Paths to Peace? Infrastructures, Peace and Conflict:

An Introduction

Since its inauguration in 1869, the Suez Canal has been more than a vital artery for global trade; it has played a central role in wars, conflicts and attempts for conflict resolution. Starting life as an imperial infrastructure, the artificial waterway initially provided France and Britain with a vital link to their colonies in Africa and Asia as well as a chokepoint for regulating mobility.[1]

After the Second World War, it became a major flashpoint of postcolonial, international, global and regional conflicts. During the 1956 Suez Crisis, the military intervention by Britain and France, with support from Israel, unsuccessfully sought to overturn the nationalisation of the water infrastructure by Egyptian President Gamal Abdel Nasser that had de facto removed it from their control.[2]

If this postcolonial conflict revealed the waning influence of Europe's two main colonial powers in the Middle East, the Suez Crisis also exposed the new power constellations in

[1] Valeska Huber, *Channelling Mobilities: Migration and Globalisation in the Suez Canal Region and Beyond, 1869-1914* (Cambridge: Cambridge University Press, 2013).
[2] Scott Lucas and Ray Takeyh, "Alliance and Balance: The Anglo-American Relationship and Egyptian Nationalism, 1950-57", *Diplomacy and Statecraft* 7, no. 3 (1996), 631-51.

the Cold War, especially growing superpower influence versus the weakening role of Western Europe.[3]

After the Suez Canal had featured in the Six-Day War (1967), it figured in the 1979 peace treaty between Egypt and Israel. In more recent years, piracy off the Somalian coast and attacks by Iranian-backed Houthi rebels on shipping in the Gulf of Aden and the Red Sea have posed new threats to traffic through the waterway. That the Houthi assaults led to a reduction in the number of passages through the Suez Canal, rising shipping costs and significant disruptions across global logistics chains also demonstrates the vulnerability of such critical infrastructures by local or regional actors in the twentieth-first century.[4] Finally, the fact that the Houthis linked their actions to demands that Israel cease its campaign against Hamas in Gaza, brought to light how tightly mobility infrastructures are intertwined with violent conflicts, wars and global conflict resolution efforts.

The example of the Suez Canal demonstrates the potential for the study of infrastructures through an approach that combines transport and mobility history with questions and approaches from historical peace and conflict research. Yet, scholars have thus far studied infrastructures in peace and conflict either through the lens of transport and mobility history or historical peace and conflict studies. But there has not yet been an explicit combination of these separate fields in the study of infrastructure.

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[3] G.C. Peden, "Suez and Britain's Decline as a World Power", *Historical Journal* 55, no. 4 (2012), 1073-96; Matthew Jones, "Anglo-American Relations after Suez, the Rise and Decline of the Working Group Experiment, and the French Challenge to NATO, 1957-59", *Diplomacy and Statecraft* 14, no. 1 (2003), 49-79; Ralph Dietl, "Suez 1956: A European Intervention?", *Journal of Contemporary History* 43, no. 2 (2008), 259-78.
[4] In 2021, the Panamanian container ship Ever Given ran aground in the Suez Canal and had had similar, adverse effects on global supply chains.

This special issue of *The Journal of Transport History* thus sets out to explore the relationship between transport infrastructure, peace and conflict from an interdisciplinary perspective, pioneering historiographical work that integrates transport infrastructure history with historical studies of peace and conflict. The key argument is that understanding infrastructure, peace and conflict requires integrating concepts from peace and conflict studies while highlighting the material and physical structures of the past. Mobility infrastructure provides a unique window onto this connection.

Key Concepts and Terminology

Prior to mapping out proposals for such an integrated approach to infrastructure, it is important to define key concepts and terminology. Mobility infrastructures—such as roads, tunnels, railways and bridges—have long captivated the attention of scholars across history, anthropology, geography, sociology and science and technology studies. Rather than viewing these structures as mere technical systems, scholars interpret them as representations and manifestations of a given society's political, economic and cultural values. *Infrastructure* as a term first emerged in the nineteenth century in the context of French railway projects and broadened post-1945, especially within the North Atlantic Treaty Organization's military discourse. Its scope today is expansive. Infrastructure now

encompasses not only mobility, energy and communication networks but a range of services including hospitals, schools and media platforms.[5]

Scholars define *infrastructure* in various ways. Brian Larkin calls it "conceptually unruly", describing it as "matter that enables the movement of other matter" and as essential to societal function by enabling other systems to operate.[6] Paul Edwards sees infrastructure as crucial to modern societies and the experience of modernity.[7] Sociologists Susan Leigh Star and Karen Ruhleder argue that infrastructure is relational, becoming meaningful only in connection with organised practices.[8] This relational approach has shaped scholarship on infrastructures, framing them as *socio-technical systems*—networks moulded by social and technical factors.[9]

In a similar fashion, this special issue employs broad concepts of *peace* and *conflict* to arrive at a fuller understanding of the processes of integration and disintegration – social, political and territorial – from the perspective of transport infrastructures and mobility history. In this, it ventures beyond the common perspective of international history and diplomacy, considering instead also broader issues such as social inequalities,

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[5] Ashley Carse, "Keyword: Infrastructure – How a Humble French Engineering Term Shaped the Modern World", in Penny Harvey, Casper Bruun Jensen and Atsuro Morita (eds), *Infrastructures and Social Complexity: A Routledge Companion* (London: Routledge, 2017), 27-39, here 28; Dirk van Laak, "Der Begriff Infrastruktur und was er vor seiner Erfindung besagte", *Archiv für Begriffsgeschichte* 41 (1999), 280-99, here 281.

