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CHARLES-JOSEPH MINARD'S BORDERS: CARTOGRAPHIC ANXIETY AND MAPS OF MIGRATION

Cartography is now a familiar, ubiquitous cultural narrator for migration. At worst, maps are used to portray migration as an invasion, drawing on a tradition of military cartography developed by Nazi Germany during World War II.[1] At best, cartography depicting migration is a motor of imagination for activists and artists to create counter-imaginations – often referred to as counter-maps or radical cartographies, among others – which promote the right to move, describe the complex border systems, and/or tell intimate stories and motivation for moving.[2] The border is reproduced, erased, or interrogated, taking centre stage on most maps of migration. It is now of fundamental importance to border studies that the border is not a thin line on a map. The line is a placeholder for complex structures, such as vast technological surveillance systems and visa regimes creating blockades in the shape of paperwork.[3] On hegemonic maps – meaning maps following the current

[1] See: H. Van Houtum and R. Bueno Lacy, "'Ceci n'est pas la migration': Countering the Cunning Cartopolitics of the Frontex Migration Map", in: *Handbook on Critical Geographies of Migration*, eds. K. Mitchell et al., Cheltenham 2019, pp. 153–169.

[2] Radical Cartography is used in the book *An Atlas of Radical Cartography* (2009), where it is described as (quoting Trevor Paglen); "a departure point or a tool that can aid in analysis but do not speak for themselves." A. Bhagat and L. Mogel, "Introduction", in: *An Atlas of Radical Cartography*, eds. A. Bhagat and L. Mogel, Los Angeles 2009, available online: (http://an-atlas.com/contents/contents_intro.html [accessed: January 2019]). Counter-mapping has been defined as "any effort that fundamentally questions the assumptions or biases of cartographic conventions, that challenges predominant power effects of mapping, or that engages in mapping in ways that upset power relations". L.M. Harris, and H.D. Hazen, "Power of Maps: (Counter) Mapping for Conservation", *ACME* 2005, 4(1), p. 115.

[3] See: H. van Houtum and T. van Naerssen, "Bordering, Ordering and Othering", *Tijdschrift Voor Economische En Sociale Geografie 93* 2002, 2, pp. 125–36; D. Krichker, "Making Sense of Borderscapes: Space, Imagination and Experience", *Geopolitics* 2021,

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cartographic conventions – the line remains exactly this, a line structuring the world like a grid. The complex systems the line represents are often developed to hinder, manage, or surveil mobility. Regardless, the grid is continually transgressed by people on the move, proving the lines penetrable and porous. The French civil engineer Charles-Joseph Minard's 1862 map of global migratory flows contained no borders (ill. 1). This paper takes the current conflicts in mapping and counter-mapping migration (and borders) as an opportunity to discuss an early example of a map of migration. The ambition is to tease out what it is a border *does* to cartographic migratory flows. Minard's map was chosen for this paper because it does not participate in the current hyper-visualisation of border crossings, thus echoing the need for mapping practices to cease creating more data on migration.[4] I have therefore turned to the archives to discuss issues of borders on maps of migration. This is thus an experiment to envision what potential Minard's map has for contemporary mapping practices and their roots. To compare Minard's map to contemporary mapping practices, I use the term 'cartographic anxiety', i.e. meaning the anxiety over unstable borders and the critique of objectivism in geography studies.[5]

Currently, the literature on maps of migration is well-developed in human geography and border studies, which both have a longer history of critical engagement with maps. This paper is thus also part of a continued effort to break down disciplinary boundaries and write about data visualizations and cartography from the perspective of art history.[6] Ultimately, this paper navigates the

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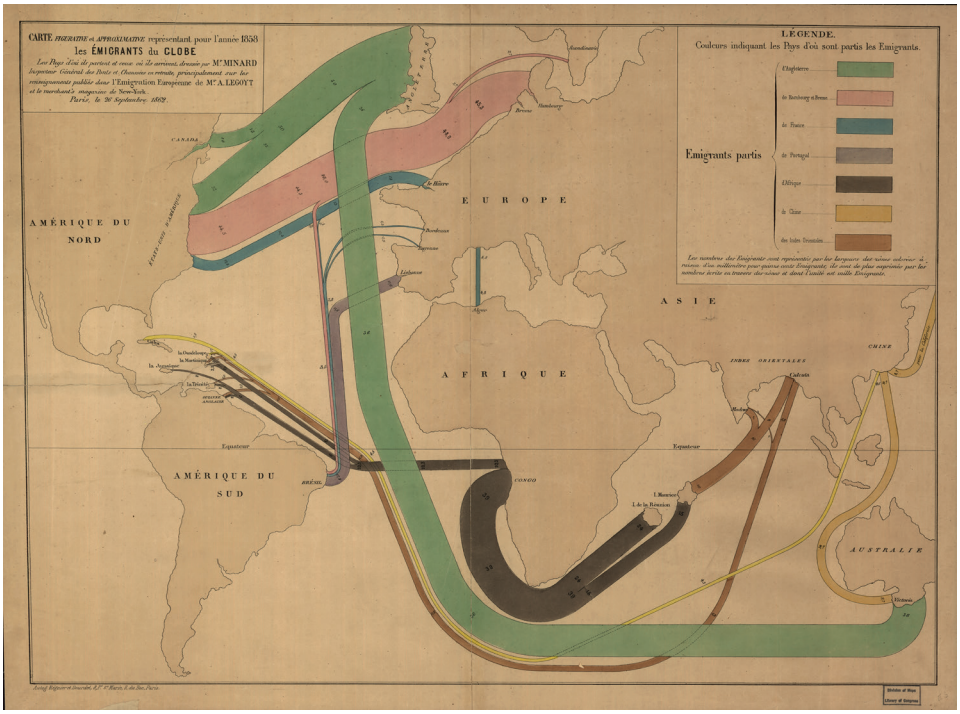
26(4), pp. 1224–1242; C. Minca, A. Rijke, P. Pallister-Wilkins, M. Tazzioli, D. Vigneswaran, H. Van Houtum and A. Van Uden, "Rethinking the Biopolitical: Borders, Refugees, Mobilities…", *Environment and Planning C: Politics and Space* 2022, 40(1), pp. 3–30.

