Dangerous Congestions: Cholera, Mapping, and the Beginnings of Modern Urbanism
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1   See Evelien van Es, "The Exhibition 'Housing, Working, Traffic, Recreation in the Contemporary City': A Reconstruction," in Evelien van Es et al., eds., *Atlas of the Functional City: CIAM 4 and Comparative Urban Analysis* (Bussum: THOTH Publishers/Zurich: gta Verlag, 2014), 441–44.

2   See Anna M. Cabré and Francesc M. Muñoz, "Ildefons Cerdà and the Unbearable Density of Cities," in *Cerdà: Urbs i Territori: Planning Beyond the Urban*, exh. cat., Barcelona, 1994–1995 (Madrid: Electa, 1996), 37–46.

3   Cf. Arthur H. Robinson, *Early Thematic Mapping in the History of Cartography* (Chicago: University of Chicago Press, 1982); Tom Koch, *Cartographies of Disease: Maps, Mapping, and Medicine* (Redlands: Esri, 2005); Philipp Felsch, "Wie August Petermann den Nordpol erfand: Umwege der thematischen Kartografie," in Steffen Siegel and Petra Weigel, eds., *Die Werkstatt des Kartographen: Materialien und Praktiken visueller Welterzeugung* (Munich: Fink, 2011), 109–21.

4   Enrico Chapel, *L'œil raisonné: L'invention de l'urbanisme par la carte* (Geneva: Metis, 2010). Chapel's focus is on France and the fourth Congrès International d'Architecture Moderne 4; for the latter see also Enrico Chapel, "Thematic Mapping as an Analytical Tool: CIAM 4 and Problems of Visualization in Modern Town Planning," in van Es et al., *Atlas of the Functional City*, 27–37.

Density was a constant concern of modern urbanism. When the results of the fourth Congrès International d'Architecture Moderne on the "functional city" were presented at an exhibition in Amsterdam in 1935, 1 a shocking montage warned against high population density, declared as the cause of infant mortality. The panel shows a wretched child in front of a map visualizing the density of Barcelona's districts. **fig.1** The three-dimensional cartogram rises in the medieval city center, where the population was densely packed—a fact that had already bothered Ildefonso Cerdà nearly a century before. The engineer, who planned a new, more spacious Barcelona in the 1850s and 1860s, built his urban theory on statistics, 2 making him one of the first modern urbanists. Detailed statistics on cities were first collected in the 1820s and 1830s, when population statistics and thematic cartography in general made a leap, pioneered by France and Great Britain. Subsequently, the relationship between density, disease, and poverty became the focus of interest for physicians and statisticians. One of the reasons for this was the second cholera pandemic, which—originating from India—crossed Europe in the early 1830s. 3 As is the case in the current coronavirus pandemic, the cholera pandemic caused a surge in datafication. Tables and maps of the distribution of the disease proliferated, together with statistical mapping in general, and the discourse on hygiene and urban reform gained momentum.

These new statistical maps raised awareness of social and urban differences and contributed to the discovery of the transmission routes of cholera. At the same time, these maps also created a new urban imaginary. With them, a new city emerged—a city of cloudy masses and differing zones, showing the population as a mobile and movable mass. And with these maps, modern urbanism came into existence—as a discipline monitoring demographic movements, steering the distribution of the population and ensuring its health, which meant, before everything else, the removal of congestion. Following Enrico Chapel, for whom statistical mapping and modern urbanism are inextricably linked, 4 in this essay I will draw on maps from Great Britain, France, and Germany to trace the fear of congestion that emerged in the wake of the cholera pandemics and outline the urbanist strategies that resulted. These include pioneering maps from the 1840s that pushed sanitary reform, maps from the 1870s and later that urged attention to housing, and maps from the 1910s that were used to model urban form as a whole. The point of this synopsis spanning

a century is to show that these maps set a specific epistemic frame that not only changed the way the city was imagined but also how it was planned and managed. 5

Cholera Maps

As Ian Hacking has put it, an "avalanche of printed numbers" was set in motion in the 1820s and 1830s. Statistical surveys, especially for military and fiscal purposes, had existed long before, but in the early nineteenth century the numbers multiplied, and above all they were no longer a state secret. Statistics were promoted by civic associations, driven by scientific enthusiasm as well as a number of pressing social issues, and addressed new "moral" issues such as crime and literacy. 6 Cholera was another of these topics, and an important one. The pandemic of 1831 to 1832, the first to reach Central and Western Europe, produced masses of new data as emerging experts and state commissions investigated the spread of the disease and its causes, not least using statistical maps. While many pioneering maps at this time were mainly interested in national distributions, these maps were the first to deal with differences within cities.

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Densidad por hectárea.

