Material Ideologies

Limestone
Concrete
Cobblestone
Steel
Glass
Aglay
Jerusalem Stone
Copper

Material Ideologies: Building the City

Helen Rix Runting and Leonard Ma

These are images of the type that get *stuck* once seen, that return, unbidden: seven high-rise towers, engulfed in flames. On Wednesday November 26, 2025, a fire broke out in a cluster of tightly packed, 31-storey residential towers at the Wang Fuk Court residential estate in Hong Kong's northern Tai Po district.[1] The photographs published online were the stuff of nightmare: the flames are overwhelming in scale, color, and intensity. They churn visibly, climbing to twice the height of the buildings themselves, seemingly preying on the structures beneath and within them. All matter they touch is transformed into fuel. At the time of writing, the death toll is estimated at 128 people, with 200 remaining missing and 800 being housed in temporary accommodation.[2] The cause is being described as a potent mix of technical and material factors—protective netting and bamboo scaffolding shrouded the building due to a renovation; highly flammable foam boards were present on-site; and fire alarms alarms malfunctioned—and human error.[3] Eight people have been arrested: responsibility for this tragedy can apparently be apportioned via the justice system. Fires have to start somewhere.

The tragic Grenfell Tower fire of 2017, which killed 72 and injured 70 in London, started with a malfunctioning fridge freezer; but the reason it spread lay in the choice to install a cladding that "burned violently" in tests at least 16 years prior during a retrofit of the building.[4] The Grenfell Tower Inquiry report delivered in September 2024 is unambiguous in its findings: "the fire at Grenfell Tower was the culmination of decades of failure by central government and other bodies in positions of responsibility in the construction industry to look carefully into the danger of incorporating combustible materials into the external walls of high-rise residential buildings and to act on the information available to them."[5]

Here, politics, architecture, and the built environments of our cities are revealed to be not just "related" but so deeply entangled that there is no clear start or finish to either. Architecture is further shown to reside not solely in the building itself, but also in the decisions that shaped its genesis; cities are shown to be unavoidably material, despite their political constitution. Catastrophic events destabilize and unsettle the otherwise static role that we usually attribute to the "materials" that compose the city to the point where the category itself becomes questionable. What do we really mean when we talk about *materials* anyhow?

Elaborating a critique of the Aristotelian distinction between "matter" (often viewed as inert, natural, "stuff") and the more intentional, active notion of *form*,[6] architect Helena Westerlind reminds us of Adrian Forty's suggestion that it might be more accurate to think of concrete as a *process* rather than a *material*.[7] Instead in her experiments with the material, she argues that "the concrete is not formed, but 'in-formed."[8] The work of Anna Livia Vørsel provides an important additional resource at this juncture: with support from Susan Schuppli's notion of the "material witness," Vørsel argues that building materials both register and store information:

"As materials register information (for example, a change in humidity)," she explains, "they often change in the process (they become damp), and what is registered becomes visible through the presence of the change (visible moisture) or in the conditions of it (it becomes mouldy)."[9] Through her "building accounts," buildings are thus offered up as a means to view abstract or invisible process: political shifts, changes in ideology, the machinations of global financial flows, hopes, and ideas. Importantly, buildings, for Vørsel, do not need to fail — catastrophically or otherwise — in order to reveal this hidden dimension.

In Urban Studies, we are already used to the idea of *space* as being a non-static entity that is both "relational" and (perpetually) "in process." As modes of production have shifted from agriculture to industrialization and more recently, financialization, the city, as a discrete object of analysis gives way to *the urban*. Still recognizable, on closer examination the urban evaporates into entangled webs of dependencies and global capital flow. Though the production of urban space has proven fertile ground to consider capitalism's deleterious spatial effects, the tragedies in Hong Kong and at Grenfell remind us that *material* is not just an experiential veneer over the abstract forces of capital, but a concrete reminder of the spatial consequences of the processes of urbanization.

So, what happens if we move beyond the category of space to the matter that has been prepared and put together in such a way as to compose a built environment? What "information" (knowledge, form, or historical background) has it accumulated over time that in turn might inform us? Collected in these pages is the outcome of a semester long research studio investigating building materials at the scale of the city. Steel, copper, concrete, glass and stone, the research in these pages begins with a specific material for a series of investigations that take us from Tallinn to Baku, from Kharkiv to the mining towns of Chile. Along the way they reveal the entanglements between the matter of our shared built environment, and the processes of resource extraction, financial flow, labor struggles—the very real weight of the abstract processes of the urban. They point us to a space redolent with the material traces of other cities: places and lives that never eventuated, and dreams that in fact materialized, only to be transfigured again. And again.

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2 Reuters, "Hong Kong Begins Three Days of Mourning After Deadly Apartment Fires," *The Guardian*, November 29, 2025, https://www.theguardian.com/news/2025/nov/29/hong-kong-begins-three-days-of-mourning-after-deadly-apartment-fires.

3 Ibid.

4 Dominic Casciani, "The Grenfell Report: Key Findings from the Inquiry," *BBC News*, September 4, 2024, https://www.bbc.com/news/articles/c049yvrd5qxo.

5 The Grenfell Tower Inquiry, "Pase 2 Report Overview: REPORT of the PUBLIC INQUIRY into the FIRE at GRENFELL TOWER on 14 June 2017," September 2024, https://webarchive.nationalarchives.gov.uk/ukgwa/20250320200312mp_/https://www.grenfelltowerinquiry.org.uk/sites/default/files/CCS0923434692-004_GTI%20Phase%202_Report%20Overview_E-Laying_0.pdf, 7.

6 Helena Westerlind, *Choreographing Flow: A Study in Concrete Deposition* (doctoral diss. KTH, Stockholm, 2021), https://www.diva-portal.org/smash/get/diva2:1557397/FULLTEXT04.pdf.

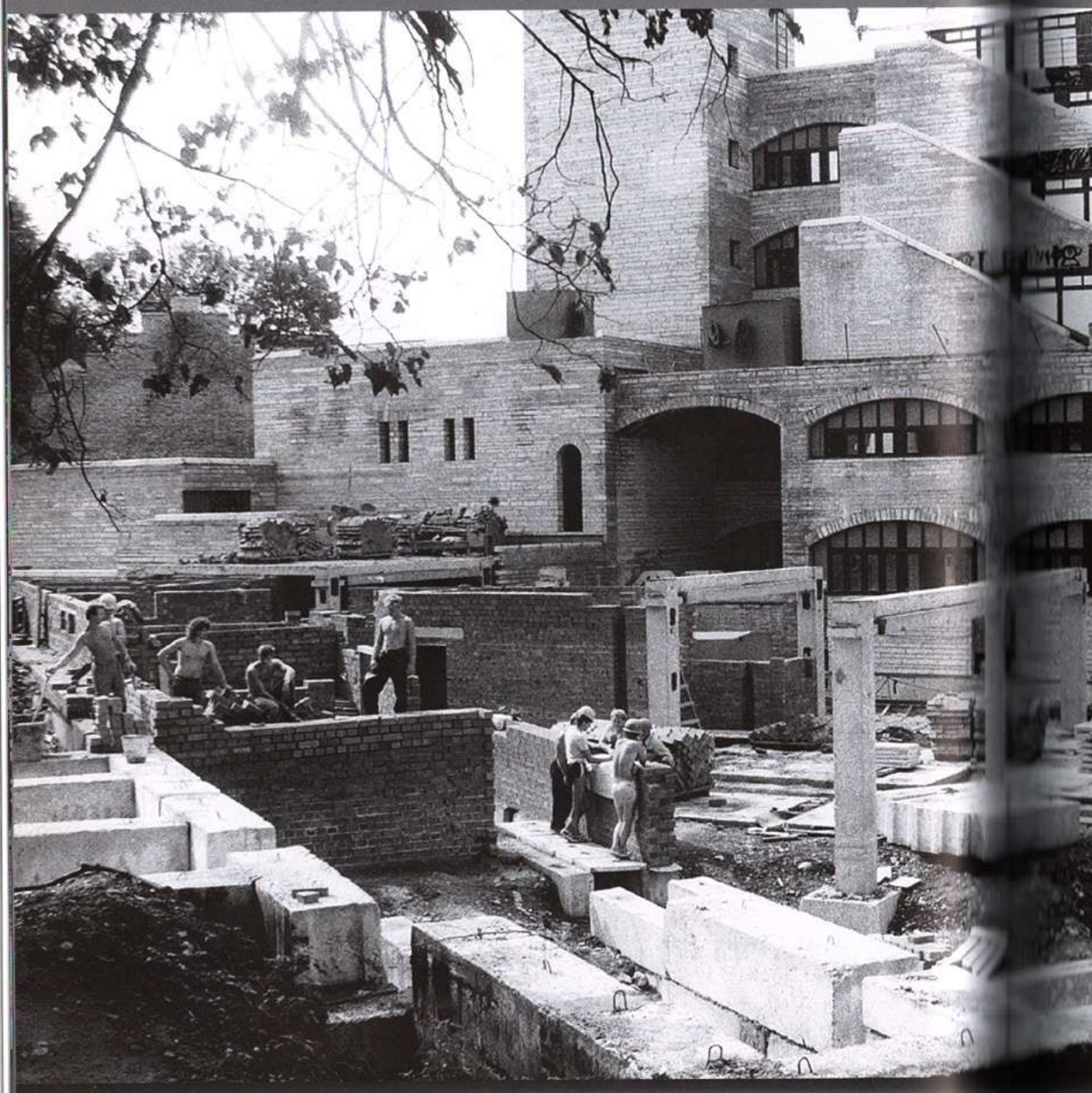
7 Forty, Concrete and Culture, 44.

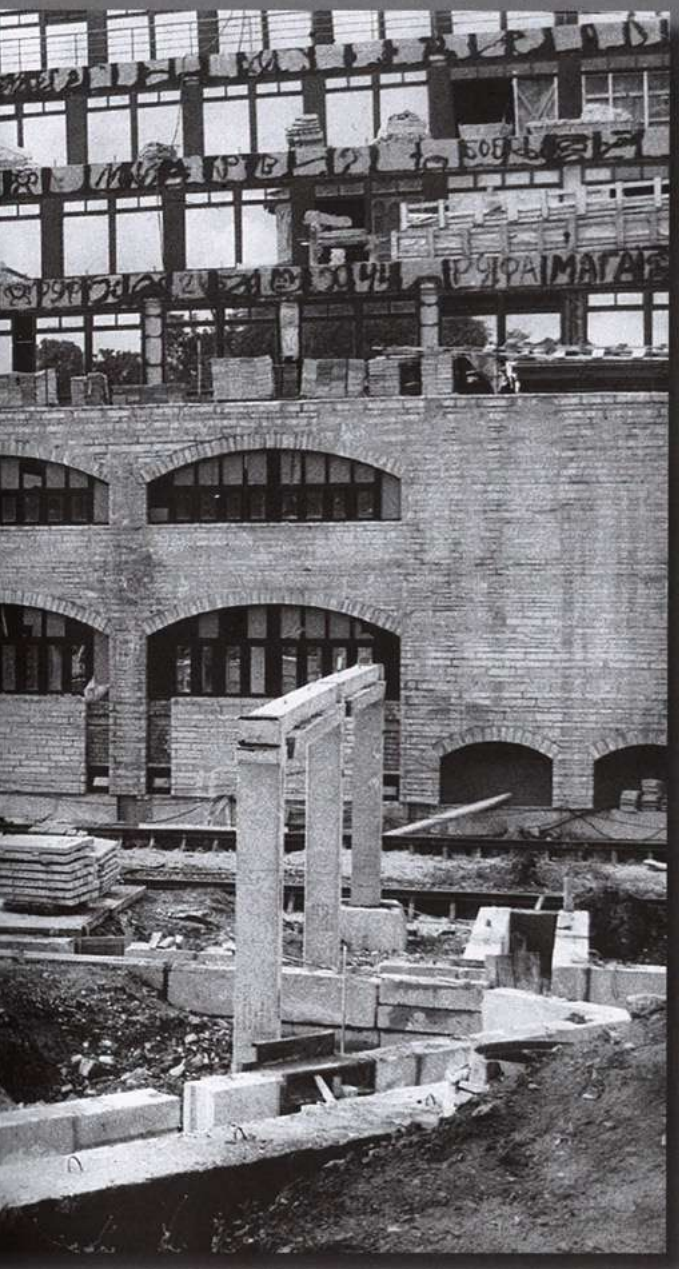
8 Westerlind, *Choreographing Flow*, 120.

9 Anna Livia Vørsel, *Building Accounts: A Material History of Three Ordinary Welfare Service Buildings in Stockholm (1969-2025)* (doctoral diss. KTH, Stockholm, 2025), 18.

4. oktoober 1986.
ENSV Riikliku Raamatukogu uue hoone nurgakivi panek.

CONSTRUCTION PHOTOS





Limestone: a Material Witness to Political Transition, National Identity, and Labour in Estonia

Mila Mielau

Limestone, declared Estonia's national stone in 1992, is not just the geological bedrock of the country; it is a material archive of Estonia's architectural, socio-political and economic transformations.[1] From medieval fortifications and interwar functionalism to late socialist megastructures, limestone has acted both as a building material and a political language. This essay explores this dual role through two buildings by Estonian architect Raine Karp: Linnahall (1980) and the National Library of Estonia (1993). Both heritage-protected monuments are in Tallinn and constructed of dolomitic limestone from Saaremaa, yet they differ in how the stone is made visible, maintained, and invested in.[2] Linnahall's reliance on concrete, with limestone mixed into it, reflects a Soviet industrial logic in which stone becomes invisible. Meanwhile, the National Library elevates limestone into a monumental facade, anticipating the symbolic nationalism of the early independence period.

The analysis draws on Henri Lefebvre's theory of the production of space, which understands materials as active components in urban processes; Sérgio Ferro's critique of modern construction, which exposes the hidden division between intellectual and manual labour; and Frederic Jameson's writings on postmodernism and cognitive mapping, which connect material expression to broader systems of economic abstraction.[3] Together, these frameworks reveal how material choices register shifts in political economy, positioning limestone as a "material witness", a term developed by Susan Schuppli.[4]

By presenting a brief history of limestone n Estonia, analysing the two buildings through a Marxist lens, and examining their divergent renovation trajectories, the essay demonstrates how limestone reveals shifting relationships between material, labour, and ideology during Estonia's transition from late socialism to independence.

Figure 1. Quarried limestone construction block. Helle Perens, *Orgita Limestone Quarry*, 2024, photograph, accessed November 26, 2025, https://ajakirimaja.ee/ajamajad-paekivi-eesti-ehituses/.

LIMESTONE: MATERIAL HISTORY AND POLITICAL CONTEXT

Estonia's bedrock contains large deposits of limestone and dolomite – both carbonate stones whose visual and material properties overlap enough that they are often used interchangeably in architectural language. Although chemically distinct, they share similar colours, hardness, and weathering behaviour, and both require labour-intensive processes of extraction.[5] Dolomite, being slightly stronger, is commonly used today for load-bearing and façade elements, while limestone dominates historic structures. Both buildings officially used dolomite from the Tagavere quarry on Saaremaa, yet they are commonly described as being built of limestone.[6] In practice, the distinction matters little for their symbolic and architectural effect.

The organisation of stone extraction has evolved alongside Estonia's political transitions. Under the Tsarist Empire (1710–1917), quarries expanded for fortifications, churches and palaces such as Kadriorg, and the introduction of mechanisation in the industry made limestone more widely available.[7] In the interwar republic (1918–1940), limestone became a material of national identity, visible in public buildings influenced by Herbert Johanson's limestone functionalism.[8] This early use of limestone demonstrates that there were material identity and cultural attachment in Estonia, which preceded its formal designation as a national symbol.

During the Soviet period (1940–1991), construction-grade quarries near Tallinn largely closed by the 1960s.[9] Limestone was increasingly crushed for concrete, lime, and silicate bricks, aligning with a state preference for prefabricated, standardised construction. The Lasnamäe district, built largely from prefabricated concrete elements, ironically sits atop the sites of former limestone quarries.

After independence in 1991, the privatisation of quarries[10] and the liberalisation of the construction industry allowed both mechanised crushed-stone production and smaller-scale craft-oriented stonework to coexist. However, nowadays, crushed limestone quarries continue to dominate the industry. These shifts form the material background against which Linnahall and the National Library must be understood.

Figure 2. Annotated map of limestone quarries in Estonia. Mila Mielau, 2025, compiled from various online sources.

LINNAHALL:
A SOCIALIST MONUMENT

Designed between 1975 and 1976 and completed in 1980, Linnahall was commissioned when Moscow was chosen for the Olympics, and there was some idea to use Tallinn for sailing events.[11] This allowed for Olympic funding to be channelled towards the construction of this project, even if the main function was to be a multi-purpose cultural venue. It was built to serve as a symbolic bridge connecting Tallinn to the sea, which was inaccessible at the time.[12] From far away, it appears to be a massive concrete structure, the walls are made of limestone but visually less prominent, mixed with concrete elements, a material that was more aligned with soviet industrial construction.

Besides the shift in labour for the production of materials, construction relied heavily on military personnel and prison "volunteers" due to a lack of skilled workers.[13] Many had limited experience with masonry or stone setting, and technical mistakes accumulated. Crucially, thermal movement joints were omitted, which caused the stone and concrete to crack under freeze-thaw cycles. Several walls were later replaced with cheaper silicate bricks. Personally, this reflects the broader labour context of late socialism: a system prioritising speed, volume, and collective labour over craftsmanship. Therefore, the material failures are not an accident but should be considered as structural expressions of the political-economic pressure shaping the project.

Sérgio Ferro's critique of modern construction helps illuminate this. For Ferro, industrialised building systems diminish the agency of skilled workers, shifting control to administrators, managers and standardised processes. As he writes, "the hegemony of productive capital required careful control over the costs of human and material means of production".[14] Linnahall exemplifies this principle: stone is not carved but crushed, masons are replaced by general labour forces, and construction becomes a managerial rather than craft-based process. Therefore, the facade hides labour rather than revealing it, turning material into a political tool in a system where labour is abstracted and made invisible.

This labour structure also shaped the role of the architect. Under the Soviet system,

Figure 3. Architect Raine Karp. Art Museum of Estonia Foundation, *Raine Karp*, photograph, accessed November 26, 2025, https://ajapaik.ee/photo/452303/arhitekt-raine-karp/

Figure 4. Aerial photograph of Linnahall after completion. Eesti Arhitektuurimuuseum, *Linnahall, air view by the sea, behind the centre of the city building*, 1981, photograph, accessed November 26, 2025, https://ajapaik.ee/photo/15569/linnahall-air-view-by-the-sea/

architects worked in state design institutes where projects were assigned rather than chosen, and design decisions required bureaucratic approval. Architects like Karp operated within institutional constraints that limited aesthetic freedom and tied design to state priorities of efficiency and ideology. Thus, Linnahall embodies not only a socialist material economy but also a socialist architectural labour economy, where creative authorship was shared, reduced, or redirected by administrative power.

Fredric Jameson's thinking helps further clarify Linnahall's ambiguous position. Working in the field of Marxist cultural theory, Jameson analyses how the logic of capitalism is expressed through architecture and media. In his well-known argument that "postmodernism is the cultural logic of late capitalism,"[15] he describes how postmodern architecture masks economic

abstraction in finance and global supply chains. This leads to a lack of depth in material forms, causing detachment from the social relations that produced them. Although Jameson links postmodernism to late capitalist abstraction, a similar dynamic exists in postmodernism's link to late socialism. Instead of masking the abstraction of financial capital, Soviet postmodernism masked the abstraction of bureaucratic power, both reducing labour to image.

Seen through this lens, Linnahall is an "abstracted" space, as the large terraces suggest civic symbolism, but the compromised detailing and hidden stone indicate the exploited labour system behind it. As the social relations that produced it are not completely clear at first, the building becomes difficult to categorise. This leads directly to Jameson's concept of cognitive mapping, which describes the attempt to find the individual's position within the shifting socio-economic systems.[16] Jameson argues that in complex and abstract environments, individuals need cognitive maps to make sense of their historical situation. Linnahall resists this kind of mapping as it is not easy to place it within contemporary narratives of national identity, European heritage or profitable redevelopment. This difficulty of cognitive mapping helps explain why Linnahall struggles more than other Soviet-era buildings. It is a monument to a system that no longer exists and does not translate as neatly into the present system as the National Library.

THE NATIONAL LIBRARY: NATIONAL SYMBOLISM

Constructed between 1985 and 1993, the National Library of Estonia represents a distinct moment in the late socialist era.[17] It uses dolomite blocks from the Tagavere quarry, which requires skilled quarry workers, stonecutters, and masons. The decision to use natural stone was partly practical, due to shortages of other materials, and partly symbolic. In an interview, Raine Karp states, using limestone "had a primitive cause: there were no materials to be had."[18] Yet the economic reasoning was paradoxical. Though limestone was expensive and labour-intensive, it was approved precisely because of its cost. Under the Soviet system, construction trusts sought high-budget projects to increase their official value, so when auditors found that laying limestone

Figure 5. Exterior View of the National Library of Estonia. Kaupo Kalda, *Eesti Rahvusraamatukogu*, 2018, photograph, accessed November 26, 2025, https://commons.wikimedia.org/wiki/File:Eesti_Rahvusraamatukogu_Tõnismäe _hoone.jpg

was classified as an expensive job "the builders immediately agreed."[19] Even under socialism, money played a role.

Construction stone required coordination between geological knowledge, craft labour, and architectural detailing. This reintroduction of craft contrasts with the dominant Soviet trend of prefabricated concrete, demonstrating the uneven nature of late socialist material regimes. Therefore, the library reintroduced a mode of production that resisted full industrialisation, as it clearly revealed the labour-intensive process of stonework.

Lefebvre's theory of the production of space effectively frames this. The library reveals the socio-material flows that produced it: stone that had to be transported from a distant quarry still capable of craft extraction, the survival of skilled labour late into the Soviet period and a design that emphasised material texture rather than suppressing it.[20] The building serves as a spatial archive of the final years of the Soviet system, documenting a material culture that soon after independence became aligned with national heritage.

Although limestone became Estonia's national stone only in 1992, the library's near-completion at that moment allowed it to absorb this symbolism of national identity. Its facade retroactively became a national emblem, despite being designed under Soviet rule. The intersection of Soviet production and post-independence meaning gives the library its distinctive position in Estonia's architectural landscape. It demonstrates how national identity can be materially constructed in retrospect, even if the material belonged to an earlier ideological system.

TO RENOVATE OR NOT TO RENOVATE

Linnahall's post-independence experience reflects its ambiguous identity. In 2003, it ceased to be an independent legal entity, as it was given to Tallinn City, with civil servants refusing to approve maintenance budgets, in hopes of passing the financial burden to the next owner.[21] Cracks deepened, and the lack of a clear purpose led to further deterioration. Some political figures, including members of the Centre Party, argue for demolition, while others advocate for restoration. Despite repeated proposals, such as turning it into a conference centre, its future remains unresolved. Its decay reveals contemporary political indecision toward Soviet material heritage – what should be preserved or erased and who gets to decide.

The National Library, by contrast, has benefited from stable institutional support. Owned by the Republic of Estonia and operating under its own legal act, it is currently undergoing a major renovation (2022–2026) led by Sirkel & Mall with Ehitus5eco as contractor.[22] Funding comes mainly from the National Cultural Endowment and the state.[23] The limestone exterior is protected, with repair stone taken from new interior openings. Inside, however, the renovation shifts from stone to modular Bauroc aerated concrete blocks, reflecting contemporary preferences for technocratic construction and efficient labour. This transition aligns with Jameson's idea of cognitive mapping: the library fits neatly within a modern narrative of national heritage and cultural investment, as well as fulfilling the programmatic need of a library in Tallinn.