[4] M. Tazzioli, "Counter-mapping, refugees and asylum borders", in: *Handbook on Critical Geographies of Migration*, eds. K. Mitchell et al., Cheltenham 2019, p. 402.

[5] S. Krishna, "Cartographic Anxiety: Mapping the Body Politic in India", *Alternatives: Global, Local, Political* 1994, 19(4), pp. 507–21; D. Gregory, *Geographical Imaginations*, Cambridge–Blackwell 1994.

[6] Art historians have also explored artists using maps, consider: S. Alpers, *The Art of Describing: Dutch Art in the Seventeenth Century*, Chicago, Illinois 1984; J. Drucker, *Visualization and Interpretation*, Cambridge, Massachusetts 2020; S. Ferdinand, *Mapping Beyond Measure: Art, Cartography, and the Space of Global Modernity*, Lincoln, Nebraska 2019; K. O'Rourke, *Walking and Mapping: Artists as Cartographers*, Cambridge, Massachusetts 2016. This list of far from exhaustive but offers a brief overview. Among the art historians who actively use critical cartography is Simon Ferdinand, but also consider: R. Watson, "Mapping and Contemporary Art", *The Cartographic Journal* 2009, 46(4), pp. 293–307; R. Watson, "Mapping and contemporary art – revised version", in: *Artistic Approaches to Cultural Mapping Activating Imaginaries and Means of Knowing*, eds. N. Duxbury, W.F. Garrett-Petts, A. Longley, London 2019, pp. 25–45; K. Murawska-Muthesius, *Im-*



1. Charles-Joseph Minard, *Carte figurative et approximative représentant pour l`année 1858 les émigrants du globe, les pays d'où ils partent et ceux où ils arrivent*, 1862, Library of Congress Geography and Map Division, Washington, D.C.

fraught relationship between cartography and mobility, combining literature from several disciplines. Vincent Del Casino and Stephen Hanna argue that cartography is far from a static image but always in the making.[7] The meaning

aging and Mapping Eastern Europe: Sarmatia Europea to Post-Communist Bloc, London 2021. While maps and migration have received some attention, this paper regards maps *of* migration (maps showcasing movement) in particular, which have received more sporadic attention from art history. Two authors who have considered this briefly is: G. Bruno, *Atlas of Emotion: Journeys into Art, Architecture, and Film*, Brooklyn, New York 2002, p. 237; K. Murawska-Muthesius, *Imaging and Mapping Eastern Europe*, pp. 52–53. Also consider; H. Van Gelder, *Ground Sea: Photography and the Right to Be Reborn*, Leuven 2021. The book actively uses map and charts and can be viewed as a written counter-map of migration focused on the Strait of Dover. Alongside the book, Van Gelder also produced a nautical chart; Romy Delanghe, Othillia G—, *Dover and Calais to Dunkerque and Ramsgate*, 2021, Paper chart, Maco water resistant, open: 100 x 66 cm, closed: 16,5 x 25 cm.

[7] V.J.D.C.J.J. Del Casino Jr. and S.P. Hanna, "Beyond The 'Binaries': A Methodological Intervention for Interrogating Maps as Representational Practices", *ACME: An International Journal for Critical Geographies* 2015, 4(1), p. 36.

and impact of a cartographic work depends on the context. Thus, Minard's map of mobility is also a "mobile subject" which, when considered alongside contemporary mapping practices, proposes that former mapping practices might be worth considering.[8] A brief visual introduction of Minard's map is given before discussing the use of borders on maps of migration in relation to the cartographic anxiety.

The first half of the 19th century, later referred to as 'The Age of Data,' marked a distinctive change in the history of western infographics.[9] Enormous efforts were put into place to collect information on European populations: births, deaths, illnesses. The latter half of the century focused on translating the vast data sets into graphs and maps to effortlessly gauge correlations and developments. It is widely accepted that mobility studies, among many other disciplines, is a result of this collection and analysis of data. Charles-Joseph Minard, a civil engineer turned cartographer at a late age, is a heralded infographic designer from this period. Minard produced a series of thematic cartographies, which were hand-drawn cartographic prints, visualising geographic patterns. If one is familiar with infographics, he is the author of the *Figurative Map of the Successive Losses in Men of the French Army in the Russian Campaign 1812–13*[10] (1869), which Edward Tufte touted as one of the best infographics ever produced (ill. 2).[11] The flow-chart displays, in crucial simplicity, the loss of life in relation to the route and temperature. Despite Minard's current fame, and the continued fascination with his work, not much is known of the print volume or the people who subscribed to his maps.[12] One of Minard's figures has been identified in the background of a painting of the secretary of agriculture, commerce, and public works in Napoleon II's government.[13] While the extent of the circulation of his maps is unknown, they were distributed in powerful circles and presented as a symbol of status.

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[8] Ibidem.