A simple way to visualize the distribution of the disease was to use different shadings that represented the average mortality of different administrative districts, as in the case of a Parisian cholera map from 1834. fig.2 The map was part of a report that made it clear that the poorest suffered the most. One of its authors, the physician and statistician Louis René Villermé, who had been studying mortality in Paris since the 1820s, was convinced that disease was a social phenomenon. Rivers and wet "miasmatic" lowlands, which older hygiene theories feared, posed no danger in his eyes. Poverty, with its many disadvantages, was for him the most likely cause of sickness—even more significant than living in a densely populated area, which often, but not always, went hand in hand with poverty. 7 Other cholera maps, such as one of Hamburg from 1836, were more detailed and analyzed the distribution of the disease street by street. fig.3 This map was later included in a report of the British General Board of Health on the cholera epidemic of 1848 to 1849, 8 which also contained a map of London with an even more nuanced shading that gave the disease its own shape. fig.4 Maps like these were used to study the relationship between disease, topography, population density, and poverty. The German cartographer August Petermann, for

5 For more, see Christa Kamleithner, *Ströme und Zonen: Eine Genealogie der "funktionalen Stadt"* (Basel: Birkhäuser, 2020).

fig.1 Population density in Barcelona (n.d.), panel on the exhibition *Wonen, werken, verkeer, ontspanning in the hedendaagse stadt*, Stedelijk Museum, 1935, which presented the results of the fourth Congrès International d'Architecture Moderne of 1933 Source: gta Archives, ETH Zurich, CIAM 42-04-7-51-X2

6 Ian Hacking, "Biopower and the Avalanche of Printed Numbers," *Humanities in Society* 5 (1982), 279–95, here 281.

7 Despite (or perhaps because of) this clarity, Villermé did not recommend any concrete infrastructural measures. Instead, the liberal hygienist put his trust in the economic progress the future would bring. See, William Coleman, *Death Is a Social Disease: Public Health and Political Economy in Early Industrial France* (Madison: University of Wisconsin Press, 1982), chp. 6, 149–80.

8 Niedersächsisches Gesundheitsamt, Deutsche Gesellschaft für Kartographie and Staatsbibliothek Berlin—Preußischer Kulturbesitz, eds., *Den Seuchen auf der Spur: 200 Jahre Infektionskrankheiten im Kartenbild*, exh. cat. (Niedersächsisches Landesgesundheitsamt: Hannover, 2012), 10.