[6] Brian Larkin, "The Politics and Poetics of Infrastructure", *Annual Review of Anthropology* 42 (2013), 327-43, here 329.

[7] Paul N. Edwards, "Infrastructure and Modernity: Force, Time, and Social Organization in the History of Sociotechnical Systems", in Thomas J. Misa, Philip Brey and Andrew Feenberg (eds), *Modernity and Technology* (Cambridge, MA: MIT Press, 2003), 185-225, here 186.

[8] Susan Leigh Star and Karen Ruhleder, "Steps Toward an Ecology of Infrastructure: Design and Access for Large Information Spaces", *Information Systems Research* 7, no. 1 (1996), 111-34, here 113.

[9] Penny Harvey, Caspar Bruun Jensen and Atsuro Morita, "Introduction: Infrastructural Complications", in Penny Harvey, Caspar Bruun Jensen and Atsuro Morita (eds), *Infrastructures and Social Complexity: A Companion* (London: Routledge, 2017), 1-22, here 5.

racism and social peace.[10] In particular, the categories of *peace* and *conflict* (not *war*) and

their relationship with each other are central to historical peace and conflict studies.[11]

Contributors to this special issue generally operate with a broad concept of *peace*.

This draws inspiration from Johan Galtung's idea of "positive peace", which he defined as

"absence of structural violence" or "'social injustice'".[12] As a result, they view *peace* as a

dynamic *process* that involves or revolves around infrastructures.[13] In relation to

infrastructure, spatial dimensions of peace are highly relevant as through "peace spaces",

for example.[14]

Similarly, *conflict* is defined here in a broad manner that allows for consideration of

a range of issues beyond armed conflict.[15] Since conflicts around infrastructures have

commonly played out through multifaceted forms of violence, *violence* marks a core

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[10] Daniel Gerster, Jan Hansen and Susanne Schregel (eds), *Historische Friedens- und Konfliktforschung. Die Quadratur des Kreises?* (Frankfurt: Campus, 2023); Rob Nixon, *Slow Violence and the Environmentalism of the Poor* (Cambridge: Harvard University Press, 2013).

[11] Susanne Schregel, Jan Hansen and Daniel Gerster, "Historische Friedens- und Konfliktforschung: Die Quadratur des Kreises?", in Daniel Gerster, Jan Hansen and Susanne Schregel (eds), *Historische Friedens- und Konfliktforschung: Die Quadratur des Kreises?* (Frankfurt: Campus Verlag, 2023), 27-60, here 38; Christian P. Peterson, Michael Loadenthal and William M. Knoblauch, "Introduction: Disciplines in Dispute – History, Peace Studies, and the Pursuit of Peace", in Christian P. Peterson, Michael Loadenthal and William M. Knoblauch (eds), *The Routledge History of World Peace Since 1750* (London: Routledge, 2019), 1-29; Peterson, Christian Philip, Charles F. Howlett, Deborah D. Buffton and David L. Hostetter, "Introduction: The Search for Global Peace: Concepts and Currents in Twenty-First-Century Peace History Scholarship", in Charles F. Howlett, Christian Philip Peterson, Deborah D. Buffton and David L. Hostetter (eds), *The Oxford Handbook of Peace History* (Oxford: Oxford University Press, 2022), 1-68.

[12] Johan Galtung, "Violence, Peace, and Peace Research", *Journal of Peace Research* 6, no. 3 (1969), 167-91, here 183 (on Galtung, see: Peterson, Loadenthal and Knoblauch. "Introduction: Disciplines in Dispute – History, Peace Studies, and the Pursuit of Peace", 3-4).

[13] Jenna M. Loyd, "Geographies of Peace and Antiviolence", *Geography Compass* 6, no. 8 (2012), 477-89, here 479.

[14] Birte Vogel, "Understanding the Impact of Geographies and Space on the Possibilities of Peace Activism", *Cooperation and Conflict* 53, no. 4 (2018), 431-48.