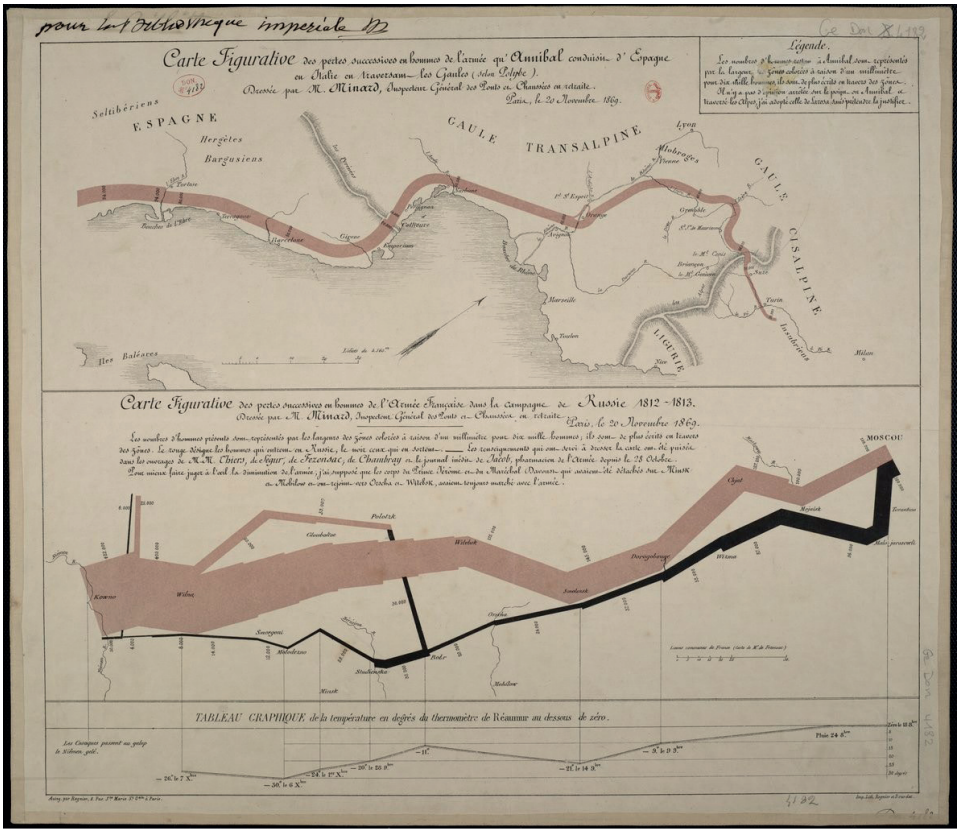
[9] See: M. Friendly and H. Wainer, *A History of Data Visualization and Graphic Communication*, Cambridge, Massachusetts 2021.

[10] French title [*Carte figurative des pertes successives en hommes de l`armée française dans la Campagne de Russie 1812–13 (comparées à celle d`Hannibal durant la 2ème Guerre Punique)*].

[11] Edward Tufte quoted in M. Friendly, "Visions and Re-Visions of Charles Joseph Minard", *Journal of Educational and Behavioral Statistics* 2002, 27, 1, p. 31.

[12] S. Rendgen, *The Minard System: The Complete Statistical Graphics of Charles-Joseph Minard*, New York 2018, p. 26.

[13] Ibidem.



2. Charles-Joseph Minard, *Carte figurative des pertes successives en hommes de l`armée française dans la Campagne de Russie 1812–13 (comparées à celle d`Hannibal durant la 2ème Guerre Punique)*, 1869, Bibliothèque nationale de France, département Cartes et plans, Paris

In 1862, Minard published *Figurative and Approximate Map Representing the Emigrants of the Globe in the Year 1858, the Countries from Which They Leave and Those Where They Arrive* (ill. 1).[14] Broad flows connect the continents on the world map. The width of the flow corresponds to the amount of people travelling along that route. The geographic departure of the lines is explained in the legend, where they are sorted by colour, and mentioned by nation, such as England, or by place of departure, such as Hamburg and Bremen. While European nations are assigned pink, green, blue, and purple, the latter three categories are yellow, brown, and dark brown. These lines depart

[14] French title [*Carte figurative et approximative représentant pour l`année 1858 les émigrants du globe, les pays d'où ils partent et ceux où ils arrivent*].

from the country of China, the continent of Africa, and the region of South Asia, and have seemingly been racialised by the selected colour. The colours match the racialised cartographic colour scheme of the time, as outlined by Zef Segal.[15] White populations were usually rendered in pink, African and South Asian in blue, grey, brown, or black, and East Asian populations in yellow.[16] Generally, blue and green were used more freely, which is reflected in the colour scheme on the map assigning it to European migration.[17] It is unknown whether it was Minard who chose the colours. The map is coloured in by hand with water colour, a job typically executed by young women in the print-shop.[18] No distinction was made between what kinds of migration the flows represent, be it voluntary or forced; only the difference between European versus non-European migration is highlighted.

Minard's source material includes the book *L'Emigration Européenne* (1861) by the director of the Statistique Générale de la France Alfred Legoyt, and *The Merchant's Magazine and Commercial Review* (1839–1870) from New York. The magazine provided merchants with statistics on matters deemed relevant for trade. Minard presumably utilised a table from 1859, which presented immigration in the years 1855–58, organised according to place of birth.[19] *L'Emigration Européenne* also includes tables that outline numbers and dates. Legoyt describes the Europeans' reasons for leaving Europe at length in the first part of the book. The description of migration patterns of people from Africa, South Asia, and China is attached as an appendix. Here Legoyt discusses the matter by region, and finishes by comparing the racial characteristics which define them, and their work effort. The racialised flows on Minard's map do not account for the racist remarks of the book, but show that the general attitude towards global migration was far from egalitarian. According to Minard, data visualisation should "convey promptly to the eye," without requiring mental calculations or complications.[20] Yet a contemporary gaze onto this map should engage with its more ambiguous parts, perhaps unclear to today's audiences.

Reducing all movement into flows, the map tells nothing of the complex and violent histories of migration. The lines departing from East and

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[15] Z. Segal, „Cartographies raciales : vers un racisme mis en espace", *Cartes & géomatique* 2023, pp. 85–97.

[16] Ibidem, p. 89.

[17] Zef Segal, email to author, 10 June 2024.

[18] Sandra Rendgen, email to author, 11 June 2024.

[19] *The Merchants' Magazine and Commercial Review XL* 1859, IV, p. 515.