fig. 2 Cholera map of
Paris in 1832
Source: *Rapport sur la
marche et les effets du
choléra-morbus dans
Paris et les communes
rurales du département
de la Seine: Année
1832* (Paris: Imprimerie
royale, 1834), 49
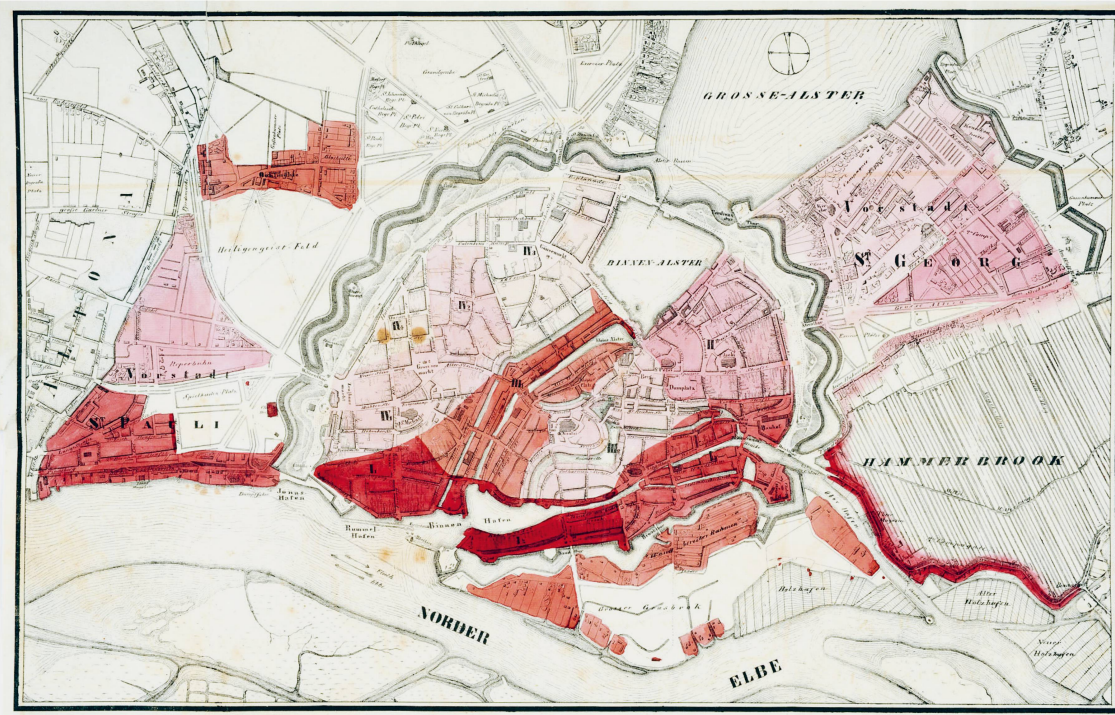
fig. 3 Map of the 1832 Hamburg cholera epidemic
Source: J. N. C. Rothenburg, *Die Cholera-Epidemie des Jahres 1832 in Hamburg: Ein Vortrag gehalten in der Wissenschaft — Versammlung des Ärztlichen Vereins am 17. November 1835* (Hamburg: Perthes & Besser, 1836)
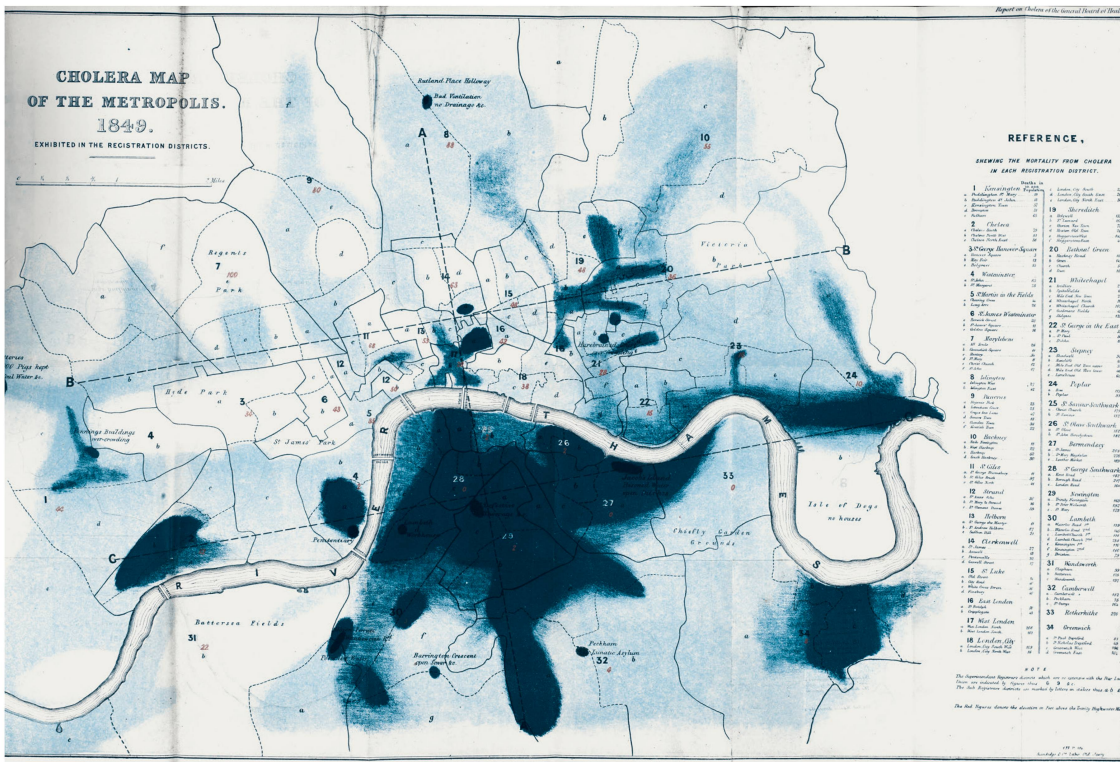
fig. 4 Cholera map of London in 1849
Source: *Report of the General Board of Health on the Epidemic Cholera of 1848 & 1849. Presented to both Houses of Parliament by Command of Her Majesty* (London: Clowes and Sons, 1850), Wellcome Collection

example, who wanted to make himself known in London, made finely shaded maps of both the distribution of the disease in the British Isles in 1848 and the Isles' population—thus showing that topography was not a threat (as was still believed by some) but that population density instead was to be feared. As Philipp Felsch has pointed out, cartographers and statisticians in this period believed in the medium of the map. They actually thought they could derive meaning from the distribution of a phenomenon without further investigation. [9]

In the cholera year 1848, the long-discussed Public Health Act was passed. Inspired by Edwin Chadwick's famous *Sanitary Report* of 1842, the act obliged British communities to invest in water pipes and new sewer systems when certain death rates were reached. Chadwick's report is usually celebrated as a milestone in the history of hygiene, but it has also received harsh criticism. In