Laurajane Smith's concept of the "authorised heritage discourse" helps explain why the National Library and Linnahall have diverged so sharply in their post-independence treatment. Smith argues that official heritage frameworks privilege "monumentality and grand scale, innate artefact/site significance tied to time depth, scientific/aesthetic expert judgement, social consensus and nation building."[24] The National

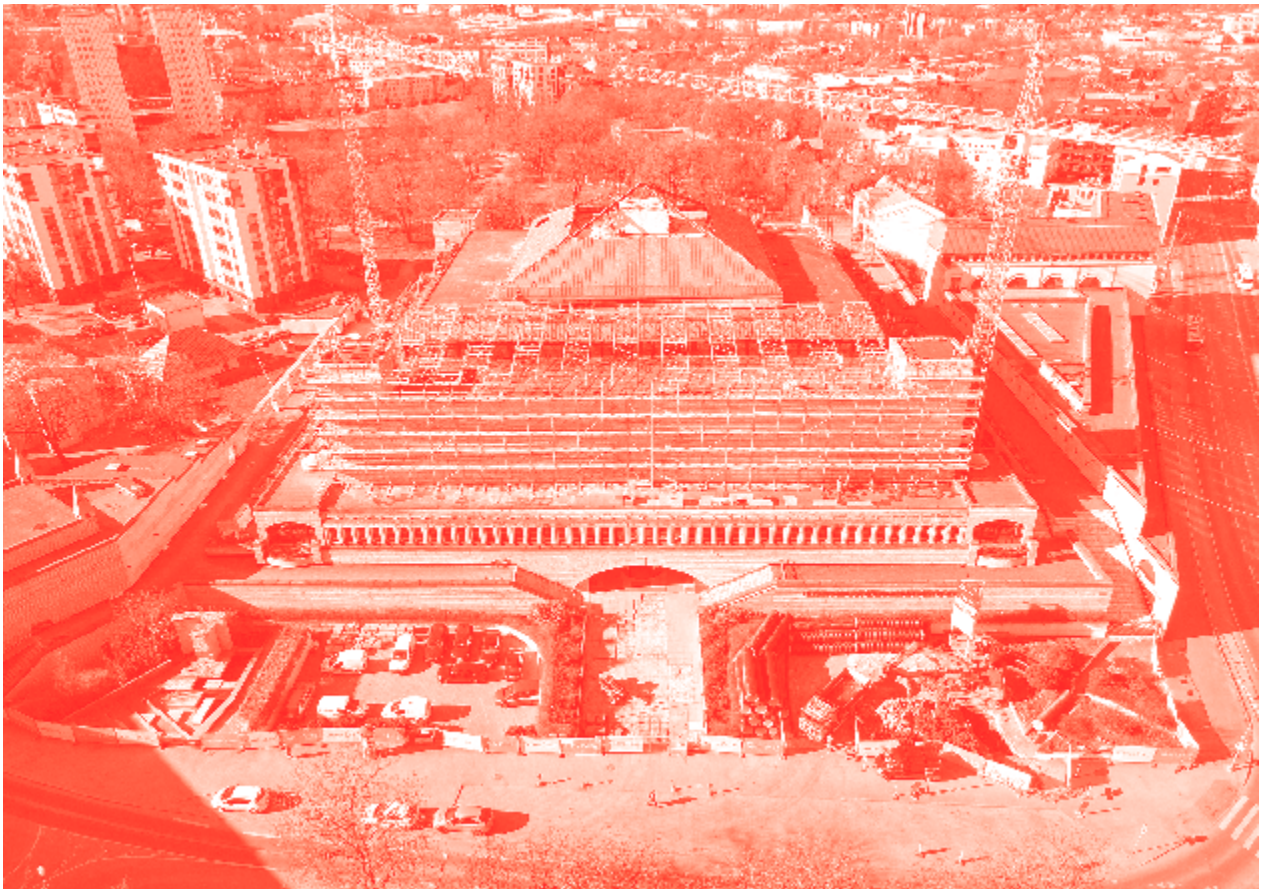


Figure 6. National Library during renovation. Ehitus5ECO, Reconstruction of the National Library of Estonia, 2024, photograph, accessed November 26, 2025, https://ehitus5eco.ee/portfolio/eesti-rahvusraamatukogu-rekonstrueerimine/

Figure 7. Linahall's neglected interior limestone walls. Mila Mielau, *Linnahall limestone wall*, 2025, photograph.

Figure 8. The National Library maintained interior limestone walls. Aethelred, National Library interior, 2025, photograph, accessed November 26, 2025, https://www.tripadvisor.co.uk/Attraction_Review-g274958-d3245595-Reviews-National_Library_of_Estonia-Tallinn_Harju_County.html

Library's monumental limestone facade, institutional function and ability to absorb the national symbolism make it a natural candidate for state-funded preservation. In contrast, Linnahall falls outside this authorised framework. Its hybrid material language of dolomite concealed within concrete and visible construction failures means that it lacks the aesthetic and symbolic legibility that heritage discourse tends to favour. Its associations with Soviet bureaucracy, coerced labour and Olympic politics complicate efforts to position it within a national narrative. As a result, it becomes materially and politically ambiguous: difficult to justify as heritage, yet difficult to demolish.

The contrast shows how heritage value is not inherent in materials themselves but produced through cultural narratives and institutional priorities. The library's stone becomes a symbol while Linnahall's remains a problem.

To call limestone Estonia's "national stone" is not only a geological statement but a political one. Throughout Estonia's modern history, limestone has been tied to shifting regimes of power, labour, and value. Its use spans Tsarist extraction, interwar nationalism, Soviet industrialisation and post-independence heritage culture. In comparing Linnahall and the National Library, the same stone reveals two diverging architectural and political trajectories.

Built rapidly with limited expertise, using crushed dolomite and state-directed labour, Linnahall embodies the industrial logic of late socialism. Its material failures and uncertain future reflect the challenges of integrating Soviet monumentalism into contemporary heritage frameworks. Yet even in decay, its dolomite surfaces act as what Schuppli calls "material witnesses", recording the ideological ambitions, tensions and limits of the system that produced them.[25]

The National Library demonstrates how stone craft persisted within the late Soviet period and how it could be reinterpreted after independence as national heritage. As architect Ville Lausmäe observes, many elements typically labelled "Soviet" were in fact designed and built by Estonians for an Estonian public, complicating the building's political reading and reinforcing its place in national culture.[26] Its renovation today reflects the alignment

Figure 9. Active Väo quarry site in Lasnamäe. Mila Mielau, *Väo Quarry*, 2025, photograph.

of heritage value, state identity and economic investment. The library's stone witnesses a transition of reinterpretation where the material practice continues across political boundaries.

Together, the two buildings demonstrate how limestone functions as a political material. It records labour conditions, exposes ideological contradictions, and reflects economic frameworks. It shows how Estonia shifted from a collectivised industrial system to a heritage-focused cultural economy, where some Soviet-era buildings are celebrated while others are neglected. Although both originated from the same political era, their different material expressions led to divergent afterlives: in one, limestone is concealed within concrete, and in the other, it becomes a visible symbol of endurance.

These findings suggest that architectural interpretation is never fixed but continuously shaped by cultural, political, and economic forces. Heritage does not merely preserve material history but selectively rewrites it, highlighting certain elements of materiality and structure. Materials like limestone become active agents in political storytelling, conveying visions of identity while concealing others. Consequently, limestone makes the political shifts between late socialism and independence visible. It shows how architecture is not just a physical structure but also an ongoing witness to historical change, with meanings that continue to develop long after construction. The material itself challenges simple divisions between "Soviet" and "national", revealing a more complex narrative in which geology, labour, and ideology are intertwined.

1 Ungru Kivi, “Limestone”, accessed November 26, 2025, https://www.ungrukivi.ee/en/materials/limestone/.

2 Helle Perens, “Houses of Time. Carbonate Rock in Estonian Buildings”, *MAJA Eesti arhitektuuriajakiri*115 (2024): 40.

3 Henri Lefebvre, *The Urban Revolution* (University of Minnesota Press, 2003); Sergio Ferro, “Concrete as a Weapon”, trans. A. Fiuza and S. Kapp in *Architecture from Below* (Cambridge: Harvard Design Magazine, 2019), 8-33; Fredric Jameson, *Postmodernism, Or, The Cultural Logic of Late Capitalism* (Durham, NC: Duke University Press, 1992).; Frederic Jameson, “Cognitive Mapping”, in *Marxism and the Interpretation of Culture* (University of Illinois Press, 1990).

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5 Natural Stone Institute, “Travertine, Limestone, and Dolomitic Limestone”, accessed 26 November, 2025, https://www.naturalstoneinstitute.org/designprofessionals/varieties/limestone/.

6 Raine Karp, Emil Urbel, Mait Väljas, *Architekt Raine Karp* (Tallinn Bookprinting House, 2016), 142.

7 Carl-Dag Lige, “On Stone’s Shoulders”, *MAJA Eesti arhitektuuriajakiri* 115 (2024): 72.

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9 Lige, “On Stone’s Shoulders”, 71.

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11 Tallina Linnahall, “History of Linnahall”, accessed 26 November, 2025, https://www.linnahall.ee/ajalugu/.

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14 Ferro, “Concrete as a Weapon”, 16.

15 Frederic Jameson, “The Brick and the Balloon: Architecture, Idealism and Land Speculation”, *The Left Review*,1998.

16 Jameson, “Cognitive Mapping”.

17 National Library of Estonia, *Estonian Centre for Architecture*, accessed 26 November 2025, https://estonianarchitecture.com/project/national-library-of-estonia/.

18 Ivi Eenmaa, *Life in Parallel Worlds: Recollections of the History of the Creation of the Estonian National Library 1982-1997* (Estonian National Library, 2013), 256-265.

19 Eenmaa, *Life in Parallel Worlds*, 261.

20 Lefebvre, *The Urban Revolution*.

21 Guided Tour of Linnahall, November 2025.

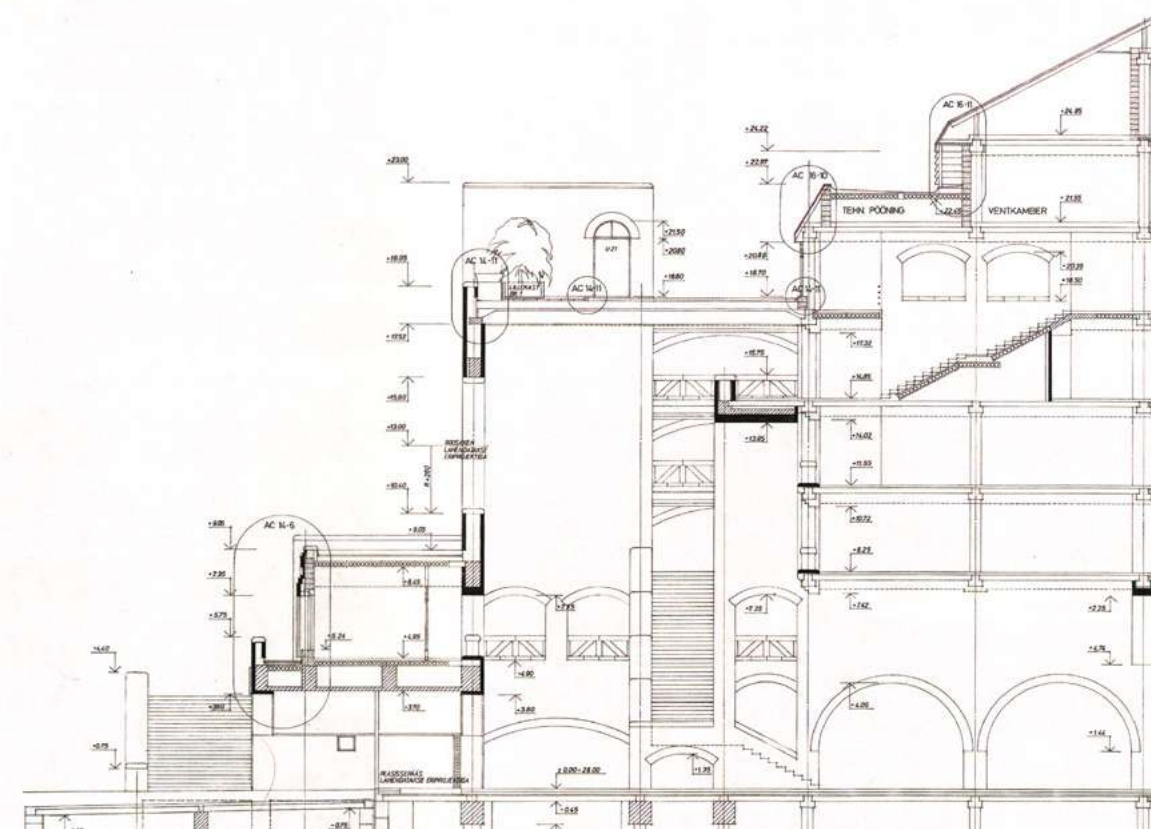
22 “Renovation Estonian National Library”, Projects, EAACA, accessed November 26, 2025, https://eaaca.org/project/renovation-estonian-national-library/

23 https://news.err.ee/1609073471/minister-cultural-endowment-may-cover-national-library-refurb-shortfall

24 Laurajane Smith, *Uses of Heritage* (Routledge, 2006), 11.

25 Schuppli, *Material Witness*.

26 Mari Peegel, Michael Cole, “Gallery: Estonian National library construction nears completion”, *ERR*, 8 May 2025, accessed November 26, 2025, https://news.err.ee/1609687727/gallery-estonian-national-library-reconstruction-nears-completion.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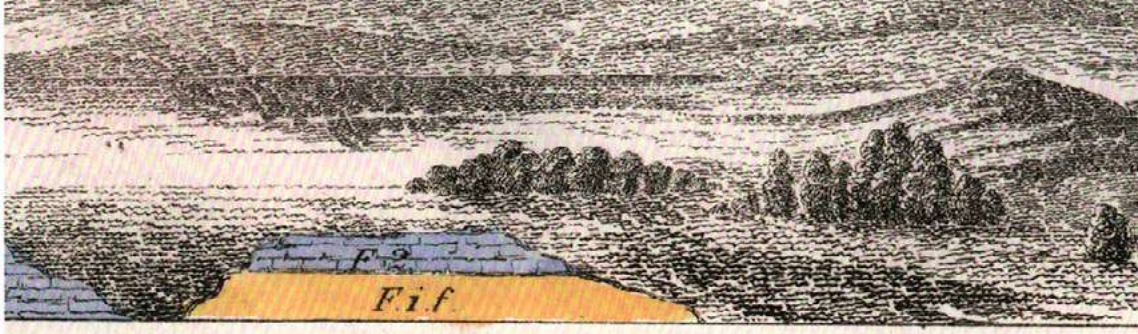
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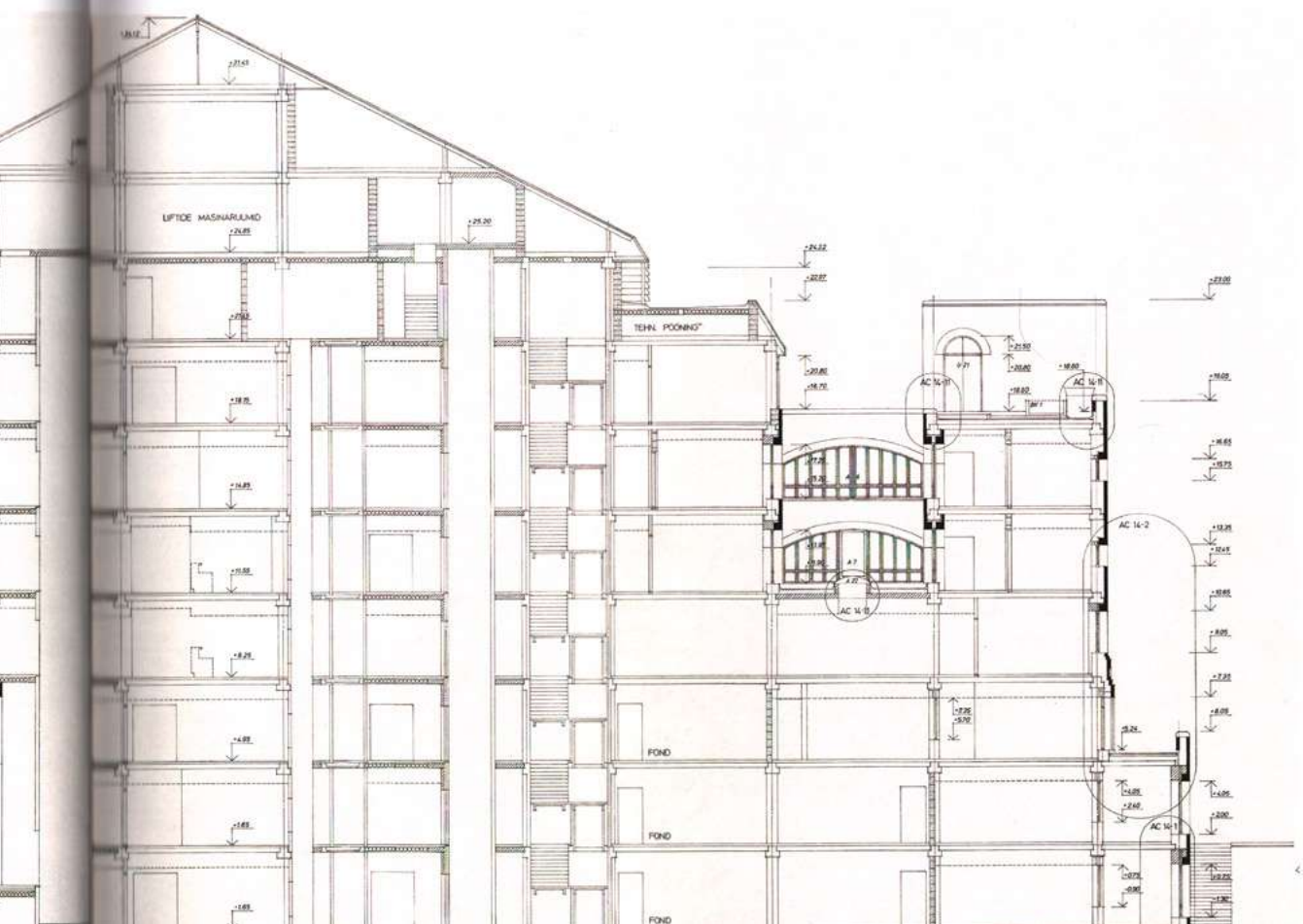
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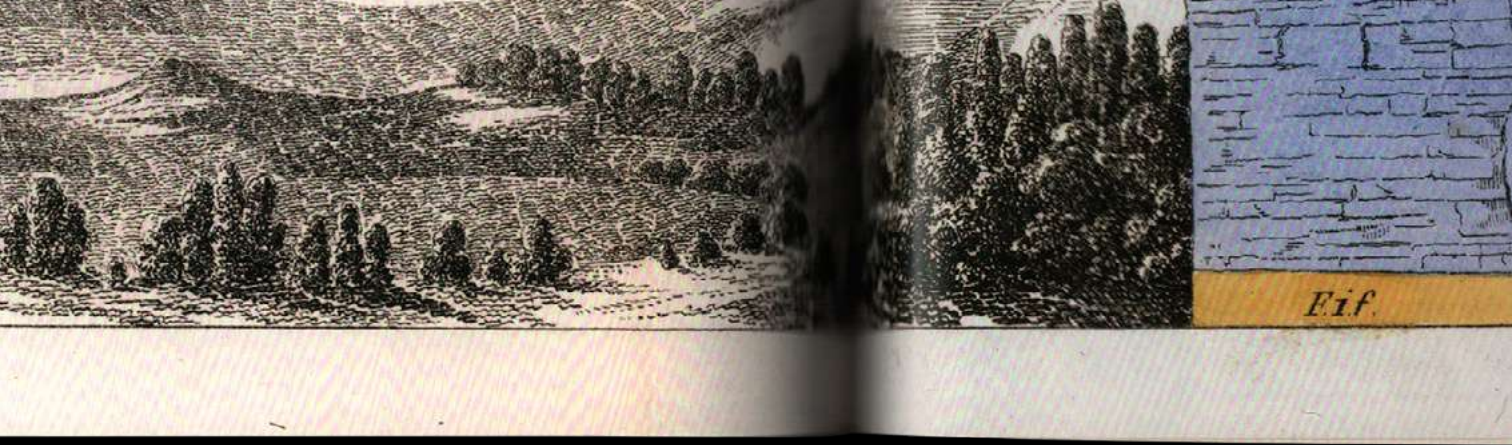
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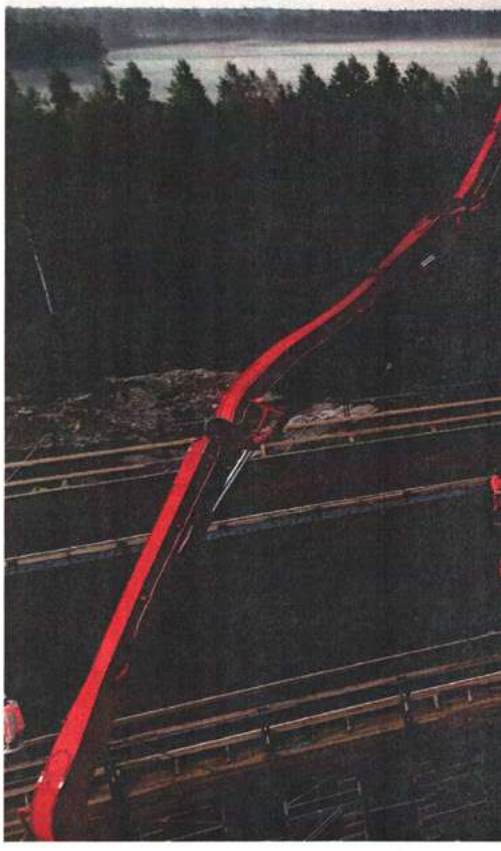


Bluffs two miles above Lake St Croix.

Ackerman Lith 379 Broadway, NY.

Coordination Over Craftmanship: Promises, Procedures and Processes of Rail Baltica

Annabel Pops

While driving to my cottage during the summer, I pass through vast forests and fields, where large concrete structures emerge in the emptiness between natural landscapes, usually without any people around. My route takes me through Rae Parish to the heart of Rapla County almost every week and runs exactly parallel to the future Rail Baltica corridor. I am witnessing the development of what is often referred to locally by politicians as the "promise of the century" for the Baltic countries: a step further to a connected Europe!

Construction is underway in the remote area between Raikküla, Järvakandi, and Urissaare, which is set to become part of a future transport corridor to Warsaw, Amsterdam, or Berlin. A new concrete viaduct, or "ecoduct", is being built, along with a temporary asphalt road we are passing by. My family has received invitations to "local community consultations" at both our home and our cottage, as both locations are near the proposed route. Luckily, we didn't receive a price offer for our houses. The feeling of empty promises/emptiness rises—the ideas feel more and more unrealistic, another 5 years added to the prognosis of the final date, another concrete structure, and I feel myself drifting more and more apart from this dream of Rail Baltica.