[15] Susanne Schregel, Jan Hansen and Daniel Gerster, "Historische Friedens- und Konfliktforschung: Die Quadratur des Kreises?", in Daniel Gerster, Jan Hansen and Susanne Schregel (eds), *Historische Friedens- und Konfliktforschung: Die Quadratur des Kreises?* (Frankfurt: Campus Verlag, 2023), 40-41.

concept within historical peace and conflict research that is relevant to the theme of this special issue and thus requires some definitional clarity.[16]

At a basic level, the present volume follows Galtung's seminal definition that "*violence is present when human beings are being influenced so that their actual somatic and mental realizations are below their potential realizations* [orig. emphasis]".[17] Similar to the wide concept of *peace* that contributors apply, the broad notion of *violence* employed here includes "structural violence as *social injustice* [orig. emphasis]"[18] and "cultural violence" that manifests itself through ideology, religion, language, science or other facets of "the symbolic sphere of our existence [...] that can be used to justify or legitimise direct or structural violence".[19] As in the case of *peace*, spatial approaches to violence offer a useful entry point to studying infrastructures.[20]

At the same time, the focus of some of the articles in this special issue on (post-)colonial violence takes on board recent calls for decolonising historical peace and conflict research.[21] This is the case where contributions problematise the uneven distribution of natural resources such as water during the French colonial rule in Morocco (Bas Rensen) or questions of indigenous knowledge in roadbuilding projects in Colombian Amazonia (Oscar Aponte).

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[16] Ibid., 29.
[17] Johan Galtung, "Violence, Peace, and Peace Research", *Journal of Peace Research* 6, no. 3 (1969), 167-91, here 168.
[18] Ibid., 171.
[19] Johan Galtung, "Cultural Violence", *Journal of Peace Research* 27, no. 3 (1990), 291-305, here 291.
[20] Simon Springer and Philippe Le Billon, "Violence and Space: An Introduction to the Geographies of Violence", *Political Geography* 52, no. 1 (2016), 1-3.
[21] Maximilian Drephal, "Historische Friedens- und Konfliktforschung entkolonisieren", in Daniel Gerster, Jan Hansen and Susanne Schregel (eds), *Historische Friedens- und Konfliktforschung: Die Quadratur des Kreises?* (Frankfurt: Campus Verlag, 2023), 215-35.

In this context, it is inevitable to point to *nationalism*, another key concept that is closely related to *violence* and *conflict*.[22] Nationalism not only played a key part in the construction of the Suez Canal by France and Britain, but it motivated, in a different guise, the Egyptian President Nasser to oppose Franco-British control of that waterway in 1956, as we already saw.

Finally, two further concepts that are related to *nationalism* need to be addressed – *national identity*[23] and *nationhood*.[24] As research in historical peace and conflict studies has shown, often nationalist movements or nationalist state policies have led to conflicts.[25] This has included territorial expansion through moving borders.[26] In this special issue, the contributions by Viliebeinuo Medom and Efrat Hildesheim demonstrate the close connections between infrastructure projects and modern state-building.

Towards an Integrated Approach to Infrastructure, Mobility, Peace and Conflict

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[22] Ernest Gellner, *Nations and Nationalism* (Ithaca: Cornell University Press, 1983); Kathleen E. Powers, *Nationalisms and International Politics* (Princeton: Princeton University Press, 2022).

[23] Stefan Berger, *The Past as History: National Identity and Historical Consciousness in Modern Europe* (Basingstoke: Palgrave Macmillan, 2015).

[24] Rogers Brubaker, *Nationalism Reframed: Nationhood and the National Question in the New Europe* (Cambridge: Cambridge University Press, 1996).

[25] John A. Hall and Siniša Malešević (eds), *Nationalism and War* (Cambridge: Cambridge University Press, 2013).

[26] Marina Cattaruzza and Dieter Langwiesche, "Contextualizing Territorial Revisionism in East Central Europe: Goals, Expectations, and Practices", in Marina Cattaruzza, Stefan Dyroff and Dieter Langewiesche (eds), *Territorial Revisionism and the Allies of Gerany in the Second World War: Goals, Expectations, Practices* (New York: Berghahn Books, 2013), 1-16; Nadav G. Shelef, *Homelands: Shifting Borders and Territorial Disputes* (Ithaca: Cornell University Press, 2020).

With key concepts and terminology in place, we can now turn towards making some proposals for a more integrated approach to infrastructure, mobility, peace and conflict. This special issue leans on the observation of a "looping relation between society and infrastructure", as formulated by Penny Harvey, Caspar Bruun Jensen and Atsuro Morita.[27] We argue that such a broader grounding, including the application of more comprehensive concepts from peace and conflict studies, enables us to gain deeper insights into infrastructure, peace and conflict. Simultaneously, a fuller understanding of historical peacekeeping and conflict resolution emerges when we foreground the material fabric and physical structures of the past. Mobility infrastructure offers a compelling window onto the material dimensions of peace and conflict.

Put another way, this special issue uses infrastructure as an analytical lens to examine the intersection between ideology and technology.[28] Canals and railways represent "technological foundation stories," as David E. Nye has demonstrated in the context of the United States.[29] During the Cold War, West Berlin's inner-city motorway (Stadtautobahn) served a similar purpose: it did not only increase mobility but projected an image of Western dominance on the frontline of the East-West conflict.[30] At the same time, research has underscored the crucial societal role of maintenance in sustaining material infrastructure, emphasising the ongoing significance of repair and maintenance in shaping

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[27] Harvey, Jensen and Morita, "Introduction: Infrastructural Complications", 12.

[28] This includes the power of interpretation: Christoph Laucht, "Infrastruktur, Raum, Deutungsmacht: Der Nord-Ostsee-Kanal als Handelsroute, Bedrohungs- und Verteidigungsraum (1895-1955)", *Historische Zeitschrift* 314, no. 2 (2022), 340-75.