[20] Minard quoted in: A.H. Robinson, "The Thematic Maps of Charles Joseph Minard", *Imago Mundi* 1967, 21(1), p. 102.

South Asia, and West Africa hold various histories. The people migrating from South Asia were indentured workers, arriving in Mauritius, the Caribbean, and South America. The Chinese population depicted on Minard's map headed for Australia, the Caribbean, and the United States to work in goldmines or in low-wage agricultural jobs. Finally, the smooth flowlines leaving West Africa omit the histories of enslaved labourers, forced to work on plantations in the Caribbean, South America, and the islands Reunion and Mauritius. Simultaneously, this is described as a rare map for this time because it presents a Europe in crisis, where people were departing to escape rising taxes and famine.[21] It was unfavourable to have this mass-migration depicted in a time where cartography was often used to promote the interest of the nation state.[22] The 'silence' of the map has been pointed out by the critical cartographer Denis Wood as indicative of the power of maps, focusing on how what is represented is often as important as what is omitted.[23] The cartographic simplicity might always fall short of depicting the violence and complexities of human history.

Zooming out and away from the flowlines to focus on the map reveals that Minard disregarded geographic precision in favour of data depiction. This is not surprising, as he is known to make straits larger so that a flowline might cut through it more easily.[24] Minard was one of the three inventors of flow mapping, a form of data visualisation using maps to showcase quantitative data of the movement.[25] On his 1862 map, the island of Madagascar is missing, and both Canada and Northern Scandinavia have been removed. Mauritius and Reunion are both disproportionally large, so they fit the size of the flowlines. It is a geography of significance. Furthermore, the distribution of space is odd. It does not function in relation to any other projection because it equalises the space of every continent: they are almost all the same size. Completely disregarding the typical Mercator projection – critiqued for depicting the Northern hemisphere as disproportionally large – Minard opts for an even-handed interpretation of the world map. The title of the map indi-

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[21] L. Bacon, O. Clochard, T. Honoré, N. Lambert, S. Mekdjian and P. Rekacewicz, "Mapping the Migratory Movements", *Revue européenne des migrations internationales* 2016, 32(3&4), available online: http://journals.openedition.org/remi/8803 [accessed: February 2019].

[22] Ibidem.

[23] D. Wood, *The Power of Maps*, Oxfordshire 1992.

[24] Rendgen, *The Minard System*, pp. 24–25.

[25] Z. Segal, "Flow Mapping through the Times: The Transition from Harness to Nazi Propaganda", in: *Motion in Maps, Maps in Motion: Mapping Stories and Movement through Time*, ed. B. Vannieuwenhuyze, Amsterdam 2020, p. 82.

cates that it illustrates the countries from which people left and where they arrive. Yet there are no borders, and thus no states. The only clear markers of nationality are the lines of migration. The line of descent flows like a river, from one vast empty landscape to the next. Geographic precision and accuracy are evidently not the foundation to this cartographic representation, but neither is the "national order of things."[26] This leaves a crack in the surface of hegemonic cartography.

Hegemonic cartography orbits around a 'cartographic anxiety'. The term was coined in 1994 by Sankaran Krishna and Derek Gregory in separate works. Sankaran Krishna described it as an anxiety over unstable borders in post-colonial India,[27] while Derek Gregory critiqued the objectivism in human geography studies.[28] Both scholars cite the Cartesian anxiety as the point of origin: the anxiety that our knowledge is not fixed, and that there are no clear distinctions between dualisms. The border on a map is a Cartesian imagination of order and separation. Gregory uses Timothy Mitchell's description of 19th-century Europe's gaze as 'The World as Exhibition'. Europe turned the real into a representation which could be studied from a distance as part of its colonial project. This was done at world exhibitions; Mitchell describes in detail how the streets of Cairo were reconstructed in Paris in 1889. However, once Europeans actually travelled to Egypt, they found it overwhelming because it was not organised as a picture to consume.[29] Hegemonic cartography is an extension of this gaze. It is also present in Minard's urge to "convey promptly to the eye", and thus translate large numbers into easily consumable lines. Maps were part of the machinery which presented the world as a picture, when it was always an abstraction and a political image.[30]

When describing the cartographic anxiety, Krishna references the neurosis which marked Indian nation building. The violence and the life lost to the conflict of the nation's northern borders was presented as a sacrifice for the greater good: a stable external border. Mapping the nation was a peculiar issue because the borders with Pakistan and China were not settled, which led the Customs Department to impress a stamp on any foreign map of India

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[26] See: L.H. Malkki, "Refugees and Exile: From 'Refugee Studies' to the National Order of Things", *Annual Review of Anthropology* 1995, 24, pp. 495–523.

[27] See: Krishna, *Cartographic Anxiety*..., pp. 507–521.

[28] See: Gregory, *Geographical Imaginations*.

[29] T. Mitchell, "The World as Exhibition", *Comparative Studies in Society and History* 1989, 31(2), p. 224, 229, 233.

[30] Several scholars have described this, for a lengthier discussion see: J. Pickles, *A History of Spaces: Cartographic Reason, Mapping and the Geo-Coded World*, London 2004.

reading "The external boundaries of India as depicted are neither accurate nor authentic".[31] A cautionary warning revealing not only the anxious cartography of India, but also a truth about the map. Returning to Minard's map, the title explicitly mentions that the map is 'figurative' and 'approximate'. The difference between Minard's warning and that of India's external borders is that India's monitoring of its depiction was an attempt at control and authority over its claim to nationhood, and Minard's map is an admitted abstraction without geographical authority nor authenticity. The imposed stamp on India's map indicates that the cartographic anxiety is attached specifically to borders. Borders are seemingly rudimentary to contemporary cartographic depictions of migration. Thus, maps of migration should, in theory, also spark the cartographic anxiety because they visualize the crossings of the supposedly impenetrable, thin border lines. Minard's flowline begins and ends at the shore, capturing people moving in an extended moment, where they are out of one country and not yet in another. This cartographic anxiety does not haunt Minard's landscapes. To further comprehend the radical nature of his depiction, the next part of the paper outlines contemporary border crossing visualisations.