How to understand and believe in a project, in which the locals are losing faith, and even politicians are questioning its feasibility? Concrete has been poured into forms in the middle of forests, and perhaps one day in the future, passengers and trains will also be seen at these sites. Here, the material, which is tangible and materialises these promised projects, becomes evidence, which could help us to "expose the practices and procedures" that allow such matter to be implemented and to become consequential.[1]

Through this article, I examine the promises, procedures, and processes behind the Rail Baltica project, from the planned deadlines to budgets to the construction sites and workforce, to highlight that there is a clear shift in contemporary construction and such megaprojects. Opening up the project through the lens of material can add another perspective—one where the knowledge and skill of the labour have been overpowered by managerialism, fragmentation, and certifications.

Rail Baltica (RB) is often described as the project of the century in Estonian media articles and by our politicians. A greenfield rail infrastructure that is to connect the Baltic countries with continental Europe in the next decade, the project holds promises of better mobility, accessibility, social benefits, improved security and military logistics, sustainable transportation, economic growth, and trade for the Baltic countries and their citizens. Beyond its geopolitical significance for the Baltics, RB is notable for its cost, complexity, project duration, and its potential to significantly impact planning in the region for decades to come. Rail Baltica has been referred to as a "tool for development", as its macroeconomic potential has been supported by various cost-benefit analyses.[2] According to economic projections, Rail Baltica's socio-economic benefits are estimated at 23.4 billion euros, including passenger time savings, cost reduction, accident prevention, and environmental and labour effects. The project's broader impact is expected to exceed 22 billion euros, with a forecasted GDP growth of 0.5–0.7% per year.[3] Rail Baltica's strong image as a driver for development and regional unity is evident in a range of promotional resources and their materials, yet the dream has not yet been realised.

Figure 1. Rail Baltica route. *Rail Baltica*, 2023, visual, accessed November 28, 2025. https://www.railbaltica.org/news/rail-baltica-project-interactive-map-updated/

With a designed speed of up to 249 km/h, the Rail Baltica embodies the ambitions of a greener and connected European future. Yet beneath its smooth promised imagery lies a complex web of budgets, tenders, and contracts. Its cost has expanded from the expected €5.7 billion in 2017 to over €15 billion, with some forecasts in 2023 suggesting €25 billion. The EU's Connecting Europe Facility has currently allocated €4 billion, and an additional €10 billion is being sought by the Baltic countries' ministers as of 2025.[4]

Discussions of the project started in the beginning of 2000, with discussions and research going on until 2014, when separate holding bodies in three countries were established, as the Estonian, Latvian, and Lithuanian governments signed the founding documents of the Rail Baltica Joint Undertaking RB Rail AS.[5] The project, which aims to unite Latvia, Estonia, and Lithuania, is currently experiencing significant challenges related to communication and leadership. As each country has worked independently on different aspects of the project, progress has been uneven. The crisis began in Riga, Latvia, where officials announced a lack of funding to complete construction and confirmed that a railway connection with Estonia, initially promised by 2030, would not materialise.

Meanwhile, Lithuania and Estonia have been covering some of the costs for Latvian workers, as Latvia's railway authority has not received additional support from their Ministry of Transportation or the Ministry of Finance.[6] This has prompted them to seek alternative funding sources for ongoing construction and contracts from both the public-private partnership model and the EU. In parallel, there are ongoing discussions about potential penalties and co-liability if any country fails to meet the expectations tied to the support received from the European Commission. Uncertainty remains about the project's future, with some hopes resting on the upcoming European Union budget period starting in 2028, although it is unclear how much funding will be allocated for large infrastructure initiatives.[7]

So, the questions remain: as the dream of a train ride to Warsaw seemingly floats further into the future, Is a great connection to Pärnu really the best we can get from Rail Baltica? In Estonian media, the frustration has been rising in recent years: the RB and its objects, ongoing opening parties and visuals have been called

a continuous *performance*.[8] After yet another audit of the RB project, the Estonian Auditor General has stated that "we have already seen enough of Rail Baltica's deliberate false promises about completion dates, beautiful images of terminals resembling space stations, and video animations where trains whizz by at several hundred kilometres per hour. Despite all this, we have not yet seen the railway."[9] The feeling of empty promises rises once again.

In architectural and urban discussions, Rail Baltica is typically addressed in terms of infrastructure, mobility, and sustainability. In the public sphere, its political weight and financial situation are used in political debates and economic analyses. The labour conditions and material processes that make it possible rarely enter the conversation, yet are worth looking into, to understand the other realities besides the promised ones in official statements.

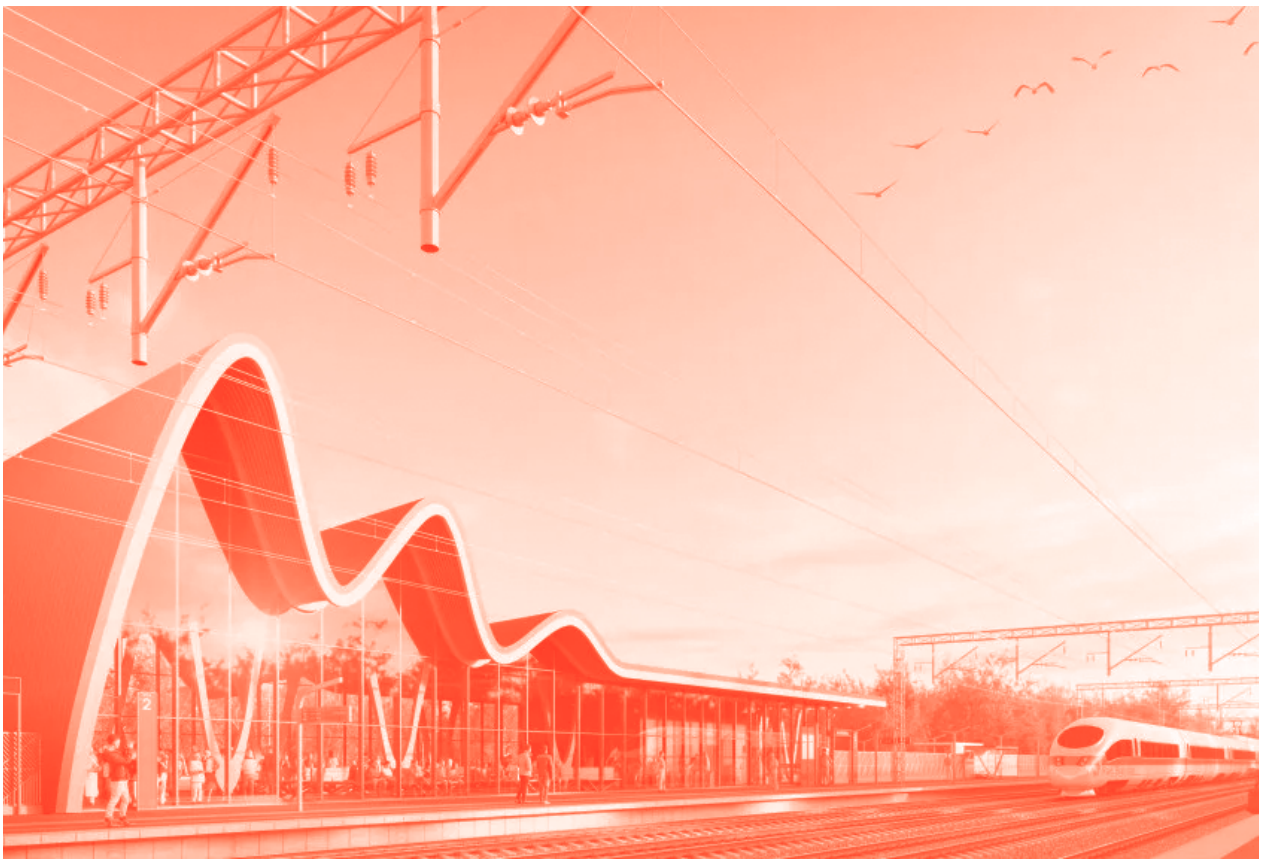


Figure 2. Rail Baltic Rapla station visual. *Raplamaa Sõnumid*, 2024, visual, accessed November 28, 2025, https://sonumid.ee/2024/09/24/rail-baltic-estonia-rail-balticu-kohalikud-peatused-toovad-uue-ajastu-liiklus-es-ja-linnaruumisajastu/.

Figure 3. Juula viaduct concrete works, *Rail Baltica*, 2025, photograph, accessed November 28, 2025, https://www.railbaltica.org/et/senised-edusammud/.

II PART

The political aspects of the progress presented in the first part of this article materialise in its second part in the form of the concrete, labour, and procurement processes that physically create the same fragmentation and management approach that Rail Baltic is also built on.

Already before the construction had started, there was speculation about the workforce needed and related economic impacts across different sectors. Even then, representatives of the Estonian Electrical Industry Association argued that it did not matter who won the contracts awarded under market conditions, as "the necessary material resources and also unskilled labour are taken from the local market anyway."[10] The prognosis made in 2018 indicated that Rail Baltica would require approximately 13,000 workers. At that time, the focus on the construction and workforce requirements was commented on by a representative of one of the largest infrastructure building companies, GoGroup: "This project will not be too labour-intensive, as it will be solved with very powerful machines. But to do it only with Estonians is also an unrealistic expectation—even today, when there is a big job, the neighbours come to help."[11] The apparent emptiness of large-scale construction sites reveals how contemporary building practices have been reorganised. The Wshortage of skilled workers, the high level of mechanisation and the complexity of logistics mean that fewer people are physically present on site.

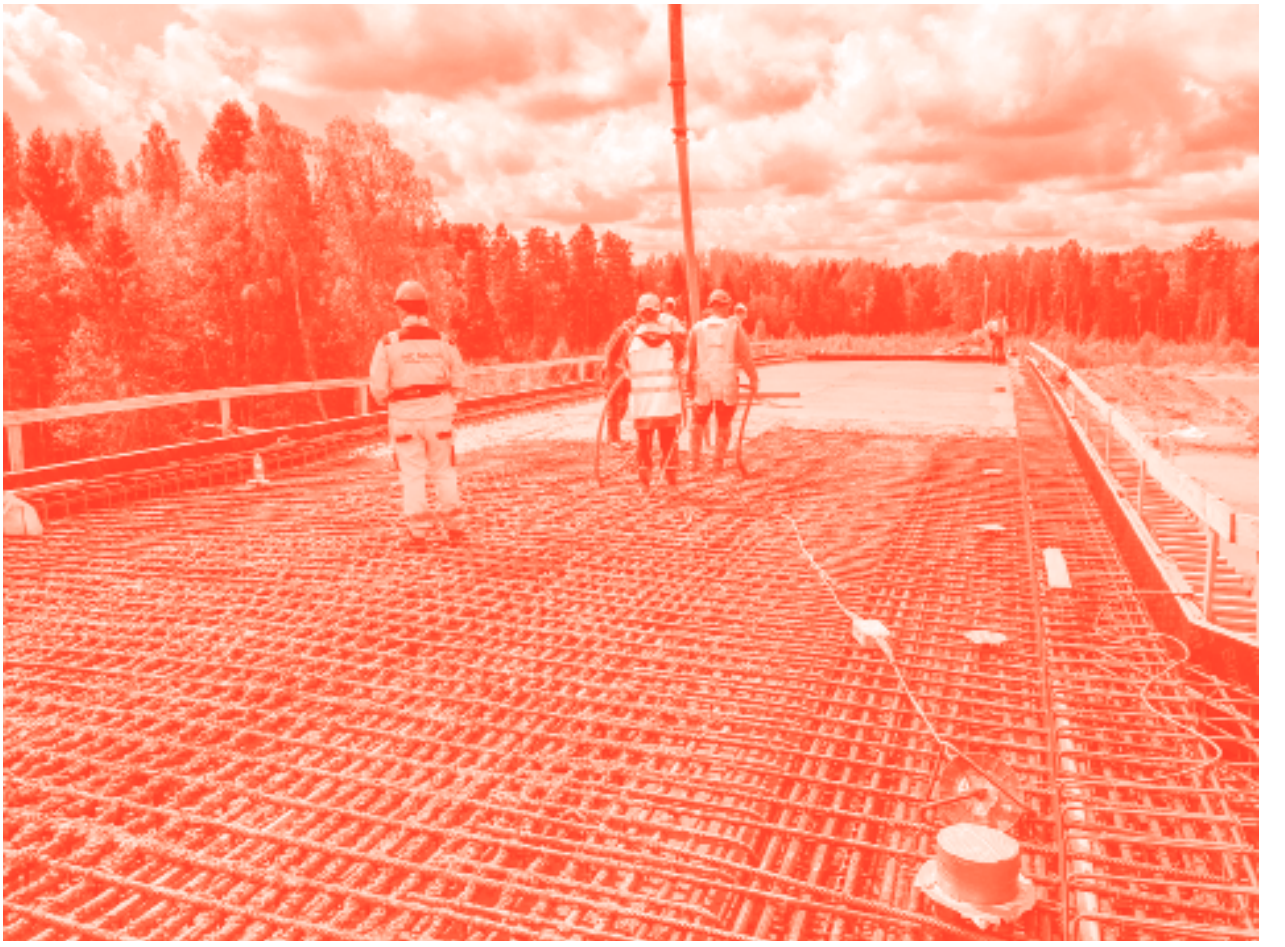
In 2018, discussions arose about Rail Baltica requiring many new quarries to provide sand, limestone, and other materials needed for the project's concrete needs.[12] The construction eventually started in 2023 in Estonia, with building activity all over Estonia from 2024 onwards. The concrete factories in Estonia are active, as a big part of their production is tied to Rail Baltica's needs.[13] The project absorbs a significant part of the country's construction capacity, linking its economy and labour to its contracts and schedules. Concrete production, formwork installation, and pouring

are increasingly carried out by workers who do not require formal qualifications, often also recruited from abroad.[14] Labour becomes mobile, temporary, and largely invisible. This emptiness is not accidental but part of a system that treats labour as flexible and replaceable. It reflects the new hierarchy in which capital and contracts are central, while the act of making is rather marginalised. Workers perform essential tasks but remain unseen in public discourse, which focuses on the scale and promises of the project rather than on its human dimension.

Boltanski and Chiapello's arguments can provide insight into the systems at play in contemporary capitalism.[15] They describe how the capitalist system has evolved into a new network-based form of organisation, valorising projects, creativity, and network existence, and emphasising employee initiative. In this transformed version of capitalism, work is organised as flexible projects rather than through continuous employment. Workers are seen as temporary "project participants," valued mainly for their adaptability, rather than for long-term craftsmanship or a collective identity. When reflecting back on Rail Baltica, particularly within the construction industry, the erosion of collective labour is significant. Additionally, the shift towards a new entrepreneurial mindset and "self-entrepreneur" is now more visible through contemporary construction fields as well. Melinda Cooper describes a similar trend in America and so-called "blue-collar" workers, whereby with neoliberalism and through government interventions and elite business group influence, construction workers and labour unions started to move towards a more individualistic system that positioned them as competing entities as well.[16]

In the context of Rail Baltica, this shift Boltanski and Chiapello describe is evident on many levels. Only consortias led by international firms with extensive credentials could meet the requirements of large-scale railway infrastructure. The RB holds the new national record for Estonia's biggest public procurement, worth almost a billion euros, an enormous sum given the scale of the country. The winners of the procurement are a consortium led by Finnish-based GRK group and French-based Bouygues Travaux Public, as the criteria and qualifications for such projects are strict and almost impossible to gain for companies working only in the Estonian or Baltic region. The only Estonian-based consortium, led by Verston, was disqualified in the first review round. Yet the Estonian companies are now tied to the project as either subcontractors or working with other infrastructure elements, with smaller joint procurement, still taking on practical execution and short-term risk. This external entrepreneurial expertise seems to be highly expected here in Estonia, as stated by the Head of the Board of Rail Baltica Estonia, that "collaboration with international leaders brings world-class engineering expertise to Estonia and opens up new opportunities for local companies."[17] So the construction process is dominated by coordination, documentation, and control rather than direct and local knowledge and skills.

A similar situation happened within the architectural competition for the main station in Tallinn, as the local architecture office 3+1 Architects first won the competition already in 2015, but the results were later cancelled under questionable circumstances, referring to a legal mistake (the procurement organiser forgot to set the competition as international in the procurement environment). The second conflicting competition was won by the international starchitect Zaha Hadid with a rather strong, branded architecture style, and a proposal that was twice as costly as the previous version. As Tallinn's former Head Architect said, then "instead of arriving in Tallinn, the future passengers will disembark in yet another ZHA rail terminal."[18] Referring once again to the implications of what projects such as Rail Baltica bring to the local sphere, questions must be raised regarding who has the right to work with such megaprojects, and what effect it has on Estonian labour.



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WHAT DOES CONCRETE HAVE TO DO WITH ALL OF THAT?

Concrete is a material which allows megaprojects such as Rail Baltica to become a reality. It builds highways, bridges, and infrastructures that embody economic and political priorities. It often comes together with the potential of growing the local economy, creating jobs, improving accessibility, and providing new infrastructure. Its presence in the city is typically associated with mass and permanence, forming the base upon which other activities unfold. Yet precisely because the material is often associated as the most universal one, its political weight and economic hopes can go unnoticed. Harvey describes such mega-infrastructural projects, where concrete plays a central role, as "spatial fixes": objects that result from redirecting surplus capital within a free-market economy into physical space, intending to preserve or increase capital value.[19]

Concrete's breakthrough in the late 19th and early 20th centuries marked a turning point in industrialisation, changing the dynamics of capital and empowering entrepreneurs who possessed the technical knowledge of reinforced concrete. According to Sérgio Ferro, the entrepreneur emerged as a modern figure carrying the "new knowledge" related to construction.[20] Command of techniques and coordination replaced craft and experience; the workers lost autonomy, and their influence in the building process began diminishing.[21] Frampton argues that "industrial modernity and fabrication widened the incipient division between invention and fabrication," thereby contributing to the degradation of traditional craftsmanship.[22] He identifies this division of conception from making as one of the dilemmas of modern architecture: the architect and engineer become figures of invention, while the builder is removed from authorship and placed rather in a system of mass production and managerial oversight.

The ideology of progress embodied in projects like Rail Baltica depends on the very fragmentation of knowledge and labour that Frampton and Ferro comment on. The craftsman's role has

been replaced by managerial systems, and skill by compliance. In this sense, Rail Baltica is a great example of industrial modernity and contemporary construction systems, where the political economy of contracts and finance dominates the physical form of construction. Concrete's key moment is in its liquid state, before hardening, when it requires the ability to organise large-scale operations, logistics, machinery, and formwork, so it favours those who hold organisational power. Craftsmanship once implied autonomy and skill grounded in material knowledge; with the industrialisation of construction, this relation was fractured. Concrete as a material played a central role in this process; its use required certification and coordination rather than manual mastery, and the knowledge that counts becomes managerial rather than embodied.

Rail Baltica, which could have offered enormous opportunities for local companies both in terms of new experiences and financially, remains a great add-on to their portfolios and a potential key to working on similar sites as future procurement winners. These companies, however, currently need to face the reality of still working on the same sites and contributing to the project, yet as mainly subcontractors, who have "a lot to learn from the external expertise." Rail Baltica is a first and one-of-a-kind project in the Baltic region, which, through various procurements and procedures, could have emphasised and contributed to the existing local systems more, holding more social responsibility and making the idea feel less distant for locals and empty in reality. It is difficult to attribute the project's direction solely to the scale and usage of EU funds, but these factors may play a role in the broader managerial network and the contemporary construction sector, particularly in building one megaproject in a small Eastern European country. As Malk also highlights in his works about Rail Baltica,[23] as a society, we should have much higher expectations for infrastructure projects. We can often think of infrastructure as merely a traditional physical system that supports societal goals and functioning, usually made of concrete and perceived as universal, cold and distant. However, the symbolic, social, and political meanings of Rail Baltic are actively embodied precisely through it, and yet there is a slight sense of emptiness behind it all, and the thought of the *train's late arrival* makes us lose a small sliver of hope again.

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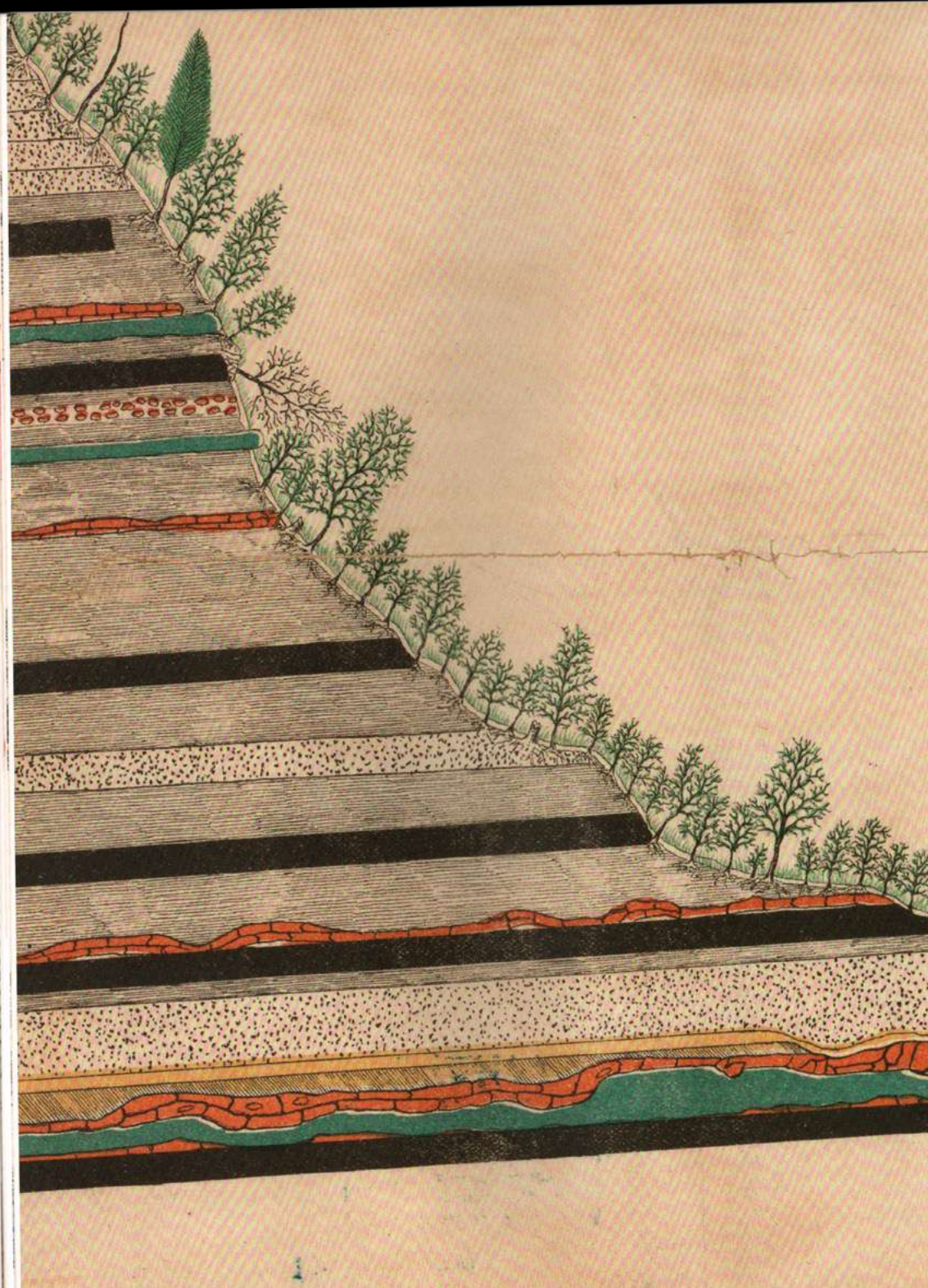


