett 2010; Law and Mol 1995). I describe their interventions as a form of *managing materiality* that attempts to delimit, rather than eliminate, the extent to which technical systems are exposed to vulnerabilities and ensure the durability of their interventions (Bennett 2010; Law and Mol 1995). Such negotiations are also deeply inflected with grounded and bureaucratic notions of care, duty, expertise, and responsibility. Thus, the scheduled maintenance of EMU rakes are more than technical routines, rather constituting relation-making practices, such as instances where young workers are socialised into the work culture of the shed, or even when engineers themselves underscore the need for the maintenance of maintenance – especially in conditions of material ruin.

These forms of repair and maintenance are deeply embedded in contemporary regimes of late industrial capitalism, which not only drives the ruination of public infrastructure through policies of divestment, but also erodes the social contract between the Railways and commuters through the introduction of world-class but exclusionary modes of travel.

⁵ The ongoing station upgradation scheme in Mumbai, for instance, is called the “Amrit Bharat” initiative.

In the case of commuter protests against AC local trains, which takes a view on the other side of infrastructural interfaces, we see both a rearticulation of the commuter subject as “middle class” and the reproduction of class- and caste-based forms of exclusion that have characterised the Indian state’s vision of world-class infrastructure (Björkman 2015; Sadana 2022). While the protests underscored that the suburban network was Mumbai’s lifeline, I also found ambiguities in how relationships between states and citizens, the Railways and commuters were being imagined. This raises further questions around how anthropologists come to understand infrastructure, especially as the concept’s relevance in anthropology, as both an analytic and empirical object, has come under critique recently.

In a rather provocative, and somewhat scathing, recent essay, Buier (2023) has problematised the utility of infrastructure in anthropology, particularly the subfield’s focus on materiality and relationality, and how this conflates multiple things as “infrastructure”. Instead, she advocates for a historical and materialist analysis of infrastructure under capitalism. While I do believe Buier’s critique is constructive, the ethnographic materials in this article nevertheless underscore how, particularly through repair and maintenance, infrastructure like Mumbai’s suburban railways are sociotechnical systems (Akrich 1992; Henke and Sims 2020; Pfaffenberger 1992). The accounts of the reparative interventions and maintenance practices by car shed engineers and workers in this article speak as to why materiality and relationality remain vital in the everyday functioning of infrastructure, as well as how care takes place across – and even helps constitute – scale, which in this case refers to the span of the suburban network, and includes the flow of objects, practices, protocols, and so on, across national and transnational boundaries (see, Henke and Sims 2020; see also Seaver 2021).

At the same time, the ethnographic focus on repair and maintenance also speaks to the political-economic dimensions of infrastructure, particularly in this contemporary moment of late industrialism in Mumbai’s suburban railways, and within the larger context of the Indian Railways. While for Buier (2023) this may be characterised by financialization, this article illustrates how such effects – fare hikes, exclusionary projects of high-speed connectivity, weakening labour organisation, divestment and privatisation – manifest across infrastructural interfaces. On the one hand, such measures have had paradoxical effects on commuters, leading to protests and mobilisations against exclusion while also highlighting social fault-lines and fissures in urban transport (Rao 2007). On the other hand, even as such policies entrench uncertainty and precarity among those responsible for infrastructural care, the vitality of their care becomes even more important to manage operational pressures amidst increasing capacities (see De Coss-Corzo 2021).

To that end, this special issue’s invitation to examine the nexus between infrastructure and late industrialism, especially through rubrics of environment and ruination, has been particularly productive. It is precisely because sites like car sheds are vital in the production and maintenance of urban spatiotemporal rhythms, that they remain in a state of lively ruination (Finkelstein 2019), where repair and upgradation take place in 100-year-old buildings and pit lines that flood during the monsoons. A crucial aspect of the liveliness and vitality of car sheds is how engineers’ and workers’ reparative interventions and maintenance practices stabilise the unruliness of both machines and ecologies, thereby socialising machines to the rhythms and dynamics of urban commuting. For instance, even as these technical interventions stabilised and extended the life of older EMU rakes during the

transitional moment of retrofitting, engineers and workers dealt with a two-fold challenge of repairing old and new faults – one of technical obsolescence, and the other of trial-and-error assemblages. At the same time, their efforts at retrofitting trains also served a further function of socialising technologies through care (Orr 2000, 2006; see also Jackson 2014), ensuring the capaciousness of the traction rolling stock to serve commuter needs, thereby serving as the metaphorical “beating heart” of the city and its sprawling suburban network.

From the vantage of car sheds, then, infrastructure like Mumbai’s suburban railway network are undoubtedly a public good in how Bear and Mathur (2015: 21) define them as “desirable ideals that are considered universally beneficial for everyone and are the rationale for radical changes to bureaucratic organizations.” Such an account of public good animates the popular idea of Mumbai’s trains being the city’s lifeline. Notions and values of accountability – expressed through grounded idioms of care, and through sociotechnical ideas of safety, responsibility, punctuality – further show how preventive and corrective maintenance become “matters of care,” rather than simply “matters of concern” (Puig de la Bellacasa 2017), through the infrastructural care that engineers and workers enact, despite the Indian state’s wider macro policies of divesting from the public provisions of the Indian Railways.

In contrast to the pressures of late industrialism, while further speaking to the vitality of ruin, the reparative interventions and maintenance practices of engineers and workers, as well as other rituals, politics and aesthetics of care drawn from Dalit, Ambedkarite and anti-caste labour movements (cf. Ali 2011), illustrate a vision of public transport infrastructure as an “alternative form of the public good scaled up from [...] collective ethics” (Bear and Mathur 2015: 27). While issues like representation through reservations and anti-discrimination, enshrined in India’s Constitution, and matters like welfare and pensions, continue to be on the agenda of contemporary labour union organising, values such as care, service, technical competence, remain a crucial part of such legacies. These legacies are partly discerned through symbolic traces – such as the industrial repair worker and the proud articulation of the Ambedkarite slogan, “Jai



Figure 6: A statue of a worker with the Dalit-Bahujan slogan “Jai Bhim” at the back and the phrase “Work is worship” at the bottom. A mural of the Constitution of India’s Preamble is framed next to the statue.

Bhim”⁶ (Figure 6); and partly through an ethos of care that car shed engineers articulate while dispensing their sociotechnical responsibilities. In so doing, their narratives and interventions underscored how repair and maintenance are a vital, inseparable, and causal part of managing environmental and operational pressures, which ensures the health and safety of not only individual trains, but also that of the suburban network at large.

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⁶ “Jai Bhim,” translated as “Hail Bhim,” is a slogan from the Dalit and Ambedkarite anti-caste movements in India. The phrase “Ambedkarite” is derived from a reference to Dr Bhimrao Ramji Ambedkar, also known as Babasaheb Ambedkar (1891–1956). He belonged to the “untouchable” Mahar caste, one of the lowest groups in the Hindu caste hierarchy. Having studied anthropology and law at Columbia University and the London School of Economics, respectively, Babasaheb Ambedkar led several movements against caste discrimination and untouchability from the 1920s onward. In the 1940s, he played a crucial role in the drafting of India’s Constitution, which outlawed untouchability, gave universal adult suffrage, provided for affirmative action, among other egalitarian measures. He was also the first Law Minister in Independent India. In 1956, just months before his death, Babasaheb Ambedkar, along with millions of his followers, converted to Buddhism to abandon the hierarchies of Hindu caste society. The slogan “Jai Bhim”: is used both as a political slogan and as a greeting, and is considered as a counter to dominant caste Hindu phrases.

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