Among the most critiqued contemporary cartographic depictions of migration are the maps by Frontex. Frontex is the European border and coast guard agency, which has been accused repeatedly of human rights violations.[32] Its mapping practices are the lead example in this paper because of the existing scholarship on their maps. Henk van Houtum and Rodrigo Bueno Lacy deemed the 2015 map of 'Quarterly detections of illegal border-crossing, 2014–2015' (https://tinyurl.com/y6o38jq3, p. 9) a cartographic malpractice.[33] None of Frontex's maps can be reproduced here due to copyright issues, but show threatening red and purple arrows traveling from a dynamic Africa and West Asia towards a unified, blue European Union. The visual language of large arrows borrows from a historic tradition of war maps, using the same to

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[31] Quoted in: R. Rao, "Revisiting Cartographic Anxiety", *Osgoode Hall Law Journal* 2012, 49(3), p. 575.

[32] One can consult Human Rights Watch or Amnesty International websites for further documentation. See, for example; *EU: Frontex Complicit in Abuse in Libya*, "Human Rights Watch", December 12, 2022, available online: https://www.hrw.org/news/2022/12/12/eu-frontex-complicit-abuse-libya [accessed: 24 June 2024]; *Greece: Violence, lies, and pushbacks – Refugees and migrants still denied safety and asylum at Europe's borders*, "Amnesty International" June 23, 2021, available online: https://www.amnesty.org/en/documents/eur25/4307/2021/en/ [accessed: 24 June 2024].

[33] Van Houtum and Bueno Lacy, *'Ceci n'est pas la migration'*, p. 153.

depict invasions.[34] Van Houtum and Bueno Lacy point out the disproportionate size of arrows, and all the information that the map omits: how many tourists travel the other way, or the number of people who gain legal permission to stay in Europe. One of their critiques is also that the map reproduces borders, calling it the territorial trap, which reduces all mobility issues to a state issue.[35] The thin line does not show that the border is, in fact, "always in motion, contingent, and contextual."[36] In the cartoonish and dramatized depiction of movement, Frontex breaks with the tradition of the gaze: the world is not organised as an exhibition to consume and study. It is a chaotic cartography where the person who moves is a threat to Europe. The erratic movement and arrows disturb the calm, orderly geography depicted as the backdrop, making the migration patterns a threat to the map itself.

What is at stake in Frontex maps goes beyond visualizing migration. The relationship between mapping, borders and mobility is an issue of state formation; in this case, however, it is at the European level. The European Union is not merely imagined through coherent cartographic images, but also through images of border crossings. [37] Or, as it has been formulated by scholars on counter-mapping practices, the border exists only in its violation.[38] Rogier Van Reekum and Willem Schinkel scrutinise the visuals produced by border management, considering how news media depicted Ukrainian people fleeing towards the European Union with large arrows. The arrows on these maps were also criticised for mimicking invasion maps. Running through recent and historical examples of maps of migration, they argue that the maps all make clear distinctions between "being in a place and of a place."[39] Hence, the border maps of migration are concerned with the national border *and* the border between citizen and non-citizen. The flowline is always a line of origin, of displacement, and almost always in opposition to the stable citizen, which

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[34] H. van Houtum, "Remapping Borders", in: *A Companion to Border Studies*, eds. T.M. Wilson and H. Donnan, West Sussex 2012, p. 412.

[35] H. van Houtum, *Free the Map: From Atlas to Hermes: A New Cartography of Borders and Migration*, Rotterdam 2024, p. 20.

[36] Ibidem, p. 35.

[37] Explained extensively here, see: R. Van Reekum and W. Schinkel, "Drawing Lines, Enacting Migration: Visual Prostheses of Bordering Europe", *Public Culture* 2017, 29(1), pp. 27–51.

[38] M. Casas-Cortes, S. Cobarrubias, C. Heller and L. Pezzani, "Clashing Cartographies, Migrating Maps: Mapping and the Politics of Mobility at the External Borders of E.U.Rope", *ACME: An International Journal for Critical Geographies* 2017, 16(1), p. 21.

[39] Van Reekum and Schinkel, *Drawing lines, Enacting Migration*, p. 44.

remains in one nation. As the authors conclude, "To belong where you are encountered is therefore the exact antithesis of our current mobility regime."[40]

One map is not circumstantial enough to comprehend the widespread mapping of migration, nor the intricacies of the technologies and policies developed to undertake this. The aforementioned map is among the least sophisticated of Frontex's mapping practices. The much more sophisticated i-Map is, by contrast, a cartographic, panopticon-like database showcasing the routes people take to reach the European Union's external border, collecting data from both member states and neighbouring countries.[41] Martina Tazzioli ironically points out that it has effectively shattered the map of Europe.[42] The European Neighbourhood Policy and bilateral agreements extend the external European border into Northern Africa and West Asia. While the i-Map structures Frontex's work, the map in the Risk Analysis Report summarizes and justifies it. A quick review of the reports from the last four years reveals that Frontex stopped using the much-critiqued swooping arrows in recent years. Only one map with large, red, static arrows remains (example: https://tinyurl.com/2j74j4he, p. 10). On their website, the current, evolving map of migration does not involve arrows at all, but displays a seemingly calm visual in blues and greens, outlining patterns of movement using circles.[43] On both this map and the map in the risk analysis a text emerges. On the website map, it reads:

> The boundaries and names shown and the designations used on this map do not imply official endorsement of acceptance by the European Union || * This designation is without prejudice to positions on status, and is in line with the UNSCR 1244, and the ICJ Opinion of the KOSOVO Declaration of independence. || ** This designation shall not be construed as recognition of a State of Palestine and is without prejudice to the individual positions of the Member States on this issue" || The pictorial representation does not purport to be the political map of India.[44]

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[40] Ibidem, p. 37.