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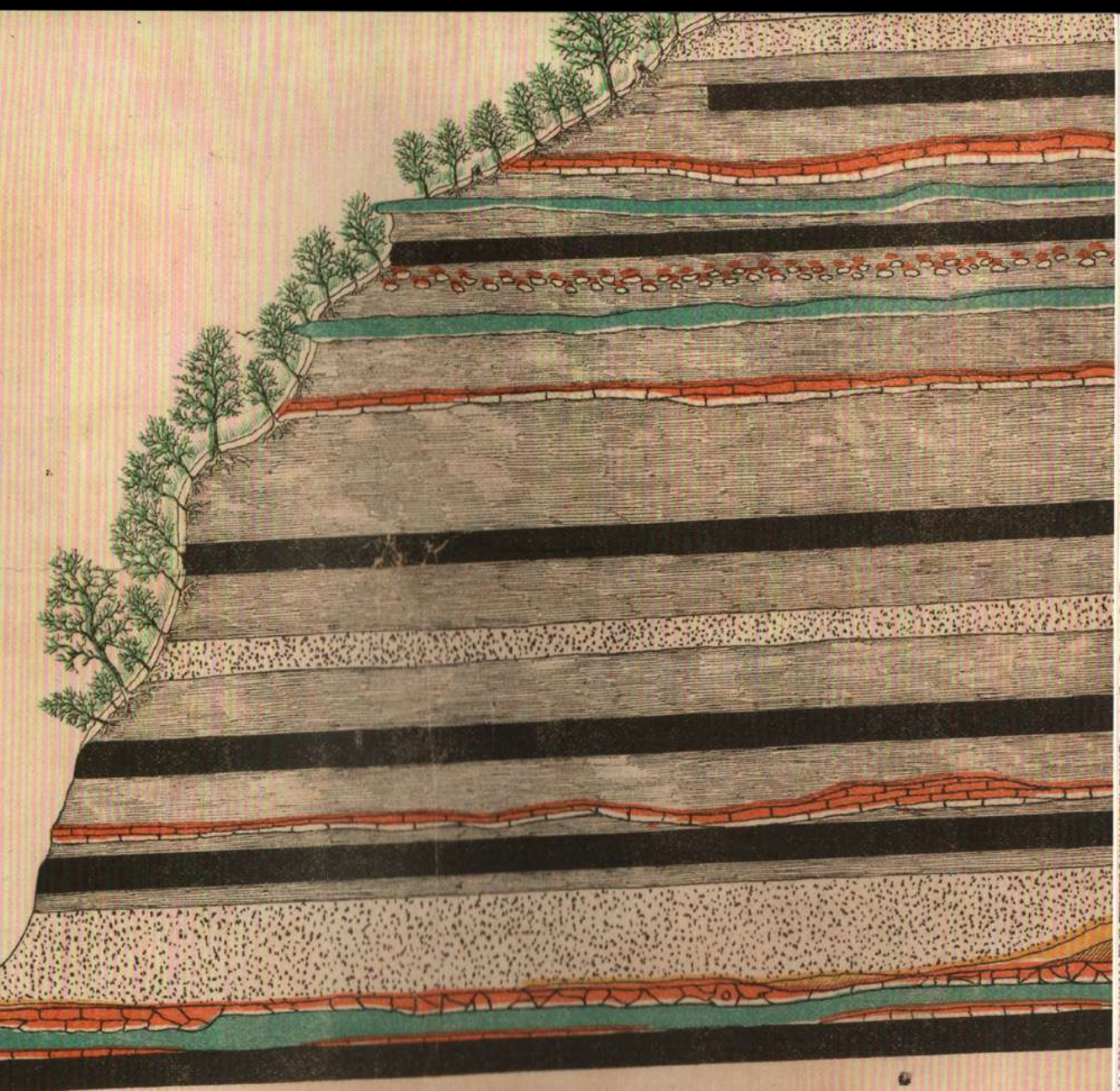

Cake → Flour Sugar Eggs → Cake?

Anna Dzebliuk

In wartime, material is no longer stable. It is broken, reassembled, and revalued. Facades and streets that once formed a static urban environment begin to constantly reconfigure themselves. In Ukraine, since Russia's full-scale invasion in 2022, more than 250,000 residential buildings have been damaged or destroyed, along with hundreds of hospitals, schools, and cultural sites.[1] Entire urban fabrics from the eastern border of the country to the city of Kharkiv have been reshaped by the consequences of the war. These physical traces of destruction have become not just the remains of a former built environment but a visible site of memory. The ruins in this new reality record and translate the story of their destruction, revealing deeper political and economic conditions.

Even though the war is still an ongoing process, the question of rebuilding critical infrastructure and housing was an urgent one from its first days. Once something has been damaged or destroyed, it immediately creates a demand for new construction. Better, modern, sustainable; the process of destruction and rebuilding appeared at the same time, as deeply entangled these two processes together. In the context of Ukraine, the postwar city is no longer merely the site of ruin, but also the site of production. Now, demand for new construction emerges directly from the ruins themselves, turning devastation into a resource for reconstruction.

In this essay, I want to argue that the reconstruction process in Ukraine is not merely a response to destruction but also the process through which capital reorganizes itself. Three materials will serve as key evidence of this process that reveal how investment, rebuilding practices, and spatial priorities are being reshaped. The analysis is based on a combination of reports and case studies that trace the economic and spatial logics of reconstruction. Using the frameworks of Schumpeter and Harvey, I want to look into the correlation between creative and real destruction, and the role of capital in shaping postwar cities.

In 1942, Joseph Schumpeter introduced the term *creative destruction*, *which captures* capitalism's capacity to renew itself by "incessantly destroying the old one, incessantly creating a new one".[2] For him, this process of replacement is a natural and necessary part of a healthy, growing economy. In peacetime, this cycle is visible in redevelopment and modernization, which leads to the destruction of old structures in order to make room for new ones. At the same time, David Harvey uses this term in a more critical way, emphasizing how the capitalist transformation of cities makes new profit opportunities. He argues that "capital builds a physical landscape appropriate to its own conditions at a particular moment in time, only to have to destroy it… in order to build a new one".[3] Harvey highlights that destruction and reconstruction are not just economic but also spatially organized. Even though these two figures have opposing political views with regard to capitalism's dynamics, they both see destruction as a fundamental force for capital to evolve and reshape itself.

In wartime, *creative destruction* remains secondary *as real destruction* takes its place. The physical ruin of streets, housing, and infrastructure creates favorable conditions for reconstruction speculation and new accumulation. The economic crisis and need for fast rebuilding make it necessary to rely on external and private-sector capital; thus, developers and banks become the main stakeholders in the reconstruction process, making the rebuilding possible. But at the same time, they are the ones extracting value from this process and making decisions about what is rebuilt and where. Capital is no longer the one who destroys, but still the one who dictates the values and priorities of rapid rebuilding. War conditions merge demolition and production into one cycle, which makes the process of replacement of the building environment much faster and more radical. The result is a city in constant reconfiguration, where rubble, steel, and concrete circulate as instruments of capital and economic accumulation.

Thus, reconstruction is not only a way of recovery but also of reorganizing of what already exists. Materials are not simply building elements anymore. They are instruments through which capital adapts and rearranges itself under crisis. Steel, once the most exported material, is now used to cover internal reconstruction needs. Rubble from destroyed buildings is upcycled into new marketable construction materials. In this way, rebuilding became a strategic process of building a new order, where materials actively participate in reorganizing urban and economic life after collapse. Thus, projects of rapid rebuilding, recycling, and

sustainable recovery are often considered to be evidence of resilience. Yet they also reveal new forms of dependency.

Recently, scholars have conceptualized the building environment as a form of *urban mine,* arguing that abundant and disused building stock can be deconstructed, and their materials reused or recycled in new construction.[4] This logic became particularly visible in a postwar city. The war conditions made the logistics of raw materials much complicated, but the demand for new construction has even increased. Thus, new production methodologies no longer rely on extraction from distant sites but on extraction from the city itself. Rubble becomes aggregate, concrete is reconstituted, and steel is melted and recast. In this sense, the wartime city becomes self-consuming.

To trace this dynamics, separate materials illustrate different dimensions of the rebuilding process.

Contradictions in the restoration of cobblestone paving reveal the changing value of labour and cost of maintenance in historic areas during an economic crisis. Steel embodies global dependency and the influence of transnational capital in defining national priorities of reconstruction. The circulation of concrete reveals how destruction itself becomes a source of production. These materials become the evidence through which a new reorganization of the urban space can be seen.

"COBBLESTONES OR DRONES?"[5]

Historically, cobblestones shaped the plazas next to the parliament building, which served as a place of deliberation, performing politics, and a *space to exercise freedom.* As Judith Butler, a philosopher and gender theorist, emphasizes in *Vulnerability and Resistance* (2015), "For the body to move, it must usually have a surface of some kind… so the pavement and the street are already to be understood as requirements of the body as it exercises its rights of mobility."[6] In this case, paving served as essential infrastructure for political action and spatial practice, enabling gatherings and protests.

In the Ukrainian context, the square made of cobblestones (Maidan) became the main ground of political changes in 2014. A peaceful protest turned into a revolution aimed at defending democracy. Protesters used cobblestones defensively to protect themselves from police forces attempting to stop the demonstrations. Granit cobblestones were uprooted from the ground, thrown, and used again. The paving was thus transformed into a physical weapon against the political regime and oppression. This can be seen as an act of reappropriation where a city itself can become a material for resistance.

Even beyond their role in protests, cobblestones became central in media discussions from the beginning of the war. In the context of limited resources, society expects to cut all non-essential infrastructure expenses in order to prioritize military needs. While in the past there was little question about the need for heritage preservation, now maintaining paving in such districts has become a topic for debate, as reflected in

Figure 1. Racurs, "Fire, Cobblestones, and Shootings," February 19, 2019

the headline of a BBC News Ukraine article: "Cobblestones or drones? Should civilian expenditures be directed toward weapons procurement".[7]

Granite cobblestones still remain in historic districts, where they require permanent investment. To restore such paving, stones must be carefully removed, cleaned, and re-laid on a repaired base. Mechanization cannot replace this process, meaning it still relies on qualified manual labor. Although paving of sidewalks, minor roads, and residential areas is usually made of concrete as a cost-effective material. As Sérgio Ferro notes, the wide use of concrete historically deskilled the workforce and centralized control.[8] In the context of cobblestone restoration, however, this deskilling has paradoxically increased the value of traditional paving skills, turning them into a rare and highly paid expertise. Thus, the price of restoration also increased with the shortage of specialists, caused by limited education and institutional support.

According to the Ukrainian Ministry of Culture, the number of trained restoration workers is already insufficient to meet the needs of heritage maintenance.[9] This shortage is also reinforced by political conditions, where skilled manual labor, particularly male labor, has become limited in wartime due to mass mobilization. Thus, paving workers often earn above the national median wage.[10] In the condition of structural deficit and wider *deskilling* of labor, historic areas demand higher investment. The cobblestone becomes not only a trace of reappropriation of material but also a marker of the shifting priorities that shape heritage preservation in wartime. While the cobblestone illustrates the reevaluation of labor and the cost of reconstruction, steel reveals the global dimensions of the same process.

"UKRAINE'S STEEL OUTPUT FALLS 70.7%"[11]

Ukraine was a major steel producer in Europe until 2022. The crude steel output was about 21.4 million tons in 2021.[12] Due to the war in the country, production fell dramatically in 2022 (roughly ~6.3 Mt, a drop of ~70% vs 2021) and remained low in 2023 (around 6.0 Mt).[13] The city of Mariupol as a crucial center for steel production, was occupied at the beginning of the war. All significant steel plants, such as Azovstal and MMK Ilyich, suffered extensive damage. At the same time, the Pokrovsk coking coal mine stopped operations due to its proximity to the front line.[14]

Thus, ArcelorMittal Kryvyi Rih became the largest surviving steel plant, owned by the Luxembourg-based *ArcelorMittal Group*. Before the war, it exported over 80% of its steel output, mainly to the EU, the Middle East, and North Africa.[15] The domestic steel market was limited, with only around 15–20% used in national construction and infrastructure.[16] As part of a transnational corporate structure, the plant's revenues and investment flows were directly tied to international capital markets through instruments such as listed bonds and shareholder equity.[17]

After 2022, the company has had to restructure financing, source raw materials through wartime logistics, and shift export routes from Black Sea to overland via Poland and Romania.[18] Due to constant massive destruction in Ukraine, demand for domestic rebuilding has appeared. This means that remaining steel production is increasingly allocated for reconstruction projects and infrastructure recovery.[19] Steel is extensively used in rebuilding critical infrastructure, including bridges, roads, and residential buildings. The allocation of funds for these projects often involves international loans and grants from the European Investment Bank (EIB), the European Bank for Reconstruction and Development (EBRD), and the World Bank.[20] In this turn, the demand for production hasn't changed dramatically but the war conditions force the reorganization of the financial system and capital.

Figure 2. Alexander Ermochenko / Reuters , "Life in the Ruins of Mariupol," October 31, 2022

This external financing allows the Ukrainian state to sustain investment during wartime but also ties reconstruction to global financial governance. Greta Krippner argues that state policies designed to deflect political pressures in the domestic economy created new opportunities for financial expansion and deepened the integration of national economies into global financial markets.[21] Ukraine's reconstruction is seen as a great act of charity and benevolence, but through finance, it has also become an instrument for wide financial control and dependency on transnational capital. While steel production demonstrates how global financial flow shape reconstruction, concrete shows how materials themself can be revalued and turned into a source of accumulation.

"MAKING CONCRETE UPCYCLING A REALITY"[22]

Due to massive missile attacks, Ukrainian cities suffer a vast amount of destruction, which leaves dozens of millions of tons of rubble. This constant production of waste shapes a new landscape in Ukrainian cities, where the material landfills have expanded to the scale of entire districts. While competitions are being held for the reconstruction of some buildings, others are being transformed into a resource. Most of the heavily damaged structures are concrete buildings from the socialist housing stock, which is widely stigmatized as a heritage of the USSR regime. Thus, the destruction of the existing environment opened up the possibility of building new desirable cities from scratch.

S3RoU (Safe, Sustainable, and Swift Reconstruction of Ukraine), is a newly established organization focused on post-war rebuilding.[23] As S3RoU emphasizes in its motto, "We transform war and disaster rubble into a sustainable future."[24] The project itself proposes the technology that converts crushed debris into high-quality up-cycled building materials (aggregates, sand, cement paste). The cement paste is treated and converted into a valuable supplementary cementitious material (SCM), that can be reused in new structural concrete and pavements.[25] Traditional recycling methods downcycle materials into lower-value products. Although this approach upcycles rubble into products of equal quality to their original use. Thus, the processed waste becomes marketable construction products that can be sold almost for the same value as newly produced ones. The system also proposes mobile processing units that allow rubble to be recycled directly on-site.[26] Thus, the place of destruction became the place of extraction, which essentially creates a new field of accumulation.

Figure 3. Concrete Supply UK, How to Break Up Concrete

The rapid production of rubble and the urgent need for rebuilding created a unique condition to implement new technologies that would not be possible otherwise. All core technologies and funding for S3RoU come from the UK partners, where the University of Sheffield (UK) and the University of Leeds (UK) act as technological and administrative project leads, focusing on materials value optimization.[27] Just the implementation process within the country and further scaling rely on the Ukrainian side. The UK Government's Innovate Ukraine initiative invested around £16 million in this project, giving the country a leadership position in post-conflict reconstruction and circular economy technologies.[28] Such investment assumes potential global implementation in post-conflict and end-of-life infrastructure reconstruction. Thus, Ukraine became a testing ground for experimental material practices, which can be rapidly implemented and normalized. In this sense, reconstruction is not only a response to loss but also a process that reorganizes the values of materials on a different scale.

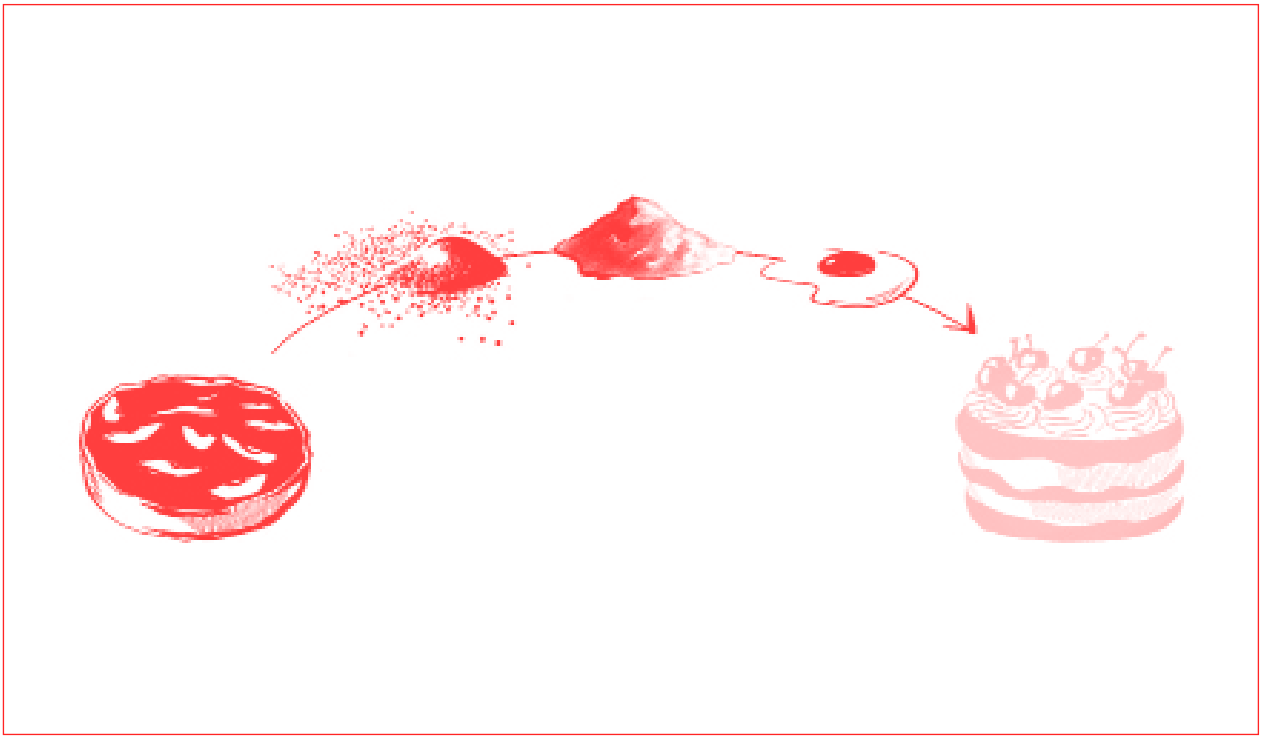

Figure 4. Anna Dzebliuk

Amos Chapple compared the new technology for processing rubble to "taking a cake and dissembling it into flour, sugar, and eggs from which another dessert can be baked."[29] The same metaphor can be applied to describe the process of reorganization of postwar urban space. Where the city functions as a *cake* that disassembles into a set of ingredients in order to create a new urban form. The chance to make a *better cake* from the same ingredients leaves little room for simply replicating the original one.

Thus, the reconstruction process transforms into a complex reimagining of urban space. The interim stage, when the city is dismantled into materials, forms the possibility to redefine the existing urban environment. In this turn, the reconstruction process becomes a field of negotiations between different powers, where the decision about the future *cake flavors and design* is made.

The Ukrainian case illustrates that reconstruction is not simply a return to the prewar condition but an attempt to build a new city, through the reorganisation and reevaluation of materials. As I argued in Part 1, the lack of resources in the wartime forces reevaluation of the urban space, changing the value of labour and cost of maintenance in historic areas. In Part 2, steel shows which financial instruments make the reconstruction possible and, at the same time, reveal deeper instruments of control and dependency. At the same time, in Part 3, we can see how distraction opens up a new possibility for experimental material practices. Thus, the postwar city is produced from the debris of the previous one, where new production is tightly entangled with destruction. As a *cake*, a city disassembles into components, which can be reorganized, revalued, and form a new one. Yet the final *recipe* depends on a new power relation and economic dependencies formed in war conditions.

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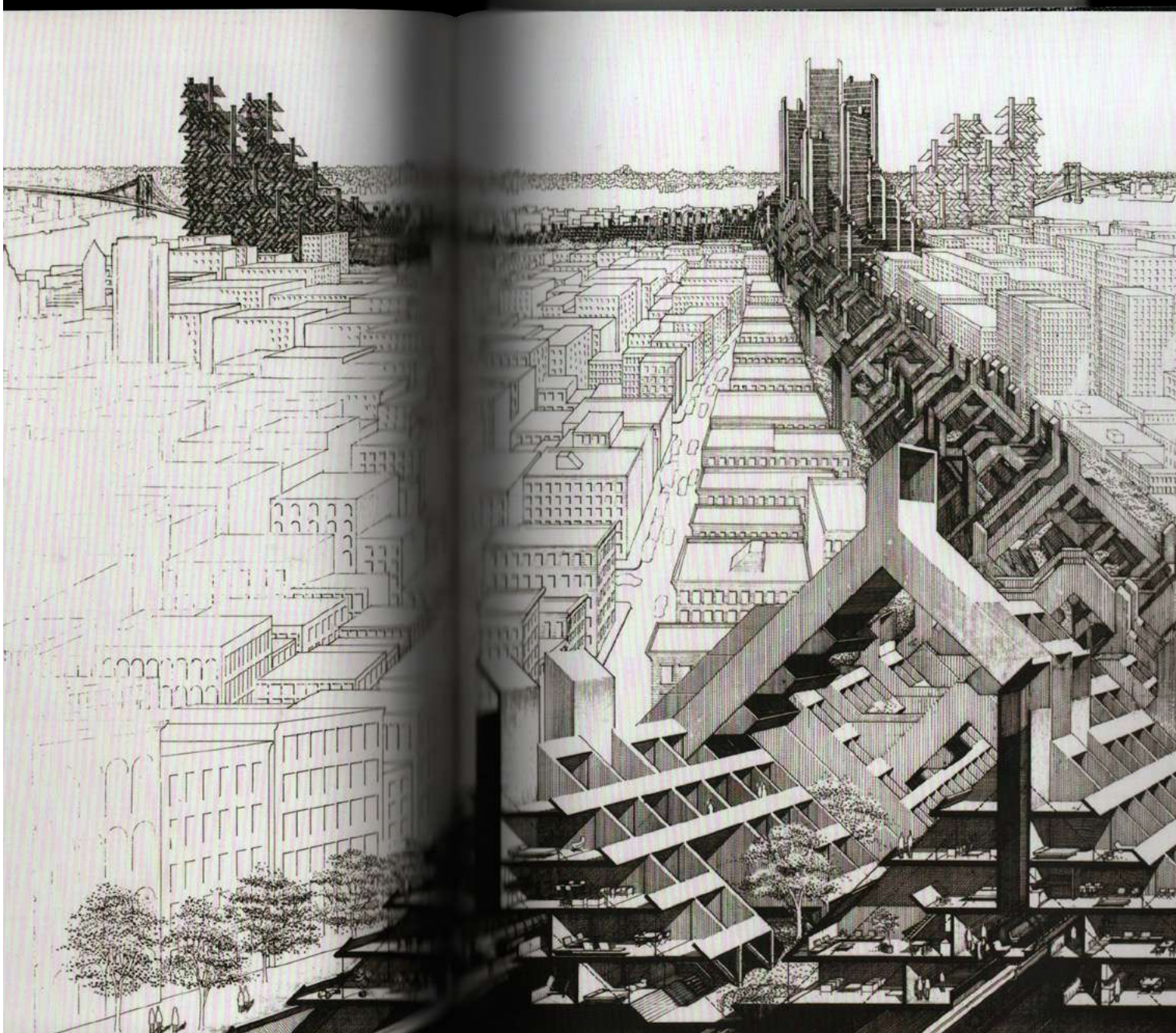