[29] David E. Nye, *America as Second Creation: Technology and Narratives of New Beginnings* (Cambridge, MA: MIT Press, 2003), 2.

[30] Christoph Bernhardt, "The Making of the 'Stadtautobahn' in Berlin after World War Two: A Socio-Histoire of Power about Urban Mobile Infrastructure", *Journal of Transport History* 41, no. 3 (2020), 306-27.

social landscapes.[31] The affective dimension of infrastructure, captured in what Larkin

refers to as the "poetics of infrastructure", also deepens our understanding of

infrastructure as a key element of socio-material relations.[32]

Scholars emphasise that infrastructure and power are deeply intertwined, noting

that "roads have social consequences."[33] Large-scale projects like dams and highways

represent ambitions to control nature or dominate space.[34] Water infrastructures such as

the Kiel Canal "connect and divide" both physically and socially.[35] In urban areas, access

to utilities can arbitrarily connect some populations to central networks while excluding

others, thereby reinforcing divisions along race and class lines.[36] Roads, intended to unify,

frequently leave certain areas disconnected. In the United States, roadbuilding history

exemplifies this impact: inner-city freeway projects in cities like Los Angeles and New

Orleans were routed through predominantly African American neighbourhoods.[37] Edwards

notes that infrastructures not only split physical spaces but also impose figurative divides,

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[31] Andrew L. Russell and Lee Vinsel, "After Innovation, Turn to Maintenance", *Technology and Culture* 59, no. 1 (2018), 1-25.

[32] Larkin, "The Politics and Poetics of Infrastructure".

[33] Penny Harvey and Hannah Knox, *Roads: An Anthropology of Infrastructure and Expertise* (Ithaca, NY: Cornell University Press, 2015), 7. For the broader German-speaking literature on infrastructure and power see Jens Ivo Engels and Gerrit Jasper Schenk, "Infrastrukturen der Macht – Macht der Infrastrukturen. Überlegungen zu einem Forschungsfeld", in Birte Förster and Martin Bauch (eds), *Infrastrukturen und Macht von der Antike bis zur Gegenwart, Beiheft der Historischen Zeitschrift* (Munich: de Gruyter Oldenbourg, 2014), 22-58.

[34] Julia Tischler, *Light and Power for a Multiracial Nation: The Kariba Dam Scheme in the Central African Federation* (Basingstoke: Palgrave Macmillan, 2013); Frederik Schulze, *Wissen im Fluss. Der lateinamerikanische Staudammbau im 20. Jahrhundert als globale Wissensgeschichte* (Paderborn: Brill Schöningh, 2022).

[35] Eike-Christian Heine, "Connect and Divide: On the History of the Kiel Canal", *Journal of Transport History* 35, no. 2 (2014), 200-19.

[36] Werner Troesken, *Water, Race, Disease* (Cambridge, MA: MIT Press, 2004).

[37] Peter D. Norton, *Fighting Traffic: The Dawn of the Motor Age in the American City* (Cambridge, Mass: MIT Press, 2008); Mark H. Rose and Raymond A. Mohl, *Interstate: Highway Politics and Policy since 1939* (Knoxville: University of Tennessee Press, 2012); Eric Avila, *Popular Culture in the Age of White Flight: Fear and Fantasy in Suburban Los Angeles* (Oakland: University of California Press, 2006); Kyle Shelton, *Power Moves: Transportation, Politics, and Development in Houston* (Austin: University of Texas Press, 2017).

such as requiring car ownership for access.[38] Infrastructures thus create both unity and

separation, with their benefits and burdens unevenly distributed.[39]

Scholars have forcefully emphasised the concept of "infrastructural violence" to

illustrate how infrastructure shapes societal organisation.[40] Infrastructure literally

structures relationships between people and objects, materialises forms of domination

and suffering and exposes conflicts over resource distribution. As Dennis Rodgers and

Bruce O'Neill observe, infrastructure "is not just a material embodiment of violence

(structural or otherwise), but often its instrumental medium".[41] In this sense, infrastructure

functions as a material conduit for what Galtung describes as structural violence,

providing a critical access point to examine systemic forms of harm embedded in a

society's efforts to organise and govern itself.

Scholars have extensively discussed the role of roads and highways in shaping

infrastructural violence, focusing on their significance for state and nation-building in both

colonial and post-colonial contexts.[42] Penny Harvey and Hannah Knox argue that

infrastructure projects like roads, tunnels and railways should be examined as "sites of

politics".[43] Similarly, Kenny Cupers and Prita Meier contend that studies of infrastructure

should go beyond examining state power and expert knowledge to also highlight the

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[38] Edwards, "Infrastructure and Modernity", 191.

[39] Andreas Greiner, Caroline Liebisch-Gümüş, Mario Peters and Roland Wenzlhuemer, "Roads to Exclusion: Introduction", *Journal of Transport History* 45, no. 3 (2024), 634-45.

[40] Dennis Rodgers and Bruce O'Neill, "Infrastructural Violence: Introduction to the Special Issue", *Ethnography* 13, no. 4 (2012), 401-12.