[41] For a further explanation and critical treatment of the i-Map, see: S. Cobarrubias, "Mapping Illegality: The i Map and the Cartopolitics of "Migration Management" at a Distance", *Antipode* 2019, 51(3), pp. 770–794.

[42] M. Tazzioli, "Migrants' Uneven Geographies and Counter-Mapping at the Limits of Representation", *Movements. Journal for Critical Migration and Border Regime Studies* 2015, 1(2), p. 9.

[43] *Monitoring and risk analysis: Migratory Map*, "Frontex", available online: https://www.frontex.europa.eu/what-we-do/monitoring-and-risk-analysis/migratory-map/ [accessed: December 2023].

[44] Ibidem.

These are relatively new designations in Frontex mapping practices, which showcase a new cartographic awareness and an admitted cartographic anxiety. They reveal a certain neurosis, in which the borders on the map are not stable enough to be drawn, nor vague enough to be erased. The borders of Palestine, Kosovo, and India exist on a sliding scale between veracity and uncertainty. This marks an unusual scepticism, in contrast to the previous, propaganda-like, cartographic campaigns. While a critique of Frontex's maps is apt, the agency's politics, strategies, and technologies do not begin and end with their maps. They can change their maps, and leave the rest untouched. On this map, the largest admitted anxiety is borders, and not migration.

Minard's map divulges the temporality issue of contemporary migration maps, and their association with military cartography. Historically, military maps were used to plan battles. Anders Engberg-Pedersen analyses the significance of maps in *War and Peace* by Leo Tolstoy (1867), describing how a general begins confusing two battles; the won battle, which took place in the carefully and cartographically planned reality, and the lost battle, which played out in the real landscape of the battlefield.[45] Though this literary-specific example should not be made generalisable, the prediction aspect of battle or invasion maps is significant, alongside its notion of absolutism; what is planned on the map seems so close to the truth that it appears real. Van Houtum links Frontex's maps directly to invasion maps from World War II, which, again, outline threats of invasions, not actual invasions. They are visual warnings. This makes the Frontex map and its association with military cartography a map of a supposed, imminent future. It is not just a persuasive image of people crossing the external European Union border without permission, but a warning of the erosion of the European Union. Again, this is a map about borders, not migration. While the consequences of the migration Minard depicted play out in the present, his map shows events firmly rooted in the past. It is a map that exclusively depicts that which has already occurred.

In its attachment to the past, it provides an origin story to some tenets of flow-mapping. Flow maps were persuasive from their inception, illustrating a focus on nationalist interests; trade maps commonly depicted the state as economically thriving, or general Western dominance.[46] This feature of flow-mapping was later employed in Nazi Germany to justify German Ex-

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[45] A. Engberg-Pedersen, "Event Maps: The Cartographic Archive and Imagined Futures of War", in: *(W)Archives: Archival Imaginaries, War, and Contemporary Art*, eds. D. Agostinho, S. Gade, N. Bonde Thylstrup and K. Veel, Berlin 2020, pp. 70–71.

[46] Segal, *Flow Mapping through the Times*, p. 100.

pansionism, and the right to eradicate the Jewish population.[47] The more movement associated with a nation, the more developed it was. In the more recently outlined history of mapping migration, the first use of the arrow on maps of migration is traced back to Ernst Georg Ravenstein's *Currents of Migration* (1885) (ill. 3).[48] The map sketches the internal flow patterns in the United Kingdom and Northern Ireland, copying meteorological maps of wind pressures.[49] Similarly, the flows of Minard's map resemble rivers. Alexander Kent and James Cheshire briefly assess the history of mapping mobility, and question whether an arrow can still be used to symbolize migration because of its close association with invasion maps.[50] One of the earliest uses of an arrow on a map gives the direction of the river, which resembles an archers' arrow.[51] Its early use cements it as a symbol rooted in weaponry. Kent and Cheshire examine another early map of migration which is a flow-map using arrows, and maybe the first of its kind (ill. 4). The map is from 1902 and was published in 1929 in a Russian school atlas. Like Minard's map, the arrows leaving Europe and Eastern Europe are pastel-coloured, while the lines leaving West Africa are black, the yellow line describes 'Hindus,' and the dotted lines leave East Asia. The main difference here is that this map reproduces borders and follows the Mercator projection. The result is strikingly dissimilar, and more chaotic. Flow maps' potential as persuasive images was recognised early and actively utilised. Yet early maps of mobility borrowed its visual symbols from natural phenomena and wind pressures, depicting migration as a natural phenomenon.

Seeing Minard's map as a visual interruption to hegemonic ways of mapping mobility, requires examining efforts of counter-mapping migration. Generally, counter-maps document the violence of border-regimes or imagine alternatives. In some instances, they do both. Tazzioli encourages non-cartographic counter-maps, which showcase how irregular movement can productively perturb the depicted space of Europe, away from hegemonic imaginations. Instead of maps following journeys and focusing on movement itself, counter-maps should focus on the space migration produces against hegemonic imagination.[52] She summarizes that the issue of cartographic

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[47] Ibidem.