Capitalization on crisis

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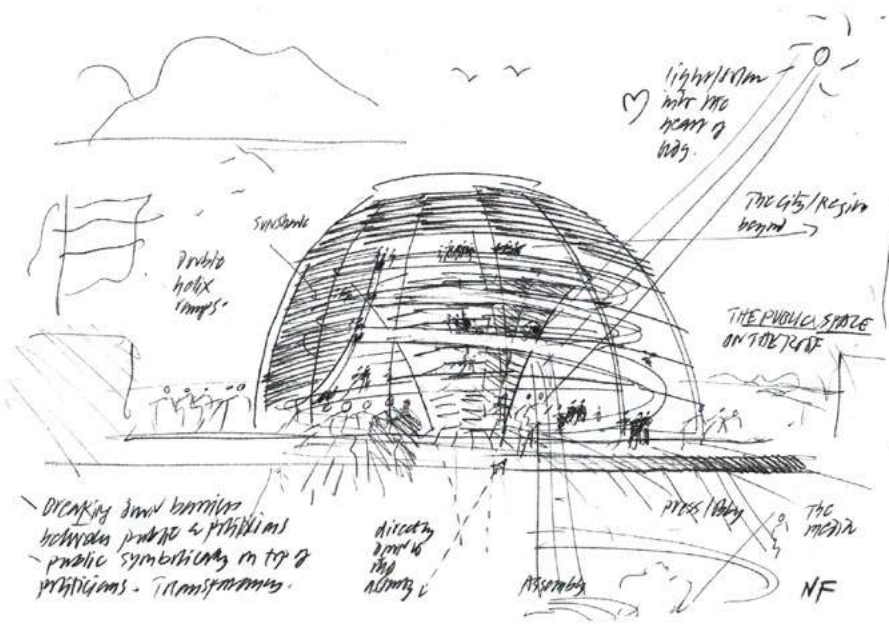
E.g. of Reichstag -glass
the meetings of parliament → panop
vie

Reconstruction of Kharkiv ODA
- symbol of soviet past before
- missile hit
- reconstruction idea in glass - dem

(3) Essay idea: glass as a material in reconstruction process → Both democratic reconstruction = path to EU

(5) HOWEVER: - capitalistic side of glass
- instalation of glass is globalised + production + Architects like Fo
Foster himself i
- no local labour designing centers
new



The vast transformation of the Reichstag led by Norman Foster not only takes into account what the German parliament – the Bundestag – represents, but also expresses a renewed approach to history.

every cultural arbitract (incl. architecture)
is a symbolic act shaped by its historic
and economic structures

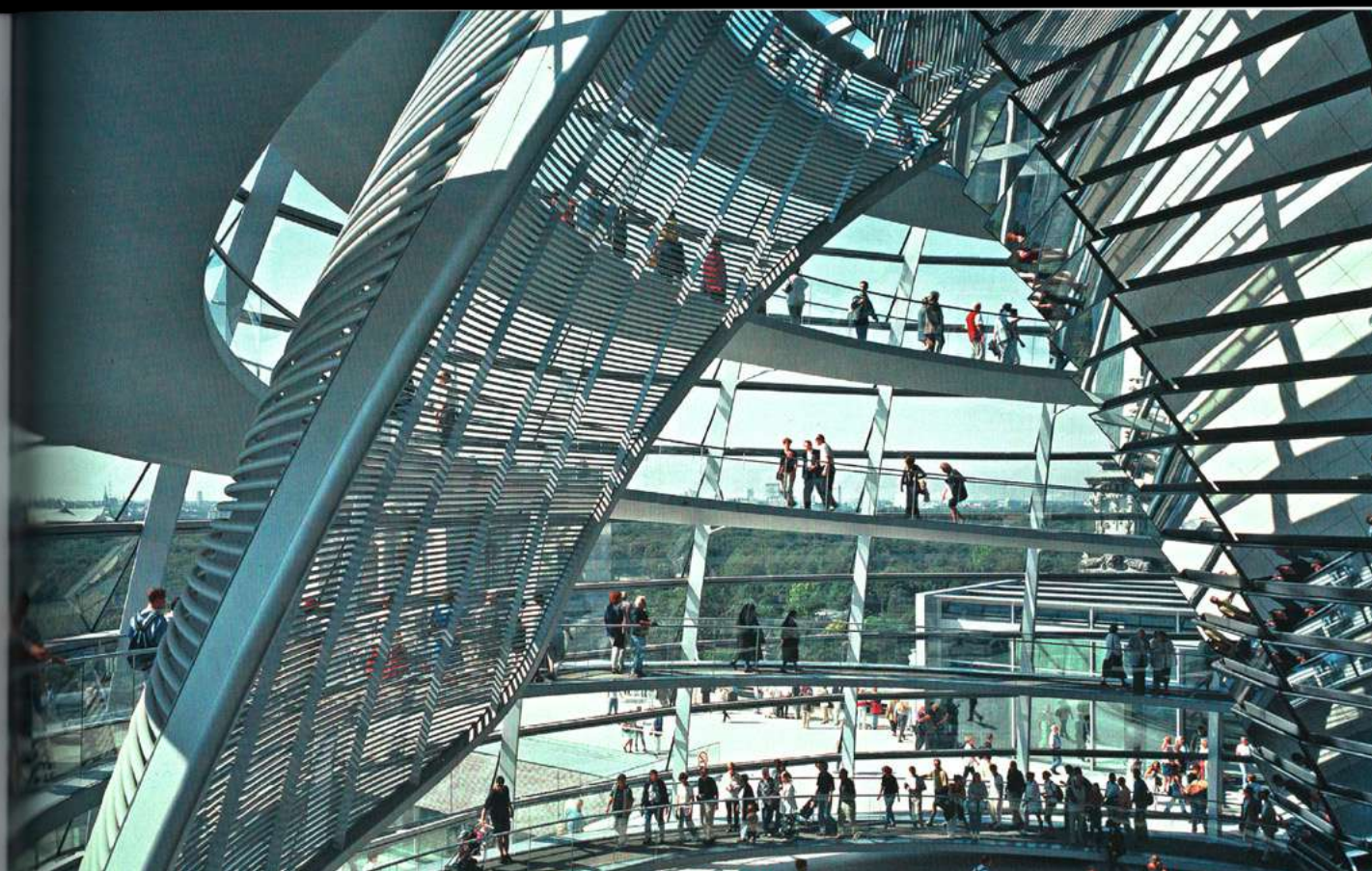
material = sign within a system

* Financialisation - proces that materialises financial schems By being embedded into physical environment

loan - money is given right away
with obligation to pay back

VS

Guarantee - no money rigth away.
if borrower cannot pay the loan, guarantee helps



Democracy or Dependence?

Marta Bodnar

The war in Ukraine started 14 years ago with the Russian annexation of Crimea and invasion of the eastern part of the country. It has turned into a full-scale invasion in 2022 and is an ongoing battle for the country's existence and independence. In February 2025, the direct damage had reached $176 billion.[1] While still living in a state of war, Ukrainians are showing resistance, strength, and the will to live a full life. For the adequate functioning of society, rehabilitation must be immediate. This includes physical rebuilding of destroyed cities, infrastructure, and dwellings. This is why, even during the war, reconstruction projects are underway, showing not only resistance, but also the choice people made years ago – to follow a democratic path toward a European future. The material usage in these projects is also intended to represent the chosen trajectory. Glass, for example, on the surface, symbolises transparency. However, looking deeper, both *glass* and *reconstruction* hide more extensive power structures; both are tied in the nets of finance, globalisation, and economic dependency. Being a Ukrainian myself, with this research, I want to explore the symbolism of reconstruction through the lens of materiality, focusing on architectural glass as both a metaphor and a material expression of democracy.

Glass is being used more and more often in architecture to showcase democracy and transparency – in the Reichstag building in Berlin, a glass dome is used to provide the visual connection to the work of parliament below, providing transparency.[2] This is the path Ukraine is following and fighting for at

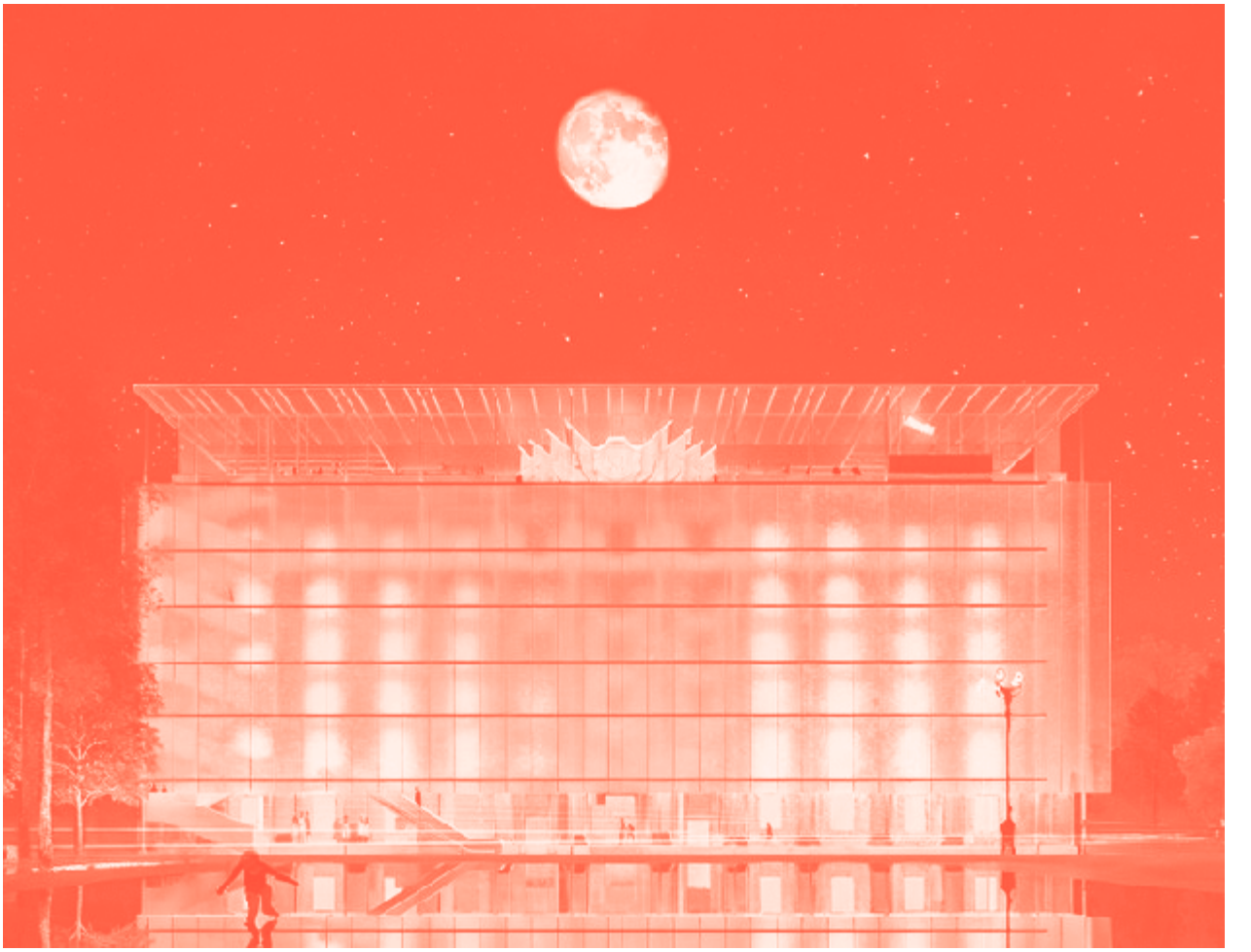


Figure 1. One of the three winning projects for the reconstruction of Kharkiv ODA by Daniel Mintz. Source: Buildner, https://architecturecompetitions.com/kharkivfreedomsquare/.

the moment – democracy and transparency in political decisions. In Ukrainian reconstruction projects, glass also symbolises a break from Soviet heaviness in materials and in political regimes. Reconstruction carries the same notion. The renewal process is a way towards the European Union. While the past is being destroyed, the future is being reimagined. For example, the project of the Kharkiv Regional Administration Building (the "Kharkiv ODA", in Ukrainian), which was built in the Stalinist style and used to be a symbol of the Soviet heritage. It is now planned to be rebuilt in glass to demonstrate a break with the difficult past – the new façade promises openness and democracy.

However, not everything is that transparent. The production and installation of architectural glass is a highly globalised process – it requires certifications, production technologies, and professionals from all over the world. Glass itself is a global capitalist material. For example, Norman Foster, famous for designing centres of major capital flow, mostly works with glass. Behind the translucent façade and its correlating democratic sentiments lies a process which is tied to international influence. Here, the book *Material Witness* by Susan Schuppli comes to mind. A British researcher working with forensic architecture, she uses architectural space to document and investigate human rights violations and war crimes. In this case, the material is "informed" as it registers the political and economic conditions of its making, transmitting it through time.[3]

The reconstruction process in Ukraine is also layered and complex. Most of the financing for large reconstruction projects comes from EU loans, international bank funds, and private investment. When this financing arrives in Ukraine, it carries conditionalities and is tied to capital returns, making the process more of a financial than a social one. Like glass, reconstruction is a transparent façade of democracy that also leads to debt and financial dependency.

This is how I came to explore how glass and reconstruction are symbolically connected and how they both are visibly transparent – representing democracy – but hide more complicated systems. In *Architecture Against Democracy*, Reinhold Martin and Claire Zimmerman argue that architectural materials and forms cannot be separated from the political and economic systems that produce them.[4] They act as conduits of ideology, mediating broader social structures. From this perspective, materials in cities are never just structural – they encode histories, power relations, and political conditions.

During the Stalinist era, Soviet architecture took the form of monumental ensembles designed to project the greatness and power of the empire. The predominant materials were bricks and stone (particularly marble), which were chosen for their durability and symbolic weight. Nature within cities was replaced by rigidly planned urban spaces. Space was transformed, as Henri Lefebvre describes in his book *The Urban Revolution*: "Paradise was no longer located in Nature … artificial paradise supplanted a natural paradise, yet these artificial paradises are clearly urban." While nature flows instinctively, the stone-built environment, aligned in straight lines, became a mechanism of control, "setting urban dictatorship".[5]

This principle of control continued under Khrushchev, though its material expression shifted. The Soviet Union produced the largest quantity of factory-built housing in the world in the 1970s. Concrete became the central material: cheap, practical, and easily mass-produced. Khrushchev denounced Stalin's unnecessary use of costly materials, presenting concrete as rational and egalitarian. Its ubiquity, from Kazakhstan to Estonia, erased architectural distinctiveness and reinforced the Soviet vision of a uniform, classless society.

When Ukraine gained independence in 1991, the Soviet urban legacy became an acute issue. The Kharkiv ODA building was originally constructed in a Stalinist monumental style and stood as a material embodiment of the Soviet past. It was destroyed by a Russian missile in the early months of the full-scale invasion during which Russia, a successor country of the Soviet Union, has tried to satisfy its colonial agenda. The building became a site of material controversy: what should replace the Soviet past, with what form and meaning? At the request of the city's mayor, the Norman Foster Foundation held a competition for design proposals for the reconstruction. One of the winning proposals inserts a glass façade, which, the jury's feedback highlighted, softens the building and symbolises transparency and accessibility.[6] This proposal reimagines the history of the building, turning it into a symbolic gateway of democracy and a European-oriented future.

The history of architectural glass is tied to colonial expansion. In the nineteenth century, Britain transformed glass into a global symbol of modernity, progress, and civilizational superiority.[7] For example, the Crystal Palace, a cast-iron and plate-glass structure built in Hyde Park, London, for the Great Exhibition in 1851, was assembled from industrially produced iron and glass and has become the quintessential imperial structure. It displayed the Empire's technological power while enclosing commodities, cultures, and territories from across the world. Glass emerged as a tool of imperial vision – as a surface through which the British Empire made the world governable.[8]

Understanding contemporary glass requires examining how it comes into being. This is evident in float glass production that is highly globalised: in 2019, more than half (51%) of global float glass capacity was manufactured in China.[9] This production requires advanced

Figure 2. The Stalinistic ensemble on Khreschatyk street in Kyiv. Source: *Architecture of the Soviet Ukraine*.Стройиздат, 1987.

technologies such as furnaces, coatings, and raw material supply. Moreover, manufacturing glass has an environmental cost, which industry leaders all over the world are trying to mitigate using new advanced technologies of production.[10] The installation of glass façades further extends these networks. To put a single panel in place requires cranes, suction lifters, glaziers with specialised certification, façade engineers, anchoring consultants, and precise coordination with structural systems.[11]

After float glass sheets are cut, they undergo additional transformations before becoming a window. Firstly, the raw float sheets are sent through an annealing lehr – a long, controlled-cooling furnace that removes internal stresses and stabilises the glass for later processing.[12] Next, the sheets are cut to standard window dimensions using automated scoring and breaking equipment, often guided by CNC machinery.[13] For safety and strength, the glass can then be tempered, meaning it is reheated to around 620°C and rapidly cooled with high-pressure air to create surface compression. This makes it much stronger than ordinary float glass.[14] Two or more glass sheets are then assembled into sealed window units with aluminium spacers and gas-filled cavities to improve thermal performance for insulated glazing units (or double glazing). This improves energy efficiency, reduces noise and prevents condensation.[15]

Figure 3. The Crystal Palace (1851). Source: *Glass in Architecture* by Michael Wigginton. Phaidom, 1982.

Window glass production and installation is a technologically sophisticated and labour-intensive process – yet in global capitalist cities, the workers who perform it often remain unseen. Dubai is the clearest example: its shimmering skyline, which Mike Davis calls "a capitalist dream", is entirely dependent on migrant labourers working in precarious and often living in inhumane conditions on the outskirts of the city.[16] The city presents itself as an image of openness and innovation, but its glass towers function as mirrors – reflecting power while completely obscuring the social inequalities that sustain them. Reflective surfaces do not reveal the buildings' interior; instead, they reflect the skyline. This technique can also be traced in Ludwig Mies van der Rohe's Friedrichstraße high-rise, where it is framed as "critical architecture", meaning that architecture simply reflects on society where power is displayed while hiding inequalities behind it.[17]

This tension between visible transparency and hidden systems is what connects Dubai to Ukraine. Both employ glass to signal a political narrative – one of progress, openness, and belonging to a global future. In Ukraine, this symbolism of rebuilding in glass is implemented, yet the reconstruction process is equally shaped by financial dependency, funded largely through EU loans, international bank mechanisms, and private investment. Glass becomes the metaphorical reflection of this reality.

In this sense, rebuilding using glass as a metaphor of transparency is more than an engineering project; it is a symbolic act performed through a material that both reveals and conceals. Glass exposes us – literally, through its visual permeability, and politically, through its embeddedness in global systems of labour and finance. In his *Concrete as a Weapon*, Sergio Ferro discusses that architectural material is always embedded in the capitalist system and never stands outside of it.[18] Following this notion, glass becomes the architectural surface where transparency and capitalism meet, similar to the architecture of the reconstruction process that hides complex financial ties. As with the fragile material itself, this reconstruction depends on the transnational flows of capital, loans, and private investment. Behind every reflective façade lies an invisible architecture of international finance. In

Figure 4. The Gherkin tower in London by Norman Foster. Source: Norman Foster. ACC Art Books, 2023.

this sense, glass becomes the perfect surface through which to read the political economy of post-war rebuilding.

Here, the figure of Norman Foster becomes emblematic. Foster + Partners is known for projects like the Gherkin in London. Framed as a "landmark" and having one of the most recognisable silhouettes in the cityscape, it is still far from being accessible to the general public as it is a home for an insurance giant of England, Swiss Re.[19] In this case, architecture has become a tool of attracting capital, which Brett Christophers describes as *asset-management capitalism*. In Ukraine, Foster enters not as a state architect but through the Norman Foster Foundation, whose Patronage Program explicitly elies on benefactors, sponsors, and corporate donors. The primary source of the Foundation is private donors, such as individual benefactors, institutions, and philanthropists. There is also in-kind support coming from Foster+Partners that covers operational expenses.[20] Brett Christophers argues that we have entered a new phase of capitalism where urban space is valued primarily for the financial returns it can generate – architecture is not just exterior, but it also contributes to the capital attraction using materials, and public infrastructure becomes privately owned.[21] In this belief, both the Gherkin and the Kharkiv ODA become assets, as Norman Foster is making a portfolio on reconstruction projects. Here we can see that even philanthropy participates in asset-making: prestige projects generate symbolic capital, attract donors, and align reconstruction with global architectural branding. In this framework, glass becomes a surface onto which the financial and geopolitical structures of reconstruction are projected. The material that promises openness becomes the mirror which metaphorically resembles Ukrainian rebuilding.

Financial dependence is not an abstract backdrop but a reality that shapes Ukraine's reconstruction on a national scale. In 2023 alone, Ukraine received around $42.6 billion in external support; only 27% arrived as grants, while 73% were concessional loans. The European Union, positioned as Ukraine's territorial and political horizon, provides the bulk of these funds, supplemented by the IMF, World Bank, and U.S. support. Additional financing flows through such programs as the Ukraine Facility, United24, and private philanthropic networks.[22] One of the examples of foreign financial donors shaping the reconstruction process happened in Mostar, Bosnia and Herzegovina. After the Bosnian War, foreign funding was attracted to rebuild the destroyed site. Stakeholders insisted on rebuilding the Ottoman core, connecting the reconstruction with tourism development, which has led to the reimagining of commemoration and heritage in urban space.[23]

In *The Shock Doctrine*, Naomi Klein describes how moments of crisis become openings for market-oriented reforms, privatisation, and investment-driven urban development.[24] In Ukraine, reconstruction becomes a site where humanitarian needs and geopolitical interests intersect with market logic, as it is financed with foreign loans that tie the country down in debt. Moreover, comparing Ukrainian reconstruction with the Marshall Plan, we can see some changes. Post-WWII Europe received aid, 90% of which consisted of grants, with the remaining 10% of loans. The aid aimed at stabilising the domestic industry and rebuilding public infrastructure.[25]

On the contrary, Ukraine's reconstruction today is largely loan-based, dispersed across multiple international institutions, and shaped by private-sector involvement.

This reality of reconstruction brings me back to glass and its production: the material that promises openness depends on supply networks, foreign manufacturing, certifications, and labour engaged from elsewhere. Similarly, Ukraine's future-oriented reconstruction relies on global financial flows. The symbolic clarity of glass and the aspirational clarity of democratic rebuilding both rest on infrastructures that remain structurally unseen. Reading reconstruction through this material lens exposes its political economy: the surface of transparency is sustained by systems that are not transparent, revealing the limits and assumptions of a paradigm that equates rebuilding with democratic progress while outsourcing the material and financial foundations that make it possible. The politics of reconstruction extend far beyond material structures – they map the economic and geopolitical future of the nation itself.