9 Felsch, "Wie August Petermann den Nordpol erfand," 115–18.

fig. 5 Edwin Chadwick, Sanitary Map of Leeds, 1842, based on a cholera map by Robert Baker from 1833 Source: Edwin Chadwick, *Report to Her Majesty's Principal Secretary of State for the Home Department, from the Poor Law Commissioners, on an Inquiry into the Sanitary Condition of the Labouring Population of Great Britain; with Appendices* (London: Clowes and Sons, 1842), Wellcome Collection

the eyes of the historian Christopher Hamlin, its main achievement was even the reduction of existing knowledge. For the report, the secretary of the British Poor Law Commission had gathered comments on the sanitary condition of the laboring population from doctors and commissioners from all over Britain that dealt with a variety of problems—not least malnutrition, which made the poor vulnerable to all kinds of diseases. Chadwick, however, put forward a single argument: that dirt, and the miasmas that allegedly resulted from it, caused illness and misery. [10] An accompanying map of Leeds, which was based on a cholera map from 1833, [11] clarified this message: workers' quarters were not only the most densely populated and dirtiest places in the city but also the places where illness and disease were concentrated. **fig. 5** Chadwick, who advocated a new miasmatic theory that no longer believed

10 Christopher Hamlin, *Public Health and Social Justice in the Age of Chadwick: Britain, 1800–1854* (Cambridge: Cambridge University Press, 1998).

11 Robinson, *Early Thematic Mapping*, 172, 186.

in the danger of swamps but of man-made filth, thus radically simplified the multifaceted problem of poverty in order to propose a technical solution. And this solution, which would guide the emerging sanitary movement and housing reform, was to resolve disturbing densifications: in the future, new alluvial sewer systems in which water ran under pressure in precisely calculated pipes were to remove the dirt from the city; likewise, traffic routes were to be created where the population could be "drained" to the urban periphery. [12] Whether it was wastewater or population, in both cases dangerous congestion and stagnation had to be removed.

"Continuous Circulation"

The 1830s and 1840s were marked by a new mobility. Road networks and shipping canals were expanded, the first railway lines were built, and world trade grew. This facilitated the spread of cholera, and at the same time the disease threatened this new, interconnected world. The authorities first reacted with quarantine measures traditionally used against the plague and sealed off entire villages from the outside world. Austria reactivated the old plague front and turned its eastern borders into a *cordon sanitaire*, and Prussia did likewise. [13] To liberal minds, this seemed an act of despotism which, moreover, was not successful. New miasmatic theories therefore questioned the principle of quarantine, which was supposed to prevent direct — "contagious" — infection. According to them, the evil lay in toxic exhalations, which were to be eliminated by a general hygienic cleansing of the environment. [14]

Quarantine measures did not disappear with these theories, but within Europe these measures were both unified and loosened, and pandemic defense was shifted to the East. The countries of the Middle East were seen as buffer zones between Europe and India, the origin of cholera. This was legitimized with the assumed stasis and backwardness of the "Orient," where isolation measures seemed easier to handle than in "modern" countries with their busy trade activity and populations constantly on the move. [15] The strongest opposition to quarantine came from the British. The British Board of Health was also the first authority to embrace the new miasmatic theories and put its trust in the circulation of water when, with the Public Health Act of 1848, it required British municipalities to invest in urban infrastructure. [16] Water was to be brought in and out of every house and then purified on drain fields, and this principle of "continuous circulation" was promoted by British experts at international congresses in the 1850s, whether they were dedicated to hygiene or charity. [17] This principle, of course, has many advantages we appreciate today, and

[12] Chadwick, *Report to Her Majesty*, 287–88

[13] See Barbara Dettke, *Die asiatische Hydra: Die Cholera von 1830/31 in Berlin und den preußischen Provinzen Posen, Preußen und Schlesien* (Berlin: de Gruyter, 1995).

[14] The classic text on this is Erwin H. Ackerknecht, "Anticontagionism between 1821 and 1867," *Bulletin of the History of Medicine* 22 (1948), 562–93.

[15] Cf. Valeska Huber, "The Unification of the Globe by Disease? The International Sanitary Conferences on Cholera, 1851–1894," *Historical Journal* 49, no. 2 (June 2006), 453–76, esp. 461–62; Benoît Pouget, "Quarantine, Cholera, and International Health Spaces: Reflections on 19th-Century European Sanitary Regulations in the Time of SARS-CoV-2," in "Spotlight Issue: Histories of Epidemics in the Time of COVID-19," special issue, *Centaurus* 62, no. 2 (May 2020), 302–10.

[16] Cf. Ackerknecht, "Anticontagionism"; Hamlin, *Public Health and Social Justice*, chp 8 and 9, 245–301.