[41] Ibid., 404.

[42] Here, the case of Panama with its canal and railway is instructive. See: John Lindsay-Poland, *Emperors in the Jungle: The Hidden History of the U.S. in Panama* (Durham, NC: Duke University Press, 2003); Peter Pyne, *The Panama Railroad* (Bloomington, IN: Indiana University Press, 2021).

[43] Harvey and Knox, *Roads: An Anthropology of Infrastructure and Expertise*, 12.

practices of everyday people.[44] Cupers and Meier focus on the imaginaries of

decolonisation and pan-African unity that emerged around plans for a pan-African highway

system in the 1960s and 1970s, highlighting the persistence of colonial structures. Michael

Bess, writing in *The Journal of Transport History*, examines the link between road building

and state formation in Mexico.[45]

A substantial body of scholarship explores the co-construction of infrastructure and

the modern state.[46] In this context, significant attention has focussed on the technological

dimensions of European integration.[47] This literature reveals that the peace promoted

through state- and nation-building was often exclusive and arbitrary, with infrastructure

projects reinforcing nationalism at the expense of indigenous identities. Railways, for

instance, were deeply entangled with the colonial project and its forms of violence, often

conceptualized as "civilizing machines".[48]

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[44] Kenny Cupers and Prita Meier, "Infrastructure between Statehood and Selfhood: The Trans-African Highway", *Journal of the Society of Architectural Historians* 79, no. 1 (2020), 61-81.

[45] Michael K. Bess, "Routes of Conflict: Building Roads and Shaping the Nation in Mexico, 1941–1952", *Journal of Transport History* 35, no. 1 (2014), 78-96; Michael K. Bess, *Routes of Compromise: Building Roads and Shaping the Nation in Mexico, 1917–1952* (Lincoln: University of Nebraska Press, 2017).

[46] Judith Schueler, *Materialising Identity: The Co-Construction of the Gotthard Railway and Swiss National Identity* (Amsterdam: Amsterdam University Press, 2008); William G. Thomas, *The Iron Way: Railroads, the Civil War, and the Making of Modern America* (New Haven: Yale University Press, 2011); Todd A. Diacon, *Stringing Together a Nation: Candido Mariano da Silva Rondon and the Construction of a Modern Brazil, 1906–1930* (Durham: Duke University Press, 2004).

[47] As examples: Erik van der Vleuten and Arne Kaijser (eds), *Networking Europe: Transnational Infrastructures and the Shaping of Europe, 1850–2000* (Sagamore Beach, Mass.: Science History Publications, 2006); Frank Schipper, *Driving Europe: Building Europe on Roads in the Twentieth Century* (Amsterdam: Amsterdam University Press, 2008); Alexander Badenoch and Andreas Fickers (eds), *Materializing Europe: Transnational Infrastructures and the Project of Europe* (Basingstoke: Palgrave Macmillan, 2010).

[48] Michael Matthews, *The Civilizing Machine: A Cultural History of Mexican Railroads, 1876-1910* (Lincoln: University of Nebraska Press, 2014).

The relationship between infrastructure and power also brings the connections between place and militarism into focus.[49] As for infrastructures, this link is especially pronounced in the ways that railroads and streets function during wartime and violent conflicts. This interplay is striking because many infrastructures were originally developed with the goal of fostering peace, enhancing public wellbeing and promoting prosperity. Yet, in times of conflict or war, they were "repurposed".[50]

The German autobahn is a particularly revealing example; the National Socialist regime's vision for an expansive highway network had roots in Weimar-era plans and mirrored similar developments in other Western European nations. Initially constructed not as a wartime instrument but for economic and propaganda purposes, the autobahn ultimately enabled rapid troop movement.[51]

Similarly, the Eisenhower administration created the interstate highway system under the National Inter-State and Defense Highways Act in the United States in 1956. While this complex road network expedited the mobility of Americans, it also facilitated the movement of troops and equipment by connecting military installations and provided a means to evacuate urban areas in the event of a nuclear attack.[52]

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[49] Richelle M. Bernazzoli and Colin Flint, "Power, Place, and Militarism: Toward a Comparative Geographic Analysis of Militarization", *Geography Compass* 3, no. 1 (2009), 393–411.
[50] Dirk van Laak, "Infra-Strukturgeschichte", *Geschichte und Gesellschaft* 27, no. 3 (2001), 367-93, here 373.
[51] Thomas Zeller, *Driving Germany: The Landscape of the German Autobahn, 1930–1970*, trans. Thomas Dunlap (New York: Berghahn Books, 2007).
[52] Tom Lewis, *Divided Highways: Building the Interstate Highways, Transforming American Life*, updated ed. (Ithaca, NY: Cornell University Press, 2013).

Such dual-usage of infrastructures was not limited to roads but also applied to alpine tourism, mountaineering and war preparations, as Daniel Marc Segesser shows in his contribution to this special issue.