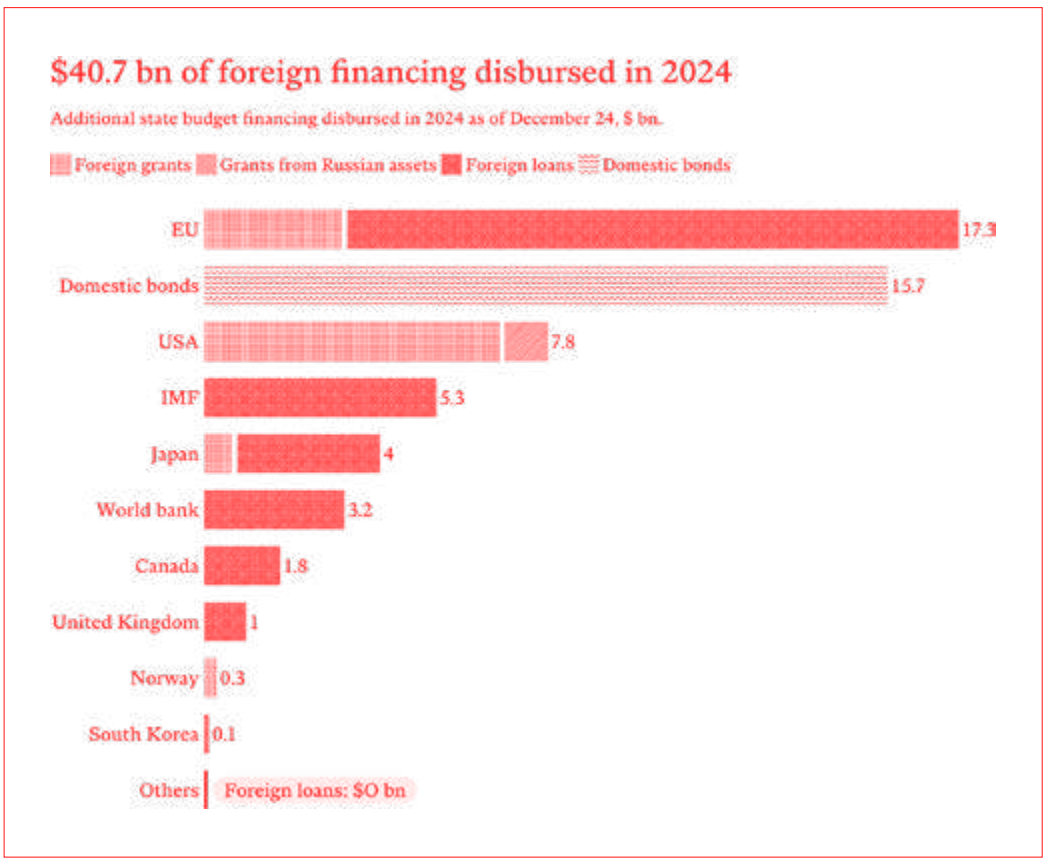


Figure 5. Recap of International Aid to Ukraine in December 2024.
Source: *Centre of Economic Strategy*, accessed November 28, 2025, https://ces.org.ua/en/recap-of-international-aid-to-ukraine-in-december-2024/.

Figure 6. In *Yi Yi* (2000), scenes shot through glass windows symbolise the complex relationship between an individual's inner world and the external world, creating a sense of separation and connection simultaneously. These frames often highlight themes of observation and the limitations of perspective, mirroring the camera lens itself and the way people perceive the world and each other. The reflections in the glass and the frames themselves are used to comment on the fragmented nature of reality, the unspoken emotions of characters and the desire to see beyond the immediate, limited view of life. By Edward Yang.

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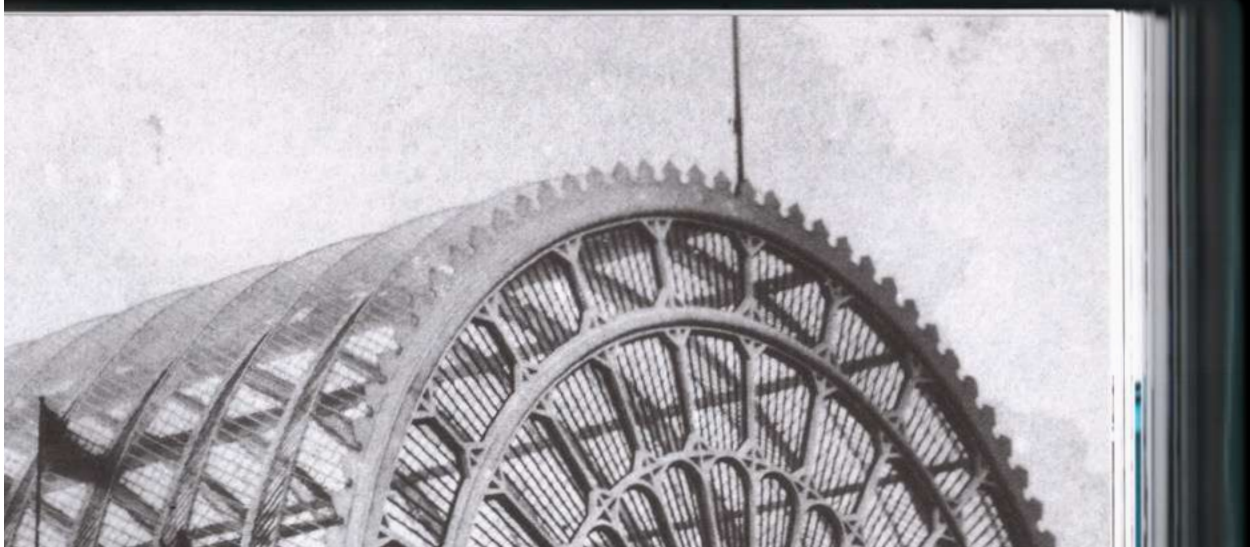

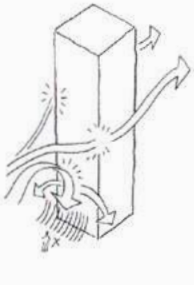

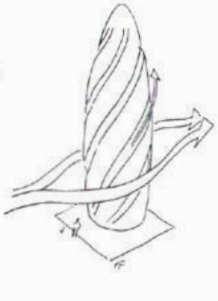

Общественного

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завершенного несложно профилированным карнизом с
шой выносной плитой. Композиционный строй здания
хорошо найденными пропорциями отчетливо воспроиз
каркасную структуру.

Универмаг невольно привлекает внимание лакони
ясностью облика, свободного от претенциозности некот
из соседствующих с ним зданий.

Улица Гуси Гаджиева, как уже отмечалось, выходи
площадь Физули. Въезд на нее подчеркнут повышен
объемами завершающих застройку улицы зданий. На с
из углов площади — пересечении улиц Басина и Шихали
банова — в 30-х годах был построен большой, многобло
жилой дом. Это было настолько необычным явлением
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Баку. Здание Городской думы (ныне Бакинский совет). Гражд. инж. И. Гославский. Фрагмент

Baku. Building of City Duma (now Baku City Soviet). Civil engineer I. Goslavskii. Fragment

Баку. Жилой дом братьев Садыховых. Гражд. инж. Г. Тер-Микелов

Baku. Sadykhov brothers' house. Civil engineer G. Ter-Mikelov

Баку. Фрагмент дома Мухтаровых (ныне Дворец бракосочетания). Гражд. инж. И. Плошко

Baku. Fragment of the Mukhtarovs' house (now Wedding Palace). Civil engineer I. Ploshko

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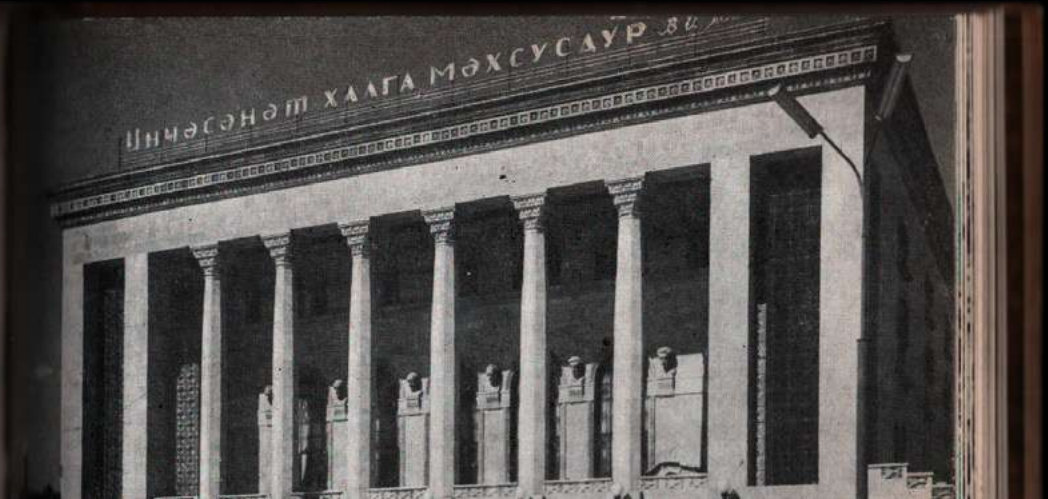

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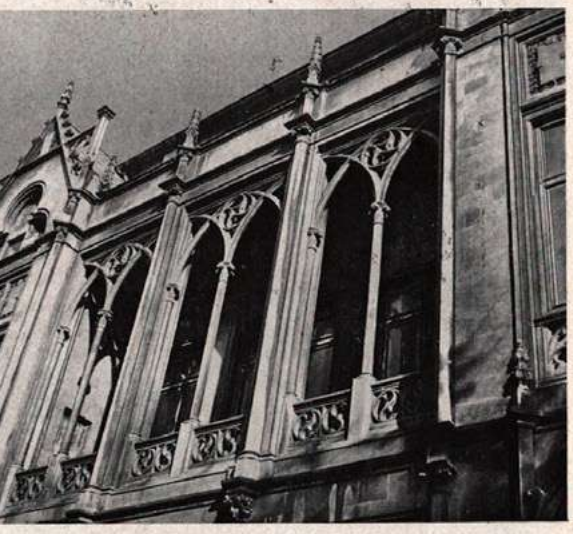

Underground Treasures: Understanding *Aglay* Through the History of Oil

Laman Mammadli

WHAT IS *AGLAY*?

Aglay is a natural stone and a very popular material choice mainly used as tile claddings for façades and occasionally for interiors in Azerbaijan. Some consider it a sandstone with specific characteristics, while others describe it as a type of limestone.[1] Its name comes from the combination of two words, *ağ* (white) and *lay* (layer), referring to the white layer of stone that is extracted and produced in the local quarries.[2]

Aside from being local and easy to produce, *aglay* is comfortable to polish and smooth, making it suitable for creating intricate details and carvings.[3] Facades clad with *aglay* more than a century ago still keep their warm-toned appearance despite the extreme winds, humidity, and intense sun of Azerbaijan.[4] Rough textured tiles, ornate façade designs, and the unmistakable tone of the material – which brings warmth even on the rainiest days – have become iconic characteristics of the centre of the capital, Baku.

Today, a quick tour through Baku would highlight the presence of *aglay* tiles on many buildings. Those buildings are often situated in or near the city center and are significant remnants of Baku's history during the 19th and 20th centuries. From a local perspective, that era is commonly referred to as "the Renaissance period" for Baku, as the oil industry was rapidly evolving during the same time. As Baghirova describes in her article:

> Increase in oil revenue, and population led to demand for construction of houses, and facilities. And, with oil money in abundance, European and Russian architects were hired to design and build new buildings paying homage to classical, and baroque style.[5]

It is possible that this close connection of architecture and oil in the city transformation brought out the extensive use of *aglay* on the building facades. Interestingly, *aglay*'s fate closely resembles how oil turned from a resource of pride into a site of labour and social responsibility while launching Baku's development. The essay explores the history of *aglay*, through its reflections of the history of oil and analyzes how the presence of one resource led to the recognition of the other and reshaped the city completely. *Aglay* went from a symbol of the city to a resource subjected to privatization, and its extraction has raised questions about the costs of the workers' conditions in the quarry.

DREAMS OF AN OIL BOOM TOWN ENGRAVED IN STONE

After being subject to a Russian invasion in the early 19th century, Baku transformed rapidly, touching every aspect of the cultural and social life of its inhabitants.[6] Baghirova argues in her work:

Figure 1. A.Michon, *Erupting Oil Well in Baku*, Azerbaijan, 1887, photograph, accessed November 29, 2025, pinterest, https://www.pinterest.com/pin/117234396531621809/

> The Industrial Revolution, which happened in 19th century led to the need to use energy resources for the economic development. Since that time the conversion of the most important energy resource - oil, in an economic and political weapon, which causes inter-state relations began. Azerbaijan, in whose history oil had a great impact on the socio-economic and political processes, was not an exception.[7]

The first industrial oil well was drilled in 1847, marking the beginning of a new era for Baku.[8] By the late 19th century and the early 20th century, Baku's oil industry boomed: more than half of the world's oil was drilled here at the time.[9] Oil drill owners prospered financially, and the city attracted international visitors ready to get their hands on the source of wealth. During that time, Baku's new capitalists and foreign entrepreneurs began commissioning European architects to design buildings and houses for the city.[10] Under the financial influence of foreign visionaries, the planning and architectural style of Baku developed in a way that the majority of new projects introduced unfamiliar architectural elements on the city's facades.[11] Baku gained the nickname "Paris of the East" due to the visual characteristics of the buildings, which are similar to those in European cities.[12] The composition of *aglay* allowed for the facades to be decorated with monumental columns, intricate carvings, neoclassical elements, and bulky, rock-textured tiles reminiscent of Parisian neoclassical architecture. Rizvan Karabakhli, PhD and Associate Professor in Architecture, writes in his article about the history of Azerbaijani architecture:

> The main artistic centers of the Shirvan architectural school were Derbent, Shamakhi and Baku … First of all, let us note that the local limestone used in Shirvan architecture has a multi-layered carving quality. Therefore, it is possible to carve any ornaments in relief on such stones. Various sculptures can even be easily carved from these stones. This is not possible with local construction materials used in other architectural schools.[13]

The term "architectural school" mentioned above refers to the style of architecture that is common in the specific regions of Azerbaijan. As Karabakhli suggests, *aglay*, sometimes depicted as the local limestone, had an advantage due to its composition to be carved into decorative elements. This material's qualities suited the rising current of building in classical, Baroque, Art Nouveau, and Gothic styles at the time. Based on the historical context, I believe such properties of *aglay* significantly contributed to its widespread use in the construction of buildings that required intricate detail.

Aglay, frequently used in residential buildings of the rich commissioners, turned into a standard facade cladding option on buildings to showcase grandeur. *Aglay* made up the image of the city, quickly gained recognition all over the country and became a symbol of luxury during the industrial era of Baku.[14] The sudden wealth coming from the oil not only industrialized Baku, it also seemingly enabled the emergence of *aglay* as the city's main choice of material for facade cladding. As the number of people getting rich from oil increased, the number of commissioned buildings grew with it.[15]

Figure 2. *The Residence of Kerbelayi Israfil Hajiyev in Jafar Jabbarli str 10. Architect: Józef Płośko. Constructed: 1910-1920*, in Gani Nasirov, *Exploring Art-Nouveau Architecture in Baku*, Urban Architecture Blog by Genii, January 31, 2024, photograph, accessed November 29, 2025, https://ganinasirov.com/2024/01/31/baku-art-nouveau-architecture/#:~:text=The%20Town%20Hall%20of%20Baku,early%20XX%20centuries"%20(1986)

It appears that *aglay* was the selected material for the facades numerous times, and soon after this repeated use of the material specifically on the houses of the elite elevated this stone into a widely recognized indicator of refinement.

Figure 3. *"Baku White City" layihəsində mənzil satışı ikiqat artdı*, abc.az. January 24, 2018, photograph, accessed November 29, 2025. https://abc.az/ru/news/5260

The purpose of cladding the new buildings in *aglay* was to achieve a uniform look of tidy, elegant appearance and most importantly, one that was familiar to many foreign entrepreneurs travelling from the West. Among the most prominent representatives of the oil capital in Baku were Swedish businessman Ludwig Nobel and Baron P. Bildering.[16] More staff was invited to Baku from Finland, Sweden, Norway, and Germany by Ludvig Nobel in 1882.[17] Additionally, specialists of the banking sector and engineering staff from England, France, and other countries also came to Baku as the city's recognition grew.[18]

During the industrialization of Baku, two interconnected events reshaped the city. The finances coming from oil extraction aided the large-scale reconstruction of Baku. Just as oil brought an industrial revolution to the country, the use of *aglay* brought an architectural one,

helping to develop the distinct face of the city, which is still relevant today.[19] Over time, *aglay* can be interpreted to have *become more than a building material*: it became a curated display of wealth, sophistication, and progress, fueled by the tastes of the oil elite. Aside from holding significance for the development of industrial processing, the oil drilling indirectly initiated the *aglay* extraction, linking the two "materials," which together shaped the identity considered authentic to Baku.

EXTRACTING THE "LUXURY"

Today, the majority of quarries extracting *aglay* are owned privately and the material is even exported globally.[20] The quarries that belong to the state have become privatized and even auctioned off at times to private owners by The Auction Organization Center of the State Service for Property Issues under the Ministry of Economy and the State Agency for the Use of Mineral Raw Materials under the Ministry of Ecology and Natural Resources.[21] During one of the auctions, held on December 14, 2022, the deposit with an area of 3.86 Ha containing *aglay* was auctioned off, however the names of the auction winners are no longer available. The state has been auctioning off areas of deposits to companies to encourage legal and efficient use and attract economic development. The land auctioning has become even more popular in the last few years, not just in Baku but all over Azerbaijan. According to the updated procedure guide on granting mining rights in 2023:

> Competitive bidding is organized by the State Agency for Use of Mineral Resources under the Ministry of Ecology and Natural Resources … Entities and individuals of the Republic of Azerbaijan as well as of foreign states, regardless of types of ownership and legal form, may participate in an open tender and auction … Mining rights for non-metallic (non-ore) mineral deposits are granted at auctions … Auctions are open … The Agency announces a competitive bidding at least 30 business days in advance of the bidding … The amount of payment for participation in the bidding and the starting price of a subject of the competition are determined by the Ministry of Ecology and Natural Resources under the rules agreed with the Ministry of Economy.[22]

These set conditions reveal the vision behind auctioning off state resources and promoting their privatization. Although this approach aims to develop and diversify |the economy while creating fair conditions for owners, the large-scale privatization of resources may raise concerns about the transparency of ownership and the equal distribution of the territories. Privatization process under the new regime of capitalism is what Brett Christopher calls asset manager capitalism: "Today," he writes, "by contrast, asset managers are the central, and arguably even dominant, private financial institutions. The term 'asset manager capitalism' has been coined to denote this centrality of asset

Figure 4. *Nobel factory in Baku. Photo album of Karl Wilhelm*, n.d., photograph, accessed November 29, 2025, Pinterest, https://www.pinterest.com/pin/390757705177677896/

Figure 5. *The Nobel Brothers' oil wells in Balakhani, a suburb of Baku. The derricks were so close to each other, making the risk of fire eminent, and the noise level horrendous*, in Asbrink Collection, *Azerbaijan's Oil History A Chronology Leading up to the Soviet Era*, Azer.com, Mir Yusif Mir-Babayev, summer 2002, photograph, accessed November 29, 2025, https://www.azer.com/aiweb/categories/magazine/ai102_folder/102_articles/102_oil_chronology.html

Figure 6. *Window Pediment of Hajinski Residence in 39 Fuzuli Street*, in Gani Nasirov, *Exploring Art-Nouveau Architecture in Baku*, Urban Architecture Blog by Genii, January 31, 2024, photograph, accessed November 29, 2025, https://ganinasirov.com/2024/01/31/baku-art-nouveau-architecture/#:~:text=The%20Town%20Hall%20of%20Baku,early%20XX%20centuries"%20(1986)

management not just to contemporary capitalist finance but to contemporary capitalism more broadly."[23] He argues that asset management has become its own right of capital accumulation as the asset managers are the profit-making firms themselves.[24] He writes, "to explore this dimension of asset manager capitalism is to focus on how asset managers generate revenues and profits, where, and on what scale, and on how such activities vary between asset managers of one type or another."[25]

The operation of privatized quarries in Azerbaijan appear to align more with to the model of asset management capitalism rather than the industrial capitalism, even though non-mineral quarrying is a mechanized material production industry. It means that having a clear understanding behind the ownership and financial flow of the supplying companies is extremely important in this case. However, examining the companies that won the auction shows that very little information is available on representatives and their involvement in other projects. The few companies awarded territories with *aglay* deposits have the advantage of accessing the highly demanded material. Unfortunately, the owners are not publicly listed. Even if the company is listed publicly, accessing further information about its ownership remains very difficult.

One of the biggest *aglay* extraction companies, formerly known as "Alin LLC" and now called "Stone & Tradition Inc.," does not disclose any information about its owners, their investments, financial flows or any other information about the company despite being in the mining and supply industry since 2001.[26] Another very well-known company supplying this material is Akkord Industry Construction Investment Corporation, an open joint-stock company, which was established in 2005.[27] Although the names of the supervisory board members and the general directors are mentioned, no further information about them can be found.

As mentioned above, the owners of the quarries and supplying companies are undisclosed. In many cases, the company names appear because their services have been independently published on commercial websites.[28] However, despite the lack of transparency of the ownership, the companies are quick to offer exportation of *aglay* into the global market. Construction firm websites supply countries such as Latvia and Norway with *aglay*.[29] Several owners of quarries have been fined due to lacking legitimate documents for land allocations, violating environmental norms, and causing damage to nature, soil and residents living nearby, and using equipment from the 1970s.[30] Some owners would even go as far as extracting stones from harvest and crop areas, which has resulted in the arrest of 7 owners in 2018.[31] Yet, many of them still violate the regulations of extraction, claiming that the profit made barely covers the workers' wages and the equipment fee.

In contrast, a report from 2012 describes owners of *aglay* quarries as owners of an "underground treasure," a description echoed even by the workers themselves, due to the profitability of the material.[32] In an interview conducted with one of the workers of the quarries producing *aglay*, Safar Aliyev states: "It is dirty work, but

Figure 7. *Drilling, Inserting Iron Pipes Into a Well*, n.d., photograph, accessed November 29, 2025, pinterest, https://www.pinterest.com/pin/390757705172188838/

this sector is the most profitable after oil, since the construction boom began. The process has been going on for about a year. Previously, one or two quarries were taken away from their owners, but now they are being investigated from top to bottom. They say, "no, we are not satisfied with your activities or the documents are not in order.""[33] The same source mentions that, "The quarries nowadays are as profitable as oil."[34]

The high demand for the material in the local market tempts some owners to violate regulations for profit: privatised quarries, for instance, equipped with outdated machinery not only harm the soil but also create challenges for the workers in the quarries.[35] Although the workers have voiced their opinions in the past, it is unclear whether any improvements have been made: "You won't see anyone working with a respirator. The stone quarry should also be monitored, because tuberculosis and other lung diseases can also spread."[36] In 2021, there was an incident in one of the *aglay* quarries, where one of the workers died in an accident. It is believed that this accident happened because of regulatory breaches and unfortunately, it is only one of the many cases. The miners in the extraction and the construction workers seem to be caught in the middle of it all. It seems that the main argument between the owners and the agencies pushing these regulations is the complex nature of keeping up with said regulations, as the owners state that these difficulties are being created on purpose. Although the agencies attempt to empathize with owners' difficulties, it is unclear what the concrete conclusion will be.

The attempt to privatize *aglay*, not just as a material but as a brand of Baku's image, resembles the earlier history of the city and its ties to oil. Just as the oil workers used to face harsh and often dangerous conditions back in the days while the owners of the drills were financially prospering, we can observe a similar phenomenon rising again through the *aglay* mining as its popular use emerged because of the oil industry back in the days.