[17] *Congrès général d'hygiène de Bruxelles: Session de 1852* (Brussels: G. Stapleaux, 1852), 29–32; *Congrès international de bienfaisance de Bruxelles: Session de 1856*, vol. 1 (Brussels: G. Stapleaux, 1857), 67–88.

bacteriology, which emerged in the 1880s, promoted its implementation. As early as 1854, John Snow demonstrated the value of clean drinking water when he discovered that cholera is spread via contaminated water. [18] However, the principle of "continuous circulation" embodied an entire world view and was first of all about the removal of filth and everything connected to it. The circulation of water was not only to overcome disease but also laziness and drunkenness among the poor, and to create a clean environment that would encourage industriousness. Stagnation of any kind was to be eliminated and the "organism" of the cities perfected. Circulation formed a value in itself. [19]

Statistics and Urban Reform

In the German Empire, it was the German Association of Public Health (Deutsche Verein für öffentliche Gesundheitspflege), founded in 1873, that promoted what Chadwick had called for in his *Sanitary Report*: the introduction of alluvial sewers as well as the decongestion of the population. The association, which brought together hygienists, engineers, and city politicians, emerged from a division of the Society of German Natural Scientists and Physicians (Versammlung deutscher Ärzte und Naturforscher), which had been founded in 1867 — the year after the fourth cholera pandemic had hit German-speaking countries. [20] Urban growth, the resulting logistical and density problems, and, above all, the statistics making them visible, increased the political pressure to act. The data provided by the newly established municipal statistical offices — Berlin and Vienna were the first in 1862 [21] — caused alarm. The Berlin office, in particular, drove the debate on urban reform with its publications. Its first yearbook was published in 1867 — belatedly because of cholera but with a map of its distribution showing the city besieged by dark stains. [22] Maps of population density followed, included in the regular reports on the Berlin census by the director of the office, Hermann Schwabe. [23] fig. 6

        These reports also provided detailed statistics on housing conditions which were, compared to other European cities, astonishingly detailed. Thanks

18 A discovery made with the help of maps, but maps that were embedded in in a clear chain of evidence. Steven Johnson, The Ghost Map: *The Story of London's Most Terrifying Epidemic — and How It Changed Science, Cities, and the Modern World* (New York: Penguin, 2006).

19 For more, see Kamleithner, *Ströme und Zonen*, chp. 5, 141–64.

20 For more, see Anne I. Hardy, *Ärzte, Ingenieure und städtische Gesundheit: Medizinische Theorien in der Hygienebewegung des 19. Jahrhunderts* (Frankfurt: Campus, 2005); Lorenz Jellinghaus, *Zwischen Daseinsvorsorge und Infrastruktur: Zum Funktionswandel von Verwaltungswissenschaften und Verwaltungsrecht in der zweiten Hälfte des 19. Jahrhunderts* (Frankfurt: Klostermann, 2006).

21 Cf. Karl Seutemann, "Die Städtestatistik," in Robert Wuttke, ed., *Die deutschen Städte, geschildert nach den Ergebnissen der ersten deutschen Städteausstellung zu Dresden 1903*, vol. 1 (Leipzig: Brandstetter, 1904), 864–92.

22 Statistisches Bureau der Stadt Berlin, ed., *Berliner Stadt- und Gemeinde-Kalender und Städtisches Jahrbuch für 1867*, vol. 1 (Berlin: Guttentag, 1867).

23 Hermann Schwabe, *Die Resultate der Berliner Volkszählung vom 3. December 1867* (Berlin: Kortkampf, 1869); Hermann Schwabe, *Die Königliche Haupt- und Residenzstadt Berlin in ihren Bevölkerungs-, Berufs- und Wohnungsverhältnissen: Resultate der Volkszählung und Volksbeschreibung vom 1. December 1871* (Berlin: Simion, 1874).

to Salomon Neumann, a pioneer of public hygiene and friend of Rudolf Virchow, the census in Berlin was reformed in 1861 and thence after included information on how many rooms the dwellings had and thus how densely occupied they were. [24] The same information was available for Vienna from 1869 onwards. [25] In London and Paris, these figures were only collected three decades later. In London, the spread of cholera could already be tracked on a weekly basis in 1866, [26] but detailed housing statistics were only available after 1891, when Charles Booth—who had just published his monumental work on the distribution of poverty in London—served as a consultant to the General Register Office. [27] In Paris, too, a lot of data had long been available, but only since 1891 had the census asked questions regarding the details of dwellings to quantify overcrowding. [28] **fig.7** Jacques Bertillon, the director of the municipal service, had recently contributed to