During violent conflicts, infrastructures like highways and railroads were often modified to serve as tools for war and even genocide. A substantial body of literature explores how mobility infrastructures were central to both World Wars, especially in enabling mass killings during the Holocaust.[53] Scholarship on the World Wars combines insights from infrastructure and environmental studies, revealing the value of bridging these fields, which had long remained separate.[54] At the same time, critical infrastructures such as bridges, roads, railroad lines, airports, harbours, utilities or IT systems are likely prime targets in armed conflicts or forms of hybrid warfare, as Russia's war on Ukraine has shown time and again.[55]

Conflicts, including the Cold War, catalysed the creation of specific infrastructures such as bunkers or fallout shelters.[56] Many of these structures like the West German government bunker near Bonn, then capital of the Federal Republic of Germany, were solely built for defence purposes to ensure the survival and continued functionality of the

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[53] See the August 2024 special issue of the *Journal of Transport History*, which also includes a comprehensive literature survey. The introduction is by Simone Gigliotti, "Conflict Transport: Holocaust Histories, Routes, and Witnesses", *Journal of Transport History* 45, no. 2 (2024), 189-93.

[54] Richard P. Tucker et al. (eds.), *Environmental Histories of the First World War* (Cambridge: Cambridge University Press, 2018).

[55] Wolf R. Dombrowsky, "Schutz kritischer Infrastrukturen als Grundproblem einer modernen Gesellschaft", in Michael Kloepfer (ed.), *Schutz kritischer Infrastrukturen: IT und Energie* (Baden-Baden: Nomos, 2010), 27-38.

[56] Kenneth D. Rose, *One Nation Underground: The Fallout Shelter in American Culture* (New York: New York University Press, 2001); Silvia Berger Ziauddin, "Superpower Underground: Switzerland's Rise to Global Bunker Expertise in the Atomic Age", *Technology and Culture* 58, no. 4 (2017), 921-54.

machinery of government in war, embodying "subterranean geopolitics" (Ian Klinke).[57] Like the German autobahn or the American inter-state highway system, civil defence infrastructures were often designed with a dual-use purpose in mind, to serve as peacetime centres of local government and wartime headquarters. In the United States, this applied to public libraries or administrative buildings such as Boston City Hall.[58]

Yet, some defence infrastructures have raised questions about labour exploitation, especially concerning the roles of prisoners of war, concentration camp inmates and other forced labourers who were involved in their construction.[59] Another key area of inquiry has examined the post-war trajectories of these bunkers and other military installations—how they were repurposed, reimagined, or integrated into new contexts, or became part of the public history and heritage of previous wars and conflicts.[60] Additionally, recent scholarship has turned to literary and visual representations of wartime infrastructure, exploring the affective legacies and lasting cultural impacts these sites continue to hold.[61]

Wars have frequently left devastation behind, leaving streets, bridges, tunnels and railways in need of extensive reconstruction. After the Second World War, efforts to rebuild urban areas often incorporated existing infrastructure, instilling new political and

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[57] Ian Klinke, *Cryptic Concrete: A Subterranean Journey into Cold War Germany* (Hoboken, NJ: Wiley, 2018); Ian Klinke, "On the History of Subterranean Geopolitics", *Geoforum* 127 (2021), 356-63.

[58] David Monteyne, *Fallout Shelter: Designing for Civil Defense in the Cold War* (Minneapolis: University of Minnesota Press, 2011), 231-70; Brett Spencer, "From Atomic Shelters to Arms Control: Libraries, Civil Defense, and American Militarism during the Cold War," *Information and Culture* 49, no. 3 (2014), 351-85.

[59] Wolf Gruner, *Jewish Forced Labor Under the Nazis: Economic Needs and Racial Aims, 1938–1944*, trans. Kathleen M. Dell'Orto (New York: Cambridge University Press, 2006).

[60] Luke Bennett (ed.), *In the Ruins of the Cold War Bunker: Affect, Materiality and Meaning Making* (London: Rowman & Littlefield International, 2017); Benedict Anderson, *Buried City: Unearthing Teufelsberg* (Abingdon: Routledge, 2017); Wayne D. Cocroft and John Schofield, *Archaeology of the Teufelsberg: Exploring Western Electronic Intelligence Gathering in Cold War Berlin* (Abingdon: Routledge, 2019).

[61] Dominic Davies, *The Broken Promise of Infrastructure* (London: Lawrence Wishart, 2023).

ideological values into them.[62] These projects sparked debates over infrastructure

improvements, civil defence and "resilience".[63] Ultimately, the experience of war and

destruction also inspired initiatives to use mobility infrastructure to foster mutual

understanding and promote peace as through using urban infrastructure to hold peace

conferences or to foster town twinning arrangements between urban centres.[64] In the case

of Coventry, England, the city council and other historical actors even tried to re-build the

city's image as an international hub for peace and war commemoration.[65] Beyond this, the

relationship between infrastructure and ecology has increasingly drawn attention, not

least in the context of climate change.[66] Further research has addressed the environmental

impacts of military testing grounds and bases.[67]

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[62] Timothy Moss, *Remaking Berlin: A History of the City through Infrastructure, 1920–2020* (Cambridge: MIT Press, 2020), 137-76.