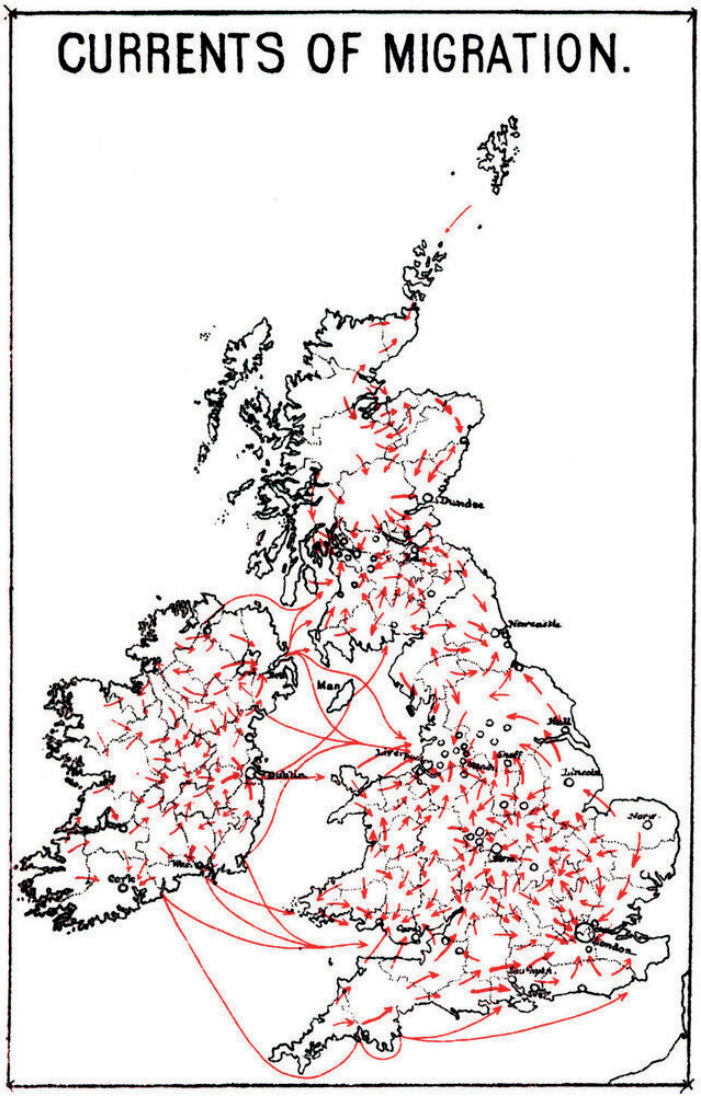
[48] Bacon et al. *Mapping the Migratory Movements*.

[49] J. Cheshire and A.J. Kent, "Getting to the Point? Rethinking Arrows on Maps", *The Cartographic Journal* 2023, 16, p. 4.

[50] See: ibidem, pp. 1–17.

[51] Ibidem, p. 2.

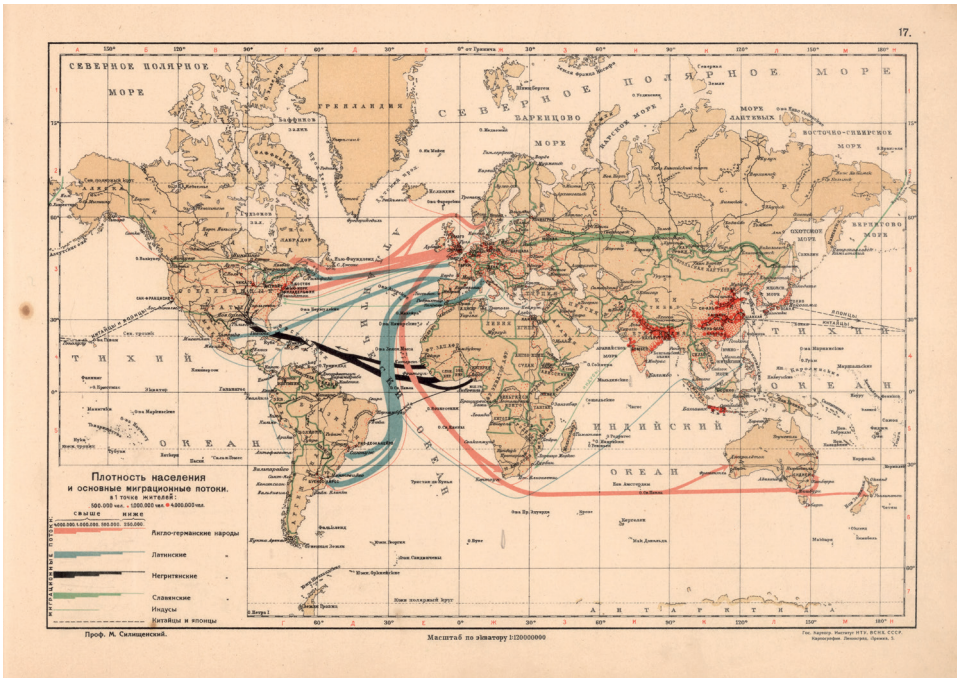
[52] Tazzioli, *Migrants' Uneven Geographies…*, p. 15.



3. Ernst Georg Ravenstein, *Currents of Migration*, 1885

counter-mapping migration is about visibility.[53] Maps primarily function by 'making visible', while those trying to transgress highly surveilled borders use a strategy of invisibility to cross. Thus, counter-mapping routes might work counterintuitively: not only do they reveal routes, they may also justify border enforcements. Artists and activists have adopted a range of strategies in

[53] Ibidem, p. 4.



4. Mitrofan Ivanovich Silishchensky, "Plotnost naseleniya i osnovnyye migratsionnyye potoki", 1902 in: *Geograficheskiy atlas Chast 1*. Sostavil Prof. M.I. Silishchenskiy pod redaktsiyey N.N. Baranskogo i V.A. Kamenetskogo, Nauchno-pedagogicheskoy Sektsiyey Gosudarstvennogo Ucheta Soveta dopushchen v kachestve posobiya dlya shkol'nykh bibliotek. Aktsionernoye obshchestvo "Sovetskaya entsiklopediya" Moskva 1929 (David Rumsey Historical Map Collection Archive)

their mapping efforts. To mention a few examples: Tiffany Chung combines multiple data sets in hand-drawn maps of routes in which she reproduces borders; Forensic Oceanography maps human rights violations at sea, focusing on culpability and responsibility; and Pedro Lasch makes images of borderless landscapes, which he has people transport across the US-Mexico border. This paper cannot do justice to the wealth of counter-mapping examples,[54] but underlines that many counter-maps function through the logic of 'making visible,' even with the best possible intentions.