fig.6 Population density of Berlin in 1867 Source: Hermann Schwabe, *Die Resultate der Berliner Volkszählung vom 3. December 1867* (Berlin: Kortkampf, 1869)
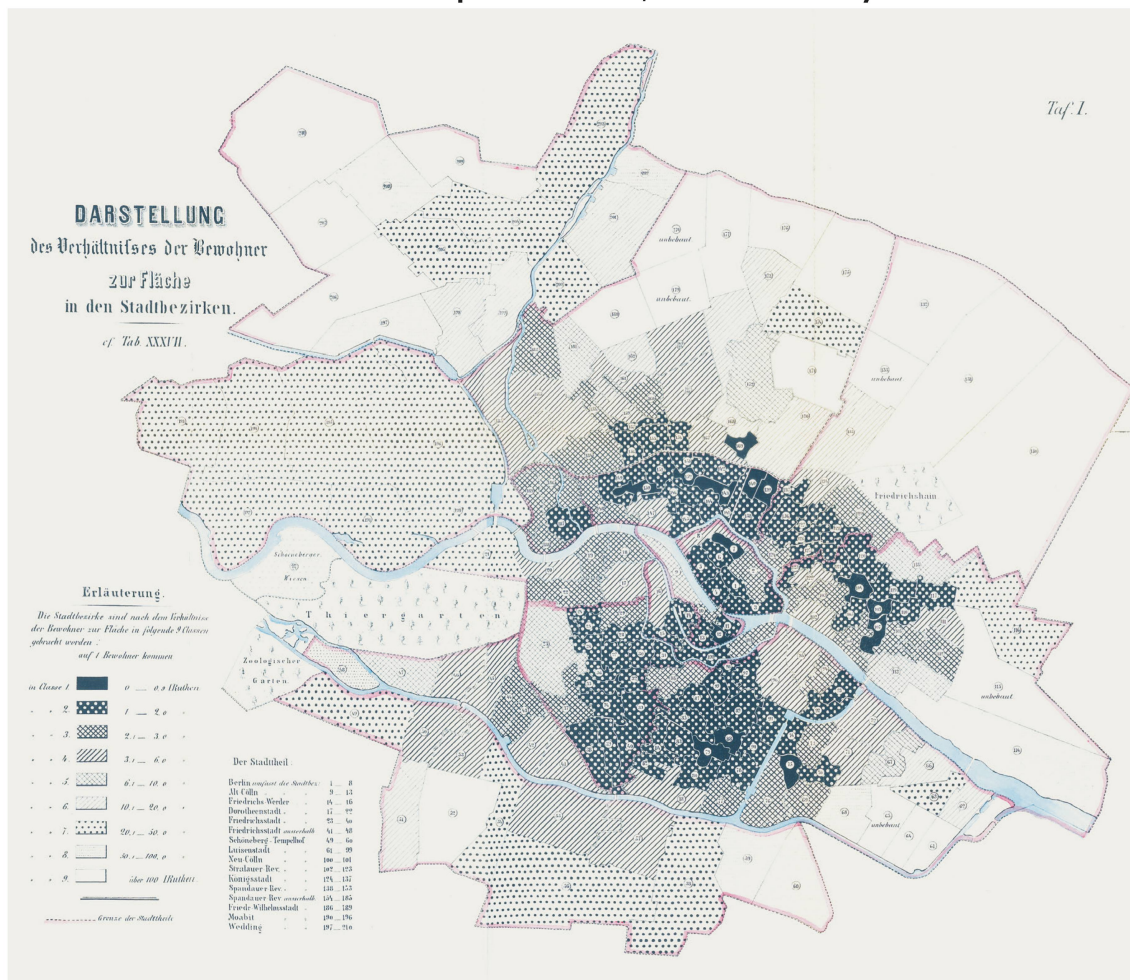
data production and its visibility when he published three map collections between 1889 and 1891, including maps of more than twenty diseases. [29]

That statistics on housing were produced so early in such detailed tables in the German-speaking countries is remarkable, as is the fact that a modern urbanist discourse, interested in steering population distribution, emerged there as early as the 1870s. This is

24 Statistisches Landesamt Berlin, ed., *100 Jahre Berliner Statistik: Festschrift zum hundertjährigen Bestehen des Berliner Statistischen Amtes* (Berlin: Statistisches Landesamt, 1962), 19—23.

25 Gustav A. Schimmer, "Gedanken über die Durchführung der nächsten Volkszählung in Oesterreich," in *Statistische Monatsschrift*, ed. Bureau der k.k. Statistischen Central-Commission (Vienna: Hölder, 1878), 169—78, here 171—72.

26 Thanks to William Farr, who oversaw the collection of medical statistics in England and Wales. See Steven Johnson, "How Data Became One of the Most Powerful Tools to Fight an Epidemic," *New York Times Magazine*, June 10, 2020.