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Здание Бакинского Совета

Архитектор К. Скуревич, работавший в Баку во время интенсивной застройки его центральной части, был основательно знаком с архитектурно-строительной практикой города, и мнение его о характере этой практики достаточно объективно. „Бакинцы, — писал он, — не только чрезвычайно равнодушно относятся к своей древней архитектуре, но неудержимо стремятся строить на „европейский лад". Хорошие мастера-каменщики, потеряв свою нить архитектуры, они, разумеется, не усвоили сущности архитектуры европейской, тем более что здесь можно встретить столько стилей (не говоря о постройках, вовсе лишенных стиля), сколько народностей заселяет теперь Баку — как будто течение переселения идет волной обратно с запада на восток. Всякие попытки местных архитекторов построить чистые здания, гармонирующие с прошлым — с ханским дворцом, разбивались о желание построить на европейский манер до такой степени, что если проект составлялся

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ре. Стыки их

Баку. «Восточный базар». Архитекторы У. Ревазов, П. Яриновский, констр. А. Бессонов. Макет; общий вид

Baku. Bazaar. Architects U. Revazov, P. Yarinovskii, Designer A. Bessonov. Mock-up photo, general view section

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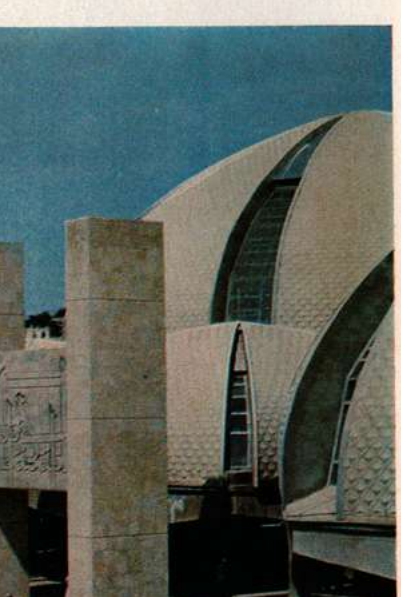

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Material Oppression: The Political Life of Jerusalem Stone

Verdha Anjum

FROM STONE TO RUBBLE

Jerusalem city's primary building material, Jerusalem stone, has been quarried by Palestinian hands since antiquity and has been carved and chiseled to adorn the city's facades. This material holds memories and now also serves as a witness to a continued trauma and colonial erasure of Palestinians since 1948.

"Jerusalem stone is a white and crystalline limestone commonly found in the *Judean Hills* and also in the occupied parts of the West Bank in Palestine".[1] The most famous type of Jerusalem stone, "Meleke," has been used in carving sacred sites and landmarks of this city. From the foundation of the Dome of the Rock to the Stone of Anointing at the entrance of the Church of the Holy Sepulchre, or the Western Wall, presenting the old city's boundary, "Meleke" has been chiseled to form Jerusalem. Since 1917, a law enforced by British colonizers required that all new construction in Jerusalem be faced with Jerusalem stone, a geological feature that evolved into an urban regulation.[2] This stone became the identity of this city.

This text examines Jerusalem stone both as a witness to the current events and political processes in East Jerusalem and the West Bank and as a political instrument to exert power and consolidate the settler-colonial landscape. This text approaches Jerusalem stone as a blend of an archive, labor struggle, and

Figure 1. Israeli forces stand guard as machinery operates amid the ruins of a Palestinian house in the *Sheikh Jarrah neighbourhood, East Jerusalem.* (Photograph by Mat Nashed, January 19, 2022, Al Jazeerah, https://www.aljazeera.com/features/2024/2/25/with-all-eyes-on-gaza-israel-steps-up-demolitions-of-palestinian-homes).

bureaucracy that weaponizes this material. These dimensions explain how geology turns into a site of contestation and material turns into a tool to dominate and occupy.

Today, Israeli settlers use this stone to present a narrative of *permanence*: as a material stone symbolizes longevity, endurance, and strength, and in using Jerusalem stone, the settlers attempt to solidify their presence, marking their territory and presenting colonialism and, occupation as irreversible acts. However, the use of this stone is not only an index of its timeless presence; it also, still, subtly indexes *rupture*. The Israeli settlers' acts of carving their lives and stories into the rocky topography of Jerusalem are coupled with the *colonial erasure* of Palestinian livelihoods. In its chiseled and polished form, this stone indexes strength, endurance, and permanence, while in its afterlife, it bears witness to the displacement, erasure, and trauma that the rubble conceals. Susan Schuppli, an artist-researcher and director of the Centre for Research Architecture at Goldmsiths, brings forth the concept of *material witness* to argue that material acts as an archive of the events, historical processes, and political conflicts; that it interacts with, objects are thus not passive but are non-human entities that not only record but also transform according to their context.[3] In the case of Jerusalem, Jerusalem stone functions as a "material witness"; the polished facade of Israeli settlements in East Jerusalem presents the narrative of permanence and continuity, while the afterlife of this same material, rubble, holds the story of this colonization and erasure.

This dynamic of colonial erasure and displacement of Palestinians while building Israeli settlements is not separate from the oppression that Palestinians endure as laborers. In 1948, the Israeli ethnic cleansing of Palestine, known as the *Nakba* (meaning Catastrophe in Arabic), began, as the land of the West Bank and East Jerusalem was occupied. Since then, a land that was once home to 900,000[4] Palestinians has transformed into a place where life is threatened. In these 76 years, every aspect of Palestinian' life has become controlled by the occupiers of their land. Use of resources, right to own land, a home, and the experience of Palestinians as a labor force are some of the crucial elements while dissecting the relation of Jerusalem stone to the lives of Palestinians in the West Bank.

Palestinians have long quarried and carved this stone; their hands craft the stone that clothes this city's facades. In his review of *Stone Men: The Palestinians Who Built Israel*, Ben Ehrenreich examines the way Andrew Ross, who is a social activist, narrates the stories of Palestinians, highlighting the life stories of Palestinians working in quarries as stone cutters, who shape stone that is, pulled from the same land that once belonged to their families. Ehrenreich's review presents how Labor frames stone not only as a material but as a tool of dispossession.[5]

This stone is then used to develop Israeli settlements in the occupied land of East Jerusalem and the West Bank. In many cases, Palestinians who work to shape this city can't even freely move in this city; they work in the stone quarries which shape Jerusalem, but still their own homes (assets) face constant threat

Journey of Jerusalem stone from being a material to being a witness of oppression.

of demolition, : their work — in the form of this carved stone — remains, but their own shelters turn into rubble. This stone, turned into rubble, bears witness to the political power and displacement of these people and becomes an archive of violence. In 2023, a total of 1,177 structures were reported to be demolished,[6] which displaced 2,296 people.[7] Thus, this stone turns into an enigma: the same materials that Palestinians shape to present permanence, erase their presence when transformed into rubble. There are many stories of those Palestinians who have seen their place of shelter being demolished in front of them. One of the stories is of Fakhri Abu Diab, a 62-year-old male, a leading Palestinian Activist living in East Jerusalem. In February, Israeli authorities bulldozed his home, leaving him in utter despair and nostalgia for the place, which wasn't only a shelter but held memories; no words can explain the pain it inflicts when the same house turns into rubble: "All of the memories, my wife and I together, everything is underneath all the rubble."[8] This intensifies the complexity of ownership and control over land, where their right to live is being criminalized. These demolitions are equal to death. Composed of demolished houses, schools, mosques, and public spaces, rubble embodies both symbolic and physical trauma; it's a tangible result of political power, systematic destruction to erase the life, places, and memories of communities that once existed.

Viewed through the discourse of *political economy*, Palestinian workers in the West Bank sink to the level of commodities. At the same time, Jerusalem's stones transition into rubble, hides a cruel paradox. The area C, covering 60% of the West Bank, is home to approximately 300,000 Palestinians who are under Israeli

Figure 3. Division of the West Bank into three zones of control: *Area A under Palestinian Authority, Area B under Joint control, and Area C under Israeli control.* (Map in the Reuters website, September 22, 2025, Reuters World, https://www.reuters.com/graphics/ISRAEL-PALESTINIANS/STATE-WESTBANK/gkvlaejbwpb/).

Figure 4. Israeli bulldozers demolish a Palestinian home in the *Wadi al-Joz neighborhood, Jerusalem (AFP).* (Photograph by Asharq Al Awsat, November 30, 2025, Arab World, https://english.aawsat.com/home/article/4197551/israel-demolishes-homes-jerusalem-prepares-evictions-sheikh-jarrah).

governance;, these people—who can't own land, resources, or a place of shelter—face extremely harsh conditions at work and are compelled to serve the same capital (i.e., the Israeli economy), feeding the same system, which displaces them and inflicts an unyielding trauma.[9]

In the book *The New Imperialism* by David Harvey, Harvey draws on Rosa Luxemburg's concept of *accumulation by dispossession,* originally described in her 1913 *The Accumulation of Capital.* In this essay, this concept acts as a lens to view the reality of the West Bank. Rosa Luxemburg explains the dual process of accumulation, in which not only the right to own the land and resources transforms into the appropriation of others' assets or properties, but the exchange of products and commodities for the surplus of capital (the Israeli economy) becomes a process of exploitation and aids inequality. By referring to Luxemburg's work, Harvey frames the exploitation of labor as a part of dispossession historically.[10] This explains the dual labor dynamics of Palestinian labor;, whereby workers aren't only dispossessed of their own land but are also exploited as a working class,: forced to work for lower wages compared to Israeli workers, they face a racial wage gap, and are also deprived of health and safety measures. The average pay of Palestinians is 29 NIS per hour, compared to 44 NIS for ethnic Israelis.[11] The cruelty doesn't end there. In 2021, of the 37 deaths reported by the Ministry of Labor on construction sites, 97% were Palestinian workers.[12]

In Area C of the West Bank, Palestinians are denied permits to build infrastructure for their survival, yet are often recruited in Israeli-owned quarries and construction companies to carve the stone that adorns Israeli settlements, building homes on the same land which once belonged to their families. During the 2025 *UN's annual reporting session, Israeli NGO Peace Now* reported that Israel had built 147 settlements and 224 outposts in the West Bank, totaling more than 371 colonies and outposts. 503,732 Israeli settlers were living illegally in the West Bank,[13] and 233,600 were living in East Jerusalem,[14] bringing the total to 737,332 Israeli settlers living illegally in occupied Palestine.[15]

Thus, the dynamics of labor and ownership of land in the West Bank and East Jerusalem reveal everyday violence and exploitation of human life. The land owned by Palestinians is now scarce, the quarries that once worked and benefited Palestinians are now closed, while Israeli settlers quarry the stone from the same land.

COLONIZATION THROUGH BUREAUCRACY

Bureaucracy is one of the most influential forms of non-violent power, capable of dispossession. In the context of Palestine, it plays a huge role in transforming Jerusalem stone from being heritage to being an instrument of colonial rule. This phenomenon reveals a complex system of colonization, where requirements for permits, the imposition of hefty fines, and land control are used to exert power and dominance. Stone has always

been a very important part of Palestinian culture, society, and economy. It comprises 7% of annual GDP growth and provides 20,000 job roles according to the Union of Stone and Marble industry in 2017.[16]

However, the same stone industry that has vital economic importance has become the main tool of political command. Most of the stone quarries and crushers are located in Area C of the West Bank, which is occupied by Israelis, and maintained by Israeli authorities, where neither Palestinians can operate businesses nor live or move around freely. The quarries can be found in Israeli settlements are called *Hebron, Bethlehem, Nablus, Ramallah, and Jenin*. Israel dominates this industry as it manages two-thirds of the stone crushers.[17]

Regulating Palestinian access to stone and quarries is equivalent to controlling Palestinians' access to the economy and to the West Bank. As Palestinians can't freely own and operate quarries, this decreases opportunities to generate revenue, build the Palestinian economy, and generate job opportunities. This not only affects the economy but also leads to displacement due to a lack of economic stability. According to the *Union of Stone and Marble industry*, no new permits for Palestinian-owned quarries have been granted since 1994, previous permits have expired by now, and the few Palestinian-owned quarries that are running in the West Bank are illegal, which adds another bureaucratic oppression i.e. closure of these quarries followed by confiscation of equipment's and imposing hefty fines, recorded to be 40,000 to 120,000 New Israeli shekels.[18] These attempts stop the production chain and put the Palestinians under economic pressure, making it hard for Palestinians to fight for their rights and reopen these quarries. These steps aren't random but are an attempt to deter the economic worth of Palestinians; these political advances make quarrying for Palestinians to be financially and legally precarious. This also affects other industries, including construction, transportation, and the export of this natural resource, which impacts the entire production and manufacturing chain.

This form of oppression becomes more apparent when this data is compared with the statistics of Israeli-owned quarries that are functioning on the same land. The *official Israeli government* reported that Israeli-owned quarries and factories operate several crushers to produce construction material like stone and gravel. It was reported in 2011 by the *Ministry of National Economy of the Palestinian Authority* and the *Institute for Applied Research-Jerusalem (ARIJ)* that Israeli companies produce 12 million tons of construction material from these quarries, comprising a market value of around 900 million USD, of which 756 million USD is from quarrying stone and 144 million USD for gravel.[19] This disparity isn't only economic but also represents the underlying phenomena of colonial erasure and dispossession; the right to own, live, and work in their own quarries has been taken away from Palestinians, depriving them of their economic potential. The presence of this natural resource in area C presents a huge worth and economic potential. The

quarriable land in the West Bank (Area C) is around 20,000 dunums, which can provide 30 billion worth of Jerusalem stone.[20] These records present the intersection of colonialism and the economy. The corporate sector has historically advanced colonial endeavors and the associated genocide with these colonies. Someone's misery becomes a platform of opportunity for others. Commercial interest aids the dispossession of indigenous people, their land, and their possessions.

OWNERSHIP: SILENT COLONIAL INFRASTRUCTURE

Colonialism is often regarded as physical oppression, but the bureaucratic regimes presented in the case of stone quarries in occupied parts of Palestine present another side of this colonial rule. The *Israeli Civil Administration* allows less than 1% of land for Palestinians to construct, most of which is already built.[21] Theoretically, Palestinians are allowed to construct on this 1% of available land, but they have to go through a permit process, which is close to impossible for Palestinians to go through, further limiting access to land for Palestinians. The percentage of approval of the permits has decreased from 97% to 1.6% between 1972 to 2010.[22] To own a quarry requires the development of complex documentation justifying the conversion of land use, environmental concerns, which makes it difficult for Palestinians to follow, as they are trapped in this bureaucratic chain of rules and regulations.

Thus, in the context of Palestine, these bureaucratic policies have turned geology into politics; stone isn't only a material now but an instrument to exert power; it carries the weight of the colonial rule not with violence but through paperwork. The hills that carry this Jerusalem stone and were once quarried freely by Palestinians are now bordered by this bureaucracy; the area has turned into a *land of contestation* where one act is legal for someone and out of bounds for others, creating massive disparities between different communities. Stone here serves as a witness to all these acts of occupation, dispossession, and exploitation; it acts as an archive in its life and in its afterlife. These regimes may appear to be just policies for regulating land use and environment, but deep down, there is a structure of dominance that changes the landscape and writes a new narrative of the land through administrative ink. Thus, the journey of Jerusalem stone descends from its glory to rubble, from being a cladding to being dust under feet, and the stone becomes a collection of the narratives of the displaced laborers. This journey reveals a cruel paradox of domination and colonial rule in which earth itself has become a tool.

Figure 5. View of part of the *Israeli settlement* of *Maale Adumim*, Israeli-occupied West Bank. (Photograph in Reuters Website, displayed in :, Tribune website, August 21, 2025, Tribune, https://tribune.com.pk/story/2562355/tel-aviv-approves-major-west-bank-settlement).

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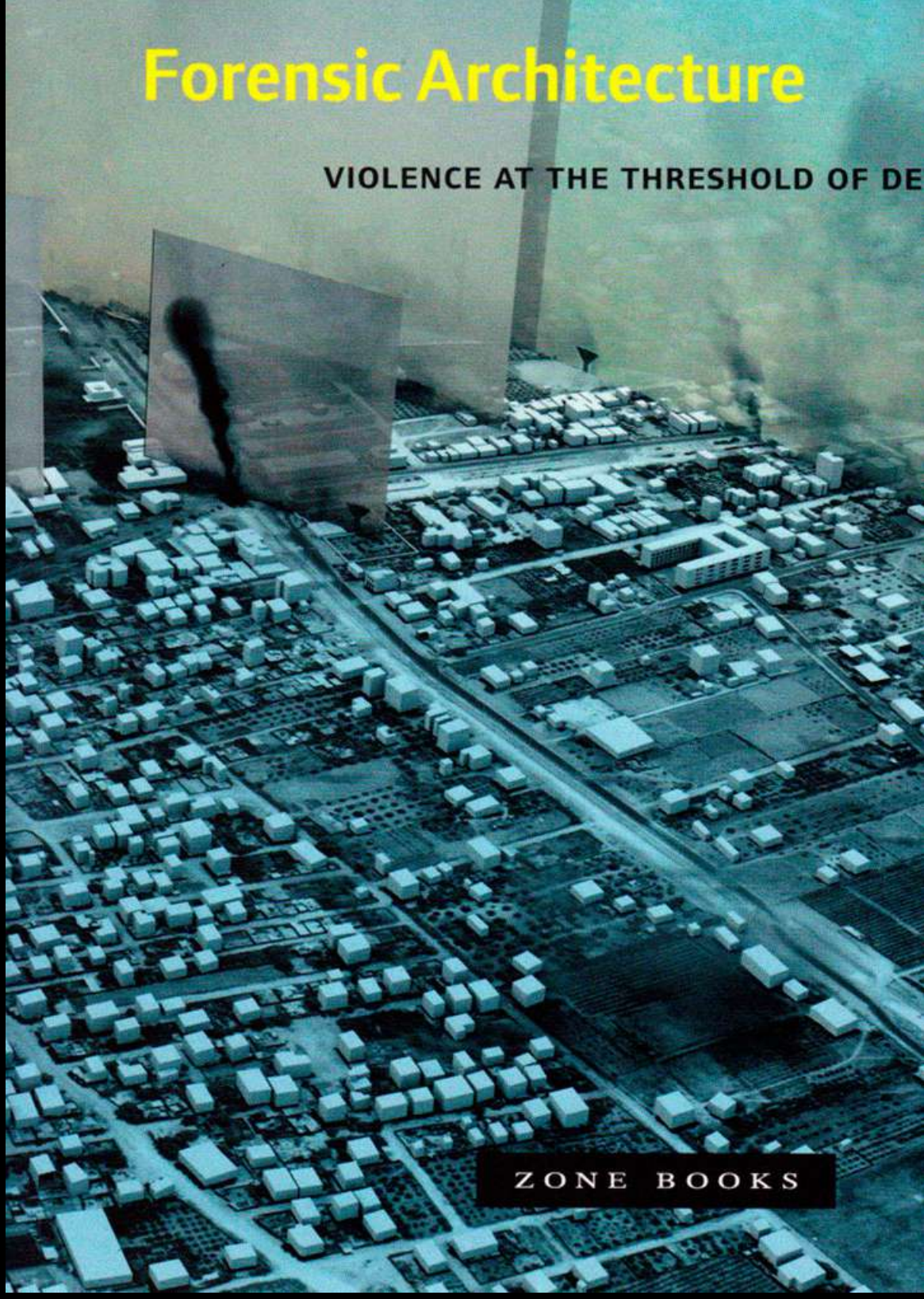
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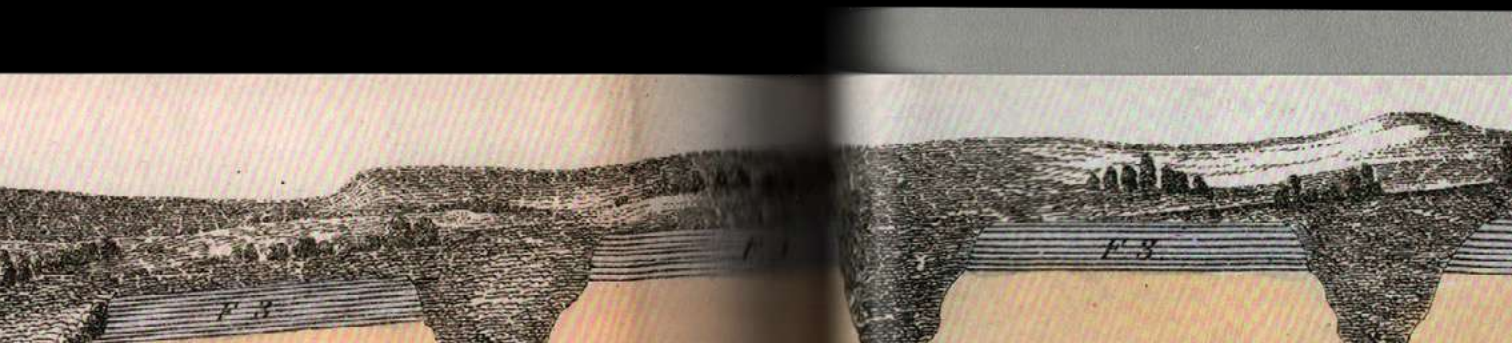

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Cities of Copper

Paula Fischer

Can the natural occurrence of highly sought-after materials be an (economic) blessing? Or is there a "natural resources curse", that implies negative consequences for the environment, the citizens and the society of the finding places of these materials?[5]

In this essay I want to explore this question through the lens of copper mining in Chile, looking at the position of copper mining in between its importance for the national identity and the economic dependency on it, tracing the historic continuity of copper miner strikes, and lastly trying to understand Chile's position on the world market, and towards its main trade partners: the U.S. and China.

All rare earths and non-renewable materials, including copper, are rising in value. This is the result of increasing extraction costs. Copper mining is becoming more time-consuming, needs more labour, and requires more complicated processes. Yet, deposits are yielding less material and are becoming harder to reach, aggravating the extraction process. The main reason for the rising costs, however, lies in the high demand for copper: as an extraordinarily good conductor of electricity and heat, it is essential in many sectors of modern cities.[6] Ralf Schmitz, CEO of the Association of German Metal Traders, breaks it down quite clearly by saying that, "copper is simply the best conductor of electricity. And we need more and more energy and electricity"[7]. This explains the importance of copper for cabling, pipes, and connectors of power grids and data centres. It also makes copper indispensable in the world's pursuit of a greener future, as "copper is central to the global transitions toward renewable energy and a digitally connected economy".[8] According to Camilla Hodgson, its demand "is expected to grow driven by its use in the data centres that power artificial intelligence", which will become increasingly important.[9] The Critical Raw Materials Act anticipates "copper demand [...] to grow by 35% in the EU and to double globally by 2050"[10] – in fact, De Wachter and Nuño point to "clean electricity [as] the largest consumer of copper by 2040", while also claiming that there

are “enough resources [...] to support the energy transition”.[11] While this may be true, the demand is contrasted with “slow growth of new supply”.[12] Since copper has been extracted for a long time, deposits become more and more difficult to reach and the copper content of those deposits is quite low. The opening of new mines requires a lot of monetary investment and time. Besides, copper deposits are very unevenly distributed on the planet. More than “50 per cent of reserves are concentrated in five countries”: Chile, Australia, Peru, the Democratic Republic of Congo and the Russian Federation.[13]

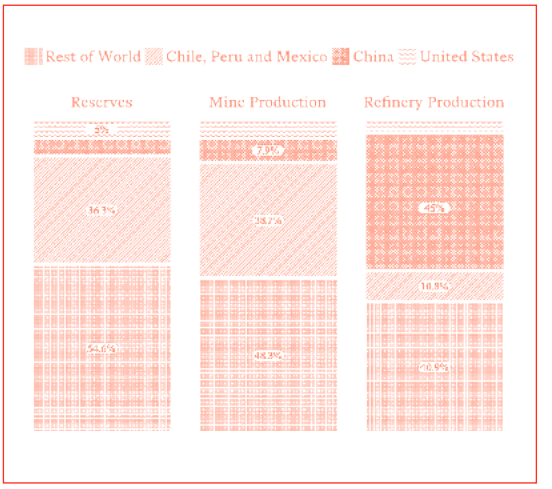

Figure 1. Copper Reserves, Mine Production & Refinery Capacity by Region – 2024. Baskaran et al., “Latin America: The World’s Copper Stronghold”, Center for Strategies & International Studies, 13 November, 2024, https://features.csis.org/copper-in-latin-america/.