[63] Guy Oakes, *The Imaginary War: Civil Defense and American Cold War Culture* (New York: Oxford University Press, 1994); Frank Biess, *German Angst: Fear and Democracy in the Federal Republic of Germany* (Oxford: Oxford University Press, 2020), 95-129. Future research could usefully build on broader considerations of "resilience" within contemporary history: Margit Szöllösi-Janze, "Resilienz: Zur Geschichte eines allgegenwärtigen Begriffs – Thesen zu den Herausforderungen einer modernen Zeitgeschichte", *Vierteljahrshefte für Zeitgeschichte* 72, no. 3 (2024), 559-89.

[64] Heinz Duchhardt (ed.), *Städte und Friedenskongresse* (Cologne: Böhlau, 1999); Corine Defrance, Tanja Herrmann and Pia Nordblom (eds), *Städtepartnerschaften in Europa im 20. Jahrhundert* (Göttingen: Wallstein, 2020); Christoph Laucht and Tom Allbeson (eds), *Twinned Cities: Reconciliation and Reconstruction in Europe after 1945*, special issue of *Urban History* 51, no. 4 (2024).

[65] Jeanne Kaczka-Valliere and Andrew Rigby, "Coventry – Memorializing Peace and Reconciliation", *Peace & Change* 33, no. 4 (2008), 582-99; Stefan Goebel, "Commemorative Cosmopolis: Transnational Networks of Remembrance in Post-War Coventry", in Stefan Goebel and Derek Keene (eds), *Cities into Battlefields: Metropolitan Scenarios, Experiences and Commemorations of Total War* (Farnham: Ashgate, 2011), 163–83.

[66] Asley Carse, *Beyond the Big Ditch: Politics, Ecology, and Infrastructure at the Panama Canal* (Cambridge, MA: MIT Press, 2014); Philipp Degens, Iris Hilbrich and Sarah Lenz (eds), *Ruptures, Transformations, Continuities: Rethinking Infrastructures and Ecology*, special issue of *Historical Social Research* 47, no. 4 (2022).

[67] Chris Pearson, Peter Coates and Tim Cole (eds), *Militarized Landscapes: From Gettysburg to Salisbury Plain* (London: Continuum, 2010); Edwin A. Martini (ed.), *Proving Grounds: Militarized Landscapes, Weapons Testing, and the Environmental Impact of U.S. Bases*, reprint ed. (Seattle, WA: University of Washington Press, 2017).

Moreover, this special issue aims to ground international history and the history of conflict and peace in their material environments. We argue that infrastructure, as a tangible manifestation of the physical world, holds an intrinsic yet often unintended capacity to shape these dynamics.[68] In the field of peace and conflict studies, the material history of infrastructure has been largely overlooked. What role does the architecture of spaces where conflicts are mitigated and peace is negotiated—such as the grand Cecilienhof Palace in Potsdam, Germany, site of the 1945 Potsdam Conference, or the humble train carriage where the armistice ending World War I was signed—play in shaping the processes that lead to peace treaties? How do the spatial and material dimensions of these negotiations influence their outcomes?

In this context, historical studies of infrastructures in peace and war can also usefully draw on approaches to the spatial and scalar dimensions of peace and conflict, as proposed by scholars in the present-oriented peace and conflict studies[69] and geographers.[70] Such approaches to space and scale should also pay attention to the relationship between the global, international, national and local dimensions of infrastructures.[71] Through its combined approach and with its focus on the material fabric and the spatial as well as

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[68] About the need to embed human civilisation in its material environments, Timothy J. LeCain, *The Matter of History: How Things Create the Past* (Cambridge: Cambridge University Press), 2017, 11; see also: William Whyte, "Buildings, Landscapes and Regimes of Materiality", *Transactions of the Royal Historical Society* 28 (2018), 135-48.

[69] Annika Björkdahl and Susanne Buckley-Zistel (eds), *Spatializing Peace and Conflict: Mapping the Production of Places, Sites and Scales of Violence* (Basingstoke: Palgrave Macmillan, 2016); "The Evolving Landscape of Infrastructures for Peace", *Journal of Peacebuilding and Development* 7, no. 3 (2012), 1-7. See also the relevant proposals by urban historians: Richard Rodger and Susanne Rau, "Thinking Spatially: New Horizons for Urban History", *Urban History* 47, no. 3 (2020), 372-83.

[70] Colin Flint (ed.), *The Geography of War and Peace: From Death Camps to Diplomats* (Oxford: Oxford University Press, 2005).

[71] Oliver P. Richmond, "Peace Formation and Local Infrastructures for Peace", *Alternatives: Global, Local, Political* 38, no. 4 (2013), 271-87.

environmental dimensions of peace and conflict, the special issue seeks to develop a deeper and more systematic understanding of the complex relationship between transport infrastructures, peace and conflict. This includes both the opportunities and limits of such an integrated approach.