27 Harold W. Pfautz, "Charles Booth: Sociologist of the City," in Harold W. Pfautz, ed., *Charles Booth On the City: Physical Pattern and Social Structure* (Chicago: University of Chicago Press, 1967), 1—170, here 32.

28 Diana Periton, "Urban Life," in Vittoria Di Palma, Diana Periton, and Marina Lathouri, eds., *Intimate Metropolis: Urban Subjects in the Modern City* (London: Routledge, 2009), 9—40, here 30.

29 Antoine Picon, "Nineteenth-Century Urban Cartography and the Scientific Ideal: The Case of Paris," *Osiris* 18 (2003), 135—49, here 147.
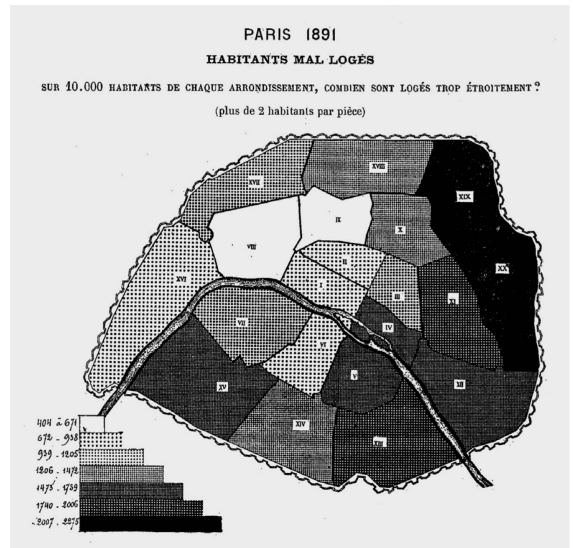
no coincidence: Reinhard Baumeister's classic *Stadterweiterungen* of 1876—which is, together with Cerdà's *Teoría* of 1867, one of the first books on modern urbanism—drew heavily on the writings of Berlin's statisticians. Their insights into Berlin's development were crucial for Baumeister. Not only were their numbers on overcrowding alarming, their knowledge about demographic movement also promised a solution. For them, the future of Berlin's *Innenstadt* was clear: just like the old City of London, it was about to become a business center. Shops and offices came, residents left—this was understood by them as a "natural development." [30]

30 Cf. Christa Kamleithner, "Concrete Abstractions: Berlin's Statistical Bureau and the Concept of Zoning, 1862–1910," in Anne Kockelkorn and Nina Zschokke, eds., *Productive Universals—Specific Situations: Critical Engagements in Art, Architecture, and Urbanism* (Berlin: Sternberg, 2019), 94–123; Kamleithner, *Ströme und Zonen*, chp. 2, 63–90, and chp. 6, 165–94.
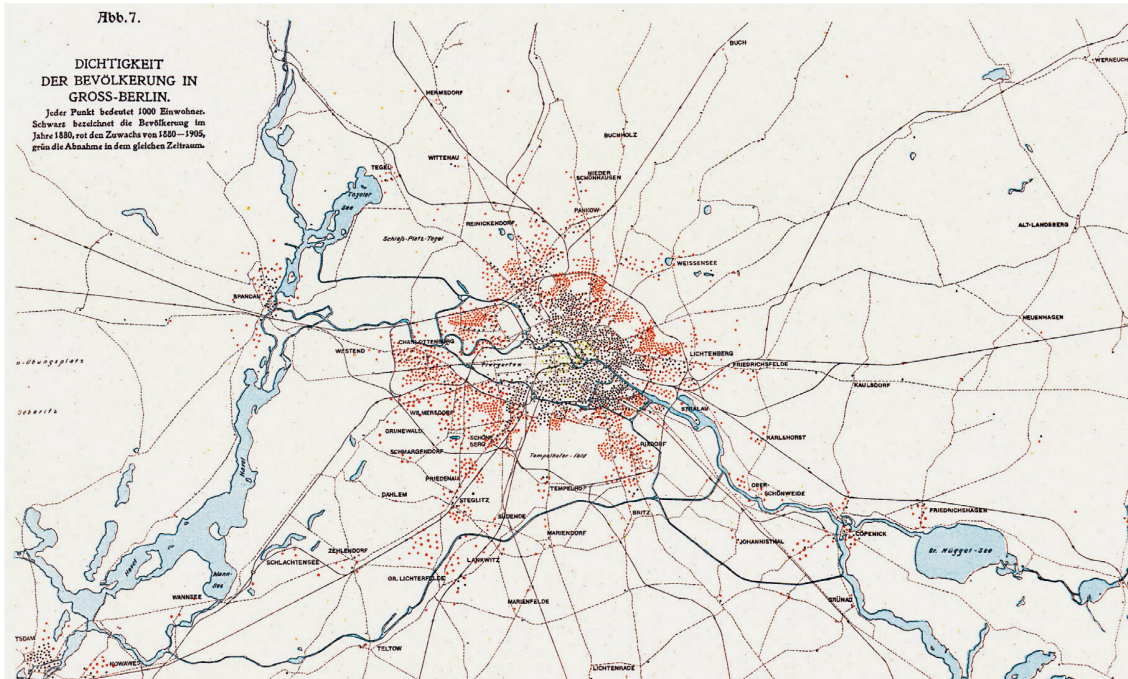
fig. 7 Inhabitants of overcrowded dwellings in Paris in 1891 Source: Jacques Bertillon, *Essai de statistique comparée du surpeuplement des habitations à Paris et dans les grandes capitales européenes* (Paris: Imprimerie Chaix, 1895), 8