EXTRACTIVISM IN CHILE

Chile is the largest producer of unrefined copper in the world, accountable for “24 percent of global copper production”.[14] Extraction, also of other minerals and resources, in Chile has a long history that goes back many centuries and that became prevalent during colonial rule. It was after 1840, however, that the introduction of new processing technologies made copper mining more efficient, and by the middle of the 19th century Chile was already the country that produced most copper in the world. Many of the country’s copper mines were started by foreign companies that began their operations already in the very early 20th century. At that point, it was common for miners’ dwellings to be built right next to the mines. This started with the company towns built for saltpetre miners, but the high point of saltpetre or nitrate extraction only lasted for around 100 years until the late 1920s.[15] The same model of building towns for miners right next to the mines was continued for copper miners – e.g. the company town Sewell, which was abandoned after the state mining company *Codelco (Corporación Nacional del Cobre)* took over the corresponding mine El Teniente in the 1970s.[16] The Chuquicamata company town was abandoned in 2007 because it provided an unhealthy environment.[17] These historical company towns embody a form of extractivism in which the mining was put at the absolute centre of people’s lives, and the mining companies created their own infrastructure in the middle of the desert, with residential areas, schools, shops, their own currency, and hotels theatres and churches.[18]

Company towns are now relics of the past, but extractivist projects remain a very important part of Chile’s economy, with copper mining being responsible for 10.9% of Chile’s GDP in 2022 and 11.9% of its GDP in 2023.[19,20]

The Uruguayan ecological and social researcher Eduardo Gudynas states that “extractivisms are actually plural”: they are “always local [...] but at the same time [...] tied to globalization, because they are the first link in international marketing and production chains”.[21] Extractivisms can be categorized into various phases depending on their quantity and intensity, on the use of other resources for this extraction, and according to whether the extracted resources will be used locally or are destined for the global commodity trade.[22] Throughout his text, Gudynas uses the term “spills” to refer to the effects these extractivisms have on every aspect of life and on the areas where the extractions are taking place: extractivisms affect the lives of workers, the environment, the local economy, and the whole society. They “reinforce the commodification of nature”, downgrading it to a cluster of more or less buried resources.[23] Gudynas goes so far as to declare that the upholding of the importance of extractivisms for the local economy goes hand in hand with a “weakening of environmental regulations” for the sake of this extractivism, the tolerating of human rights violations and poor working conditions, and the turning of a blind eye to corruption, as well as with profound territorial shifts, and even an altering of the social fabric of entire communities or societies.[24]

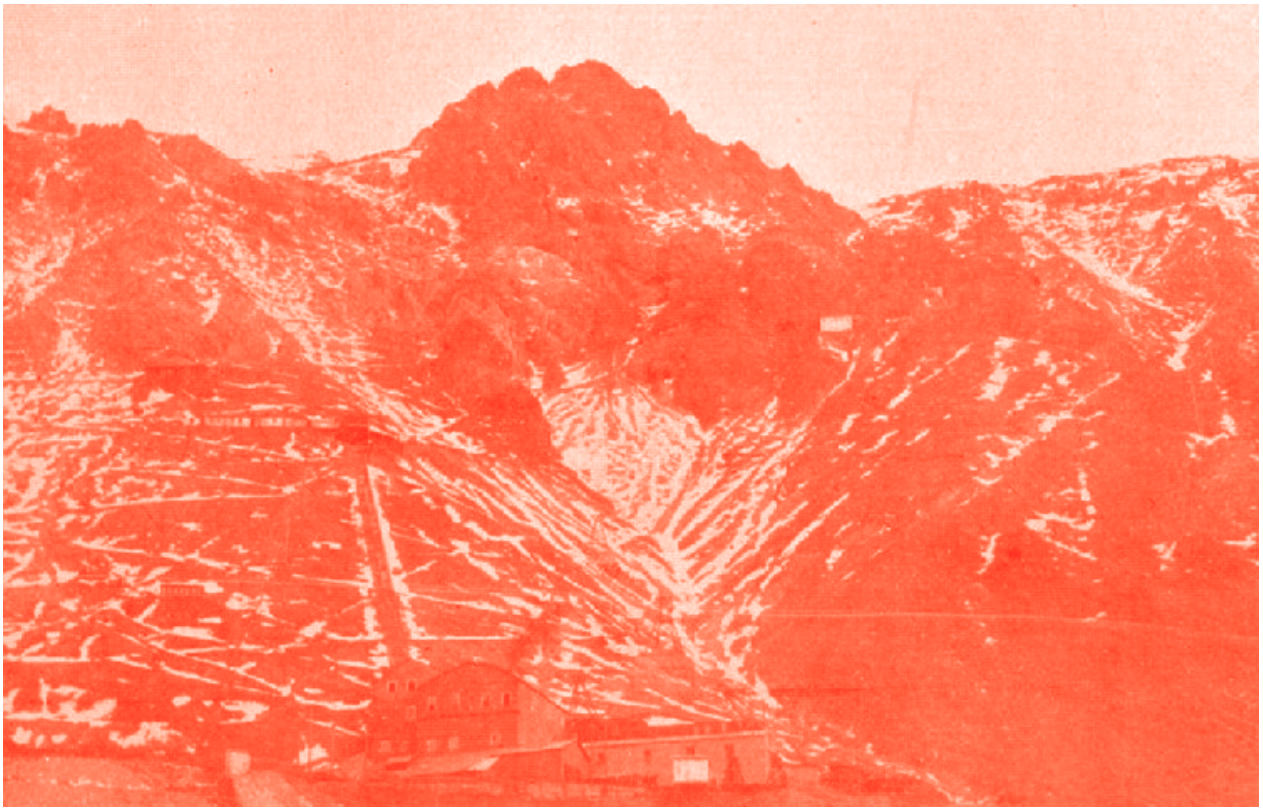

Figure 2. The El Teniente Mine, 1912. Julio E. Maldonado and Luis Serrano R., eds., "Albúm: vistas del mineral El Teniente, Braden Copper Co.", 1912, Memoria Chilena, Biblioteca Nacional de Chile, accessed 28 July 2025, https://www.memoriachilena.gob.cl/602/w3-article-80775.html.

NATIONAL IDENTITY OR DEPENDENCY?

Copper mining and its trade are important for the Chilean economy, which explains the upholding of the watchwords "we are a mining country".[25] At the same time, the large copper deposits are what Gudynas calls the "natural resources curse",[26] which enforces the reliance and dependency on a material and its value on the world market, even though "these commodities [are] obviously undervalued, since the economic costs due to social and environmental impacts are not included"[27] – not to mention costs that cannot be measured in monetary terms. Besides, the raw materials trade, especially in copper, is dominated by "global oligopolies in natural resources", a category which includes many of the companies active in Chile.[28]

Figure 3. Aerial view photo of the *Chuquicamata* mine, around 1989. Memoria Chilena, Biblioteca Nacional de Chile, accessed 28 July 2025, https://www.memoriachilena.gob.cl/602/w3-article-98725.html.

A countermeasure against this dynamic of control through globally acting companies, was concluded in Chile in 1971: under Salvador Allende's presidency, in order to protect Chile's (copper) mining industry, its nationalisation was implemented through the Ley 17.450, which declared that,

> The State has absolute, exclusive, inalienable and imprescriptible ownership of all mines, deposits, metalliferous sands, salt flats, coal and hydrocarbon deposits, and other fossil substances", as well as that, "In the case of the nationalisation of mining activities or companies [...] the law classifies as Large-Scale Mining [Grán Minería], nationalisation may include the companies themselves, rights therein, or all parts of their assets.[29]

Figure 4. "Chile puts on longs pants, now the copper is Chilean!!". Poster by Antonio and Vicente Larrea Vicente, 1971, Memoria Chilena, Biblioteca Nacional de Chile, accessed 28 July 2025, https://www.memoriachilena.gob.cl/602/w3-article-333727.html.

Figure 5. Image from the magazine *Revista Ahora* for the nationalisation of copper in 1971, it reads: From the 2nd of April of 1971, Chile sells its copper directly to all countries of the world. Rodrigo Cordero, "Una defensa poética de la nacionalización".

In this effect, the state-owned copper mining company Codelco, was created, which still owns seven main mines in the country: Chuquicamata, Ministro Hales, Radomiro Tomic, Gabriela Mistral. Salvador, Andina, and El Teniente. The nationalisation was celebrated as a reaction to the relentless "persistence of colonial relations of dependency"[30], which was still affecting foreign influence in this sector. Companies from Europe and the U.S. had been criticising trade restrictions, workers' claims for higher salaries, and "Latin America's dream of economic independence".[31] All of this, to quote Pablo Neruda, made it seem "as if everything goes when it comes to defending old and incomprehensible privileges" for those who swept in early on in the extraction of copper in Chile.[32] Allende's policies of protecting Chile's economy directly resulted in U.S. companies losing their influence in the mining sector (among other sectors important for the U.S.), and brought up strong U.S. efforts to evade this very process.

Only two years later, in 1973, in time with brutal regime changes all over the continent, democracy was overthrown and the military junta took power. This coup d'état did not come out of nowhere, it fell into a continuation of a colonial logic, now taken over by the U.S. (and the UK), who, through their "foreign policy [...] attempted to pull developmentalist governments into the binary logic of the Cold War".[33] In her very important book *The Shock Doctrine*, Naomi Klein describes Chile's situation before the coup as "wanting [a] strong social safety net, its protection for national industry, its trade barriers", reflected especially in the nationalisation of (copper) mining among other industries.[34] The U.S. interference was ideological: it made Chile a "testing ground for intellectual influence", infamously for the Chicago School of Economics scholars who began their destructive work by educating Chilean and other Latin American students to believe in an "entrepreneur's utopia" – one that mainly pursued U.S. interests in the country.[35] The CIA acted here as the long arm of the U.S. government; to quote Orlando Letelier, the Chilean ambassador to the U.S. at the time, "it was an equal partnership between the army and the economists".[36]

Pinochet "privatized some [...] state-owned companies [...]; he allowed [...] new forms of speculative finance".[37] Neoliberal reforms were introduced, and Chile was opened up to foreign investment through a series of new laws and statutes, notably the statute for foreign investment, or "DL 600", which was meant to "deregulate the flow of foreign direct investments" and resulted in a "first wave of privatisations" between 1973 and 1980.[38] This law and other regulations that followed must be understood as an effort to undo or (at least) subvert the nationalisation, as it also resulted in the almost elegant continuation of foreign investments that a hundred years earlier had

Figure 6. "Copper fights for liberty", 1983. Javiera Pizzoleo, Foto from the book "Seguel el Rebelde", in: "La huelga de 1983 que dejó a miles de mineros sin trabajo", *reporte minero & energético*, 11 September 2023, https://www.reporteminero.cl/noticia/noticias/2023/09/huelga-1983-trabajadores-del-cobre.

meant the foundation of companies from mainly the US and the UK. The main issue of these policies, apart from being introduced by a military dictatorship, was that the advantage for the local citizens and economy remained only moderate, as the Chilean economy was to go through, "a process of growth, not of development"[39], as again companies from outside the country benefited from its natural resources; although not exclusively. Codelco was able to continue working, and kept ownership of among others, the Chuquicamata and El Teniente mines. Today, it still owns 30% of Chile's mines.[40]

EMPOWERMENT AND SOLIDARITY

Having already been involved in the pursuit of the expulsion of foreign ownership of mines, the workers continued their political involvement after the democratic government had been overthrown. Copper miners of the large copper mines have been at the heart of a range of miners' protests and strikes; and many of these protests did not remain inside the community of organised or unionised copper miners but activated larger struggles for change.

In 1958, 6,000 miners of the Chuquicamata mine were on strike for 43 days, and again in 1960 for 47 days.[41] In 1966, El Teniente miners remained in protest for three months after salary negotiations had failed. Miners of other large mining companies, those of the mining camps in Potrilleros, El Salvador, Llanta, and Barquito joined the strike in solidarity, and in the common fight for better salaries.[42] Several union leaders were arrested, and the strike led to violent confrontations between miners and the police and military; ultimately, five miners were killed.[43] In 1971, miners of the El Salvador mine protested the nationalisation of copper during a 10-day-long halt.[44] Further, in April of 1973, in the face of major disagreements about salaries between the mining unions and mining companies, the miners of El Teniente entered into strike.[45] In June of the same year, miners at El Teniente went on another strike over anti-Allende tendencies of one of their unions and miners at the Chuquicamata mine were on strike for 40 days. Under the military dictatorship's control and extreme subjugation of any dissent, "strikes disappeared between 1974 and 1978".[46]

Ten years after the beginning of the dictatorship, however, in 1983, copper miners and the Confederation of Copper Workers called for a shutdown and protest on a national level, activating thousands, also from the civil society, in joining them. The protest started at the Salvador mine and other mines run by Codelco – namely, workers at El Teniente, Andina, and Chuquicamata – joined in. One thousand workers were laid off as a result of the protest. Many of the Codelco miners were arrested and many were disappeared, with 18 of them remaining disappeared until today.[47] In 1991, a month-long strike by miners of the El Teniente mine lead to losses of revenue of US $450.000 per day.[48] A strike by Chuquicamata miners in the same year expressed the strength of the unions and their "wish for participation" in the new democracy (after the end of the dictatorship rule in 1990).[49] In 2006, as the price of copper rose

on the world market, the Minera Escondida unions were trying to collectively negotiate salary adjustments and went on strike when their demands were not met.[50] According to Fracisco Zapata S., this strike shows the "continuities" in the long protest culture of copper miners.[51] In 2015, layoffs of 650 people as the result of decreasing copper prices and production at the El Abra mine[52] and the dismissal of 1,200 sick workers at the Minera Escondida led to hunger strikes by three union leaders, a family member of one of the union leaders, and three workers.[53] A 43-day-long strike in 2017 by Minera Escondida miners accomplished an end of conflict bonus and adjustment of salaries; it also caused revenue losses of around 700 million US dollars.[54] In 2019, nationwide protests for a more just society "left at least 16 dead and more than 6,000 detained", and while some mining companies called for joining the protests, others continued working as normal.[55] Finally, in 2023, access to large mines in Northern Chile was blocked during a citizen protest ignited through a shootout involving the police; the protest happened in light of the increased crime rates in Calama, which is the site of Codelco's Chuquicamata and three more important copper deposits. In 2024, a strike at Minera Escondida erupted after a labour dispute; unions accused Australian company BHP of anti-union measures.[56] The latest strike, happening in October 2025 at the Minera Antucoya ended after a few hours.

This quite extensive – but in no way complete – list of strikes by copper miners shows the long history of solidarity and organisation of miners. The time of the dictatorship acted as a break from these strikes, although the large protest of 1983 showed that they could not be completely stopped, although the human cost was immense. The Codelco miners are not only organised in local unions, but those unions are in turn part of the overarching Copper Workers' Federation, which promotes solidarity, syndicalism, and social well-being for their members.[57] This large number of strikes shows on the one side, the urgency that lies in the conflicts over wages and working conditions, and that this has to be renegotiated continuously. On the other hand, it shows that the workers are not just organised, but that a culture of protest is possible and is actually able to push through workers demands against the companies they work for.

Figure 7. "Chile welcomes Manuel Bustos" [union leader and first president of the Unitary Confederation of Workers], October 1983. Coordinadora Nacional Sindical de Chile, pamphlet, Memoria Chilena, Biblioteca Nacional de Chile, accessed 28 July 2025, https://www.memoriachilena.gob.cl/602/w3-article-77736.html.

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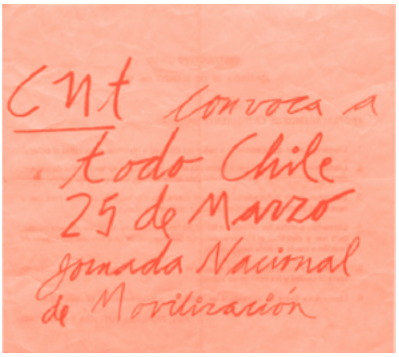

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A NEW ACTOR ON THE COPPER STAGE

Chile's economy relies on the export of natural resources, especially copper, but is at the same time dependent on those who extract the material within the country and those who buy it in large quantities. Maristella Svampa introduces the term "neo-extractivism" to capture the vastness of today's extractive projects. She speaks of the "hierarchization between colonial territories and imperial metropolises", meaning that in some parts of the world the workers, the land, and the nature are being exploited for the benefit of other parts of the world.[58] We cannot go back 500 years in this essay, but need to keep always in mind that the legacy of colonialism lives on in the global inequalities that condition this inherent hierarchy. The influence of the U.S. – not only in Chile but in many parts of Latin America – was, on the one hand, ideological, at the same time mainly pursued economic interest. This is very visible in the abandoned company towns and the voids left by the extracted ore-containing earth in the many U.S-owned mines. Chile has, however, had another main partner in trade for a long time: China, "which served as both the main partner and the raw material demander".[59] China buys roughly 70% of Chile's raw copper by signing long-term offtake contracts.[60] And it refines most of the raw copper extracted in Chile.[61] China holds the worldwide monopoly in smelting, and "produces 45 percent of the world's refined copper".[62] This is happening through the Belt and Road Initiative, which Chile joined in 2018, in a long tradition of good diplomatic relationships with China since the 1970s and a Free Trade Agreement since 2006. The relationship Allende had built with China remained more a connection of diplomacy in the beginning, as China was not in the financial position to provide financial backup.[63] The connection most important for the matter of copper came in 1995, when Chile offered a Free Trade Agreement to China. For China, this would have meant the coverage of their copper needs as "Chinese demand for construction materials was exploding", but no contract came to be.[64] When the FTA was ultimately confirmed in 2006, China was at the high point of the "construction boom" and therefore in need of large amounts of copper.[65] Since the FTA, "85% of Chilean exports to China have been copper or other ores" to China for this need .[66] From Chiles's perspective, China is a steady consumer of copper, among many other goods exported from Chile. The problem is that copper mining does not create a large number of jobs, meanwhile requiring a lot of investment.[67] The part of the copper trade that actually creates value, namely its refinement, does not lie in Chilean hands, as there is a large disparity in the smelting of copper: "Chile produces 28% of the world's copper, but only refines 8%, meanwhile China produces 9% and smelts more than a third".[68] China's position in Chile is secured through an overall positive relationship between the countries and long-term contracts securing the continuity of the copper trade. Chinese attempts to actually buy shares in Chilean copper mines, however, have been halted, after a planned sale of parts of a Codelco owned mine to a Chinese company was stopped through the "threat of a strike by the labour union".[69]

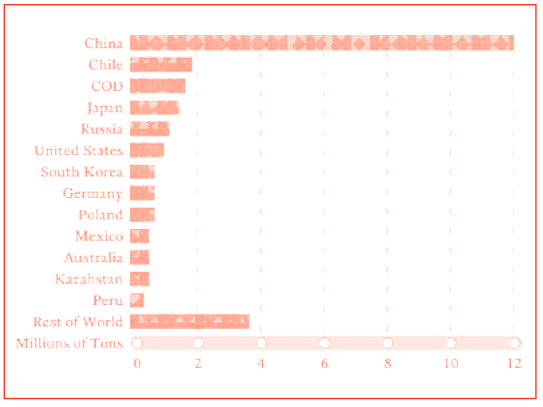

Figure 10. Refined Copper output per Country – 2023. Baskaran et al., "Latin America: The World's Copper Stronghold", Center for Strategies & International Studies, 13 November 2024, https://features.csis.org/copper-in-latin-america/.

NEW PLACES OF EXTRACTION

This essay is titled "Cities of Copper", because it allowed me to draw a connection from the early times of copper extraction to the importance of the material for today's economies. The company towns of the 20th century, the cities and miners' camps erupting with strikes and shutdowns, and the modern cities that strive for a transition towards clean energy – but also modernisation through the reliance on AI and renewed power grids – it all shows that copper is indispensable.

This essay has focused on Chile – as an important producer of copper, as a country historically caught between powerful forces on the

world stage, and as one that in a way has made copper part of its national identity. This work has also hinted at the effects of extractivism(s) and its neo-colonial structures on the local and global level. In the specific case of Chilean copper production, measures were taken as early as the 1950s to tax foreign capital, which ultimately led to the official nationalisation of copper in 1971. The difficult labour disputes of the copper miners have resulted in strong trade unions, always backed up by the result of this nationalisation: the country still holds power over a significant part of its copper mines through the Codelco ownership, which is a protection of the large-scale copper mining in the country.

Other countries live the same "natural resources curse" but in a less autonomous way.[70] China is only the latest actor on the stage of those taking their interests abroad in a way that can only be called "neo-colonial" (talking here again about Europe and the U.S. might not be necessary). But China has new strategies, cumulated in the Belt and Road Initiative, through which it cooperates with more than 150 countries. The strategies it applies here do not only consist of direct investments or purchase of individual mines (or companies, or networks); in Peru, China owns and exploits three important mines: Toromocho, Las Bambas and Austria Duvaz, and it invests in the Democratic Republic of Congo's Kamao-Kakula and Tenke Fungurume mines.[71] China's main strategy consists in the building of mega-projects that create influence and revenue through providing infrastructure. Just one example of this new strategy is the Chancay port in Peru, opened in 2024, which increases the capacity for more direct trade connections, but also makes Peru, one of the next most important copper producers, more dependent on China.[72]

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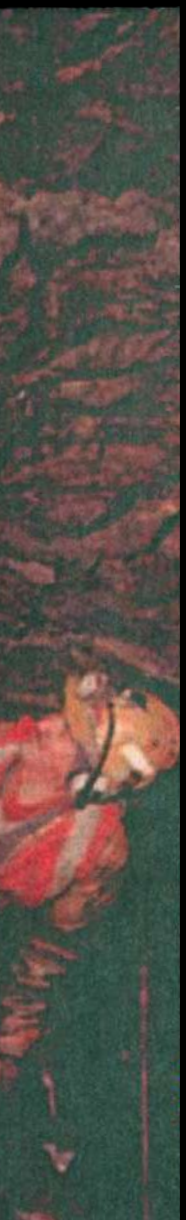

сожжены целые кварталы жилых домов. Город в короткий срок был восстановлен. В соответствии с генпланом (руководитель А. Малышенко) проведена большая работа по реконструкции движения внутригородского транспорта, развитию автомобильных дорог и благоустройству.

По своей масштабности и застройке, уровню озеленения и благоустройства проспект Карла Маркса стал одним из красивейших в республике. Комплексная застройка сосредоточилась в районах улиц Рабочей и Кирова. Новые кварталы многоэтажных жилых домов появились у набережной. Новый мост через Днепр связал левый и правый берег.

При составлении нового генерального плана Запорожья (архитекторы И. Малоземов и Л. Дмитриевская) была воссоздана идея, заложенная в довоенном генеральном плане. Проспект Ленина авторы разделили на три композиционные части с учетом конкретных условий местности и градостроительных требований. В районе Вознесенки развернулось комплексное многоэтажное жилищное строительство со зданиями культурно-бытового обслуживания, озеленением и благоустройством (архитекторы Д. Моторин, Ю. Романенко, М. Савченко

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