Paths to Peace? Infrastructures, Peace and Conflict

Featuring a set of case studies from the Global North and South, contributions to this special issue showcase the potential that the combination of methods and proceedings from (historical) peace and conflict studies with infrastructure and mobility history holds. Bas Rensen's article seamlessly introduces the central themes of this special issue. His analysis focuses on the establishment of water infrastructure by French colonial authorities in Morocco, a French protectorate, between 1912 and 1925. At the core of his article lies the concept of "infrastructural violence", which Rensen employs to illuminate the exclusionary and marginalising effects of mobility infrastructure in colonial contexts. He defines infrastructural violence as "works designed and built with the intent to translate relations of power into palpable forms of physical and emotional harm". Additionally, the article demonstrates how water infrastructure can be analysed through a mobility lens, emphasising that water must be mobilised and moved to sustain human civilisation. Rensen argues that this movement is inherently political, as it reflects and reinforces the flow of power from one place to another. Finally, Rensen also attends to the resistance of Moroccan water users to these processes. Their acts of circumvention, delay and

subversion reveal the agency of colonial subjects in challenging and disrupting the mechanisms of colonial rule.

Moving the focus to Central Europe in roughly the same period, Daniel Marc Segesser sheds light on the relationship between infrastructure development and the preparation for war. He examines how efforts to boost winter tourism in the Alps in the age of the World Wars were intertwined with preparations for future warfare in mountainous terrain. Segesser's analysis centres on Hermann Czant, a little-known Austro-Hungarian officer who was among the first to explore the intersection of war, mountaineering and tourism. Through publications and public lectures, Czant sought to promote alpine winter tourism as a dual-purpose initiative: developing infrastructure for civilian use while also creating training grounds and operational tools for military purposes. Segesser reveals that Czant's motivations were geopolitical, as he sought to revise the Paris Peace Treaties and reclaim the Carpathian territories lost to Czechoslovakia and Romania. Ultimately, Czant's story exemplifies the transformation of the Alps from a forbidding natural landscape into one increasingly shaped and controlled by human endeavours.

Building on Segesser, the following three contributions then focus on roads more specifically, exposing their political significance and roles in state-building processes. Viliebeinuo Medom's analysis of roads in Nagaland—a conflict-ridden, militarised region in northeast India bordering present-day Myanmar—traces their role from colonial times to modern India, arguing that roads were tools of empire that enabled British colonisation, the subjugation of Indigenous communities and the imposition of colonial ideals. After independence, roads remained instruments of state surveillance and control by the Indian

government, functioning as infrastructures of dominance that simultaneously connected and marginalised communities. Yet, these same roads evolved into infrastructures of resistance, with mobility empowering the Naga independence movement and challenging state authority. Medom effectively demonstrates how roads offer a critical lens for understanding the broader history of the Naga conflict, exposing patterns of inequality and structural violence. Her analysis also aligns with other works in this special issue by emphasising the emotional dimension of infrastructure, as these roads embodied aspirations for a more peaceful and less violent future.

In his contribution, Oscar Aponte explores the intertwined development of road construction and state formation in the Colombian Amazon. His case study focuses on the road connecting the Putumayo and Caquetá Rivers—the region's two longest waterways—illustrating how Indigenous transport networks were reduced to a single road serving the interests of rubber barons, missionaries and government officials. Although Indigenous knowledge was crucial in creating and maintaining these networks, colonisation and capitalist exploitation marginalised this expertise, leading to persistent financial and technological challenges in road maintenance throughout the early twentieth century. The road gained strategic significance in the 1930s amid geopolitical tensions, particularly during the territorial disputes between Colombia and Peru. It was envisioned as a tool to assert national sovereignty, encourage settler migration and facilitate resource commercialisation. However, once the conflict subsided, state interest in road construction and upkeep waned. It was not until the 1980s that seasonal flooding was

addressed by paving the road with concrete, a solution that introduced new environmental problems.

A similar focus on infrastructure and the creation of the nation state characterises the final contribution to this special issue. In it, Efrat Hildesheim analyses the history of Highway 90, Israel's longest highway, stretching over 478 km and connecting the north of Israel with the south through the contested territories of the West Bank. Her approach differs from other contributions insofar as she aims to write a "biography" of this significant road, so deeply entangled with the region's history and ongoing conflicts. Hildesheim's central argument addresses the political dimension of Highway 90, revealing its dual purpose as both civilian and military infrastructure. She views the highway as an embodiment of ideology and a reflection of the state's goal to enhance Jewish presence along Israel's eastern border regions. In Hildesheim's narrative, Highway 90 emerges as a "borderroad", a space continuously shaped by regional conflicts, wars and efforts to achieve peaceful resolutions. Employing the concept of "segmentation" as both a method and as a defining characteristic of the road itself, she demonstrates how mobility infrastructures can serve ideological purposes in the spatialisation of nation states.

Outlining proposals for the study of infrastructures in conflict and peace in the introduction and featuring a set of case studies from the Global North and South, this special issue seeks to show the tremendous benefits that such an approach holds for mobility and infrastructure history as well as (historical) peace and conflict research. This includes the material, socio-cultural and politico-ideological dimensions of infrastructures in peace and conflict. While the special issue cannot provide an all-encompassing

investigation into infrastructures in conflict and peace, it is intended to stimulate future research into this crucial, yet thus far neglected multi-disciplinary area of study.

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