31 For more, see Brian Ladd, *Urban Planning and Civic Order in Germany 1860–1914* (Cambridge, MA: Harvard University Press, 1990), chp. 6, 186–234; Kamleithner, *Ströme und Zonen*, chp. 8, 217–56.

When Baumeister argued for the planning and building of transport routes to support the provision of healthy housing on the periphery, he relied on this process that he wanted to reinforce. But what was meant to be a "natural" process turned out to be an interminable project. In the 1890s, it became apparent that more was needed than a few railways to decongest the city, which led the German Association of Public Health to promote zoning ordinances to keep building density low, at least in wealthy areas. [31] Decades later, better circulation, better housing, and functional differentiation were still the most important planning objectives.

PARIS 1891

HABITANTS MAL LOGÉS

SUR 10.000 HABITANTS DE CHAQUE ARRONDISSEMENT, COMBIEN SONT LOGÉS TROP ÉTROITEMENT?

(plus de 2 habitants par pièce)

"Draining" People, Modeling the City

Since the production of maps was expensive, statistical maps were rare in the nineteenth century. Only towards the end of the century did maps became more widely available, and with them the outwards movement of the urban population acquired a visible—and designable—form. In the 1910s, when urban planning became an international discipline, more and more paperwork was invested in statistical mapping. [32] As more and more architects entered the multidisciplinary field of urbanism, these maps began to be used as design tools. This started at the *Allgemeine Städtebau-Ausstellung* in Berlin in 1910 (parts of which were shown at the Town Planning Conference in London in the same year). The planning exhibition, which was visited by many international experts and future experts like the young Charles-Édouard Jeanneret, [33] presented the results of the Greater Berlin Competition, as well as housing and extension plans from all over Europe and the United States and statistical maps and diagrams

32 To gain an overview on statistical projects in Europe at that time, see Kees Somer, *The Functional City: The CIAM and Cornelis von Eesteren, 1928–1960* (Rotterdam: NAi, 2007), 130–38.

33 Christiane Crasemann Collins, *Werner Hegemann and the Search for Universal Urbanism* (New York: W.W. Norton, 2005), 371–72.

of Berlin. [34] Probably the best-known competition entry, a joint effort by economist Rudolf Eberstadt, architect Bruno Möhring, the traffic engineer Richard Petersen, even used a map of Berlin's population density as its basis. fig.8 This map gave the impression that the population leaving the city was channeled by the railway

Abb. 7.

DICHTIGKEIT
DER BEVÖLKERUNG IN
GROSS-BERLIN.
Jeder Punkt bedeutet 1000 Einwohner.
Schwarz bezeichnet die Bevölkerung im
Jahre 1880, rot den Zuwachs von 1880—1905,
grün die Abnahme in dem gleichen Zeitraum.

like "drainage streams," leaving the old center abandoned, [35] and the resulting zoning plan proposed to model this process by concentrating future residential areas along railways, securing green areas in between, and reducing building heights from the center to the periphery. [36]

Shortly afterwards, the preparatory work for another big competition began that made statistical surveys the starting point for extension planning. The participants of the competition for the extension of Paris, which took place between 1919 and 1920, were confronted with an exhibition of a large number of statistical maps, including older ones, and a report by the architect Louis Bonnier and the historian Marcel Poëte explaining demographic trends, land use, railways, land prices, and more. The report was convinced that the working classes were leaving the center, and this movement should not be left to chance: the competition was intended to avoid future densification and wanted to distribute the population "properly." [37] The outward movement of the population had already been visualized by older maps, fig.9 but Bonnier, who had prepared the competition, was the first to use these maps in 1919 to extrapolate future growth and give the city a new form that should create a "healthy" balance between buildings and greenery. [38] Only a few years later, in 1925, as Enrico Chapel has noticed, Le Corbusier also used this data in his book *Urbanisme*. fig.10 Whereas Bonnier had concentrated on