The 1862 abstract image of migration proffers a counter-imagination of Europe. The largest migration patterns come from this continent, portraying migration flows as pouring from its shores. Due to the missing borders, the nations, continents and regions are depicted in the flowlines. Naked, empty landscape

[54] For an overview, see: van Houtum. *Free the Map*.

has an uneasy place in imperial cartography. Native populations were eradicated from the cartographic depiction to render 'unpopulated' territories ripe for occupation.[55] Yet Minard's map is far from depopulated. He turned the logic upside down: the territories are not stable, but on the move. To recall what Van Reekum and Schinkel wrote: "To belong where you are encountered is therefore the exact antithesis of our current mobility regime."[56] On Minard's map of migration, the people on the move belong on the journey, and the line itself becomes the border, geographically enclosing them in the in-between state of travel. Though this is no romantic, idealistic depiction of migration, the people here belong where they are observed. They are not in a place or of a place; rather, they are a place. Under a contemporary loop, Minard's map produces a counter-imagination of space, produced by people on the move: a geographic river.

Minard's lack of borders means that it does not function according to the logic of 'the grid', an underlying structure of maps and thus a hegemonic imagination of space. Beyond national borders, coordinates and projections are also based on the grid structure. In the article "Grids" (1979), art historian Rosalind Krauss attacks the grid as an emblem of Modernism, and its association with art's autonomy or progress. Krauss denies this, and showcases its 19th-century roots in scientific illustrations and data visualisations. In her complex analysis, Krauss outlines how once artists began studying the optics of colour and perception scientifically, their works counter-intuitively became abstract and spiritual. Krauss almost sounds like a critical cartographer when she writes: "The grid's mythic power is that it makes us able to think we are dealing with materialism (or sometimes science, or logic) while at the same time it provides us with a release into belief (or illusion, or fiction)."[57] Returning to the underlying grid-structure for most cartography, the cartographic anxiety is then similar to pointing out that god is not real, or, that the emperor is not wearing any clothes. It reveals that the reproduction of borders or geographic correctness returns the map into the spiritual dimension of scientific

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[55] H. Winlow, "Mapping Moral Geographies: W.Z. Ripley's Races of Europe and the United States", *Annals of the Association of American Geographers* 2006, 96(1), p. 121. See also: J.B. Harley, "Silences and secrecy: The hidden agenda of cartography in early modern Europe", *Imago Mundi* 1988, 40, pp. 57–76; M. Sparke, "Between demythologizing and deconstructing the map: Shawnadithit's New-found-land and the alienation of Canada", *Cartographica* 1995, 32(1), pp. 1–21; D. Clayton, "The creation of imperial space in the Pacific northwest", *Journal of Historical Geography* 2000, 26(3), pp. 327–350.

[56] Van Reekum and Schinkel, *Drawing lines, Enacting Migration*, p. 37.

[57] R. Krauss, "Grids", *October* 1979, 9, p. 55. For a more recent overview and recount of the grid at history, also consider the publication; A. Streitberger (ed.), *Grids*, Louvain-La-Neuve 2024.

objectivity. Mitchell's notion of the 'world as exhibition' reiterates this point, highlighting that when the world was set up as a picture, it bore an air of certainty and absolute truth. On Minard's 1862 map, he studied the numbers of people moving in the world and made an image of it. Counter-intuitively, he made something quite abstract: a grid-less, borderless naked landscape. This map is about migration, not borders.

The border is not a thin line on a map of migration but an image of displacement, making the flowline a line of descent which underlines that the people arriving in a nation do not belong there. Every map of migration participates in the difficult relationship between borders and movement, be they hegemonic maps or counter-maps. Both borders and people are treated as one another's antithesis, wherein borders are rendered dependent on being transgressed. To take a step aside, while continuing to engage with the current cartographic politics, this paper dove into the history of maps of migration. Charles-Joseph Minard's illustration of global migration in 1858 demonstrates that the cartographic anxiety is far from inherent to map-making, that a militant temporality invaded geographic images, and that counter-maps are no recent invention. The history of cartography is punctuated with counter-maps which, in light of current events, demands that its audiences engage critically with its contents and systems of power. Placing Minard's map among contemporary migration maps shows that a border on a map of migration is the main narrator. It quietly takes centre stage in the chaos of arrows and lines. As outlined previously, Minard's map fails several contemporary standards. If anything, his map underlines that the origin story of maps of migration is closely related to that of racial mapping practices. Though his map offers an example of how to map people in spaces of belonging, it shows that maps of migration always went beyond depicting movement. Fundamentally, they have their roots deep in the discursive soil of issues related to class, race, and nationalism. Most flowlines depicting people in the history of mapping migration quietly portrays a violent history. A full study of the history of mapping mobility is necessary to outline the extensive discourses embedded on such maps. For now, Minard's map is an example of a cartographic imagination of mobility which is about migration, not national borders.

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CHARLES-JOSEPH MINARD'S BORDERS: CARTOGRAPHIC ANXIETY AND MAPS OF MIGRATION

Summary

In 1862, the French civil engineer Charles-Joseph Minard published his *Figurative and Approximate Map Representing the Emigrants of the Globe in the Year 1858, the Countries from Which They Leave and Those Where They Arrive*. The world map showcases broad lines connecting the continents, dividing the categories of people travelling by nationality or city of departure and sorts them by colour, such as blue or green. However, the last three categories, the country of China, the continent of Africa, and the region of South Asia, are depicted in yellow, light brown, and dark brown. It is one of the earliest flow-maps of migration, and it contains no borders.

Keywords:
migration, critical cartography, cartographic anxiety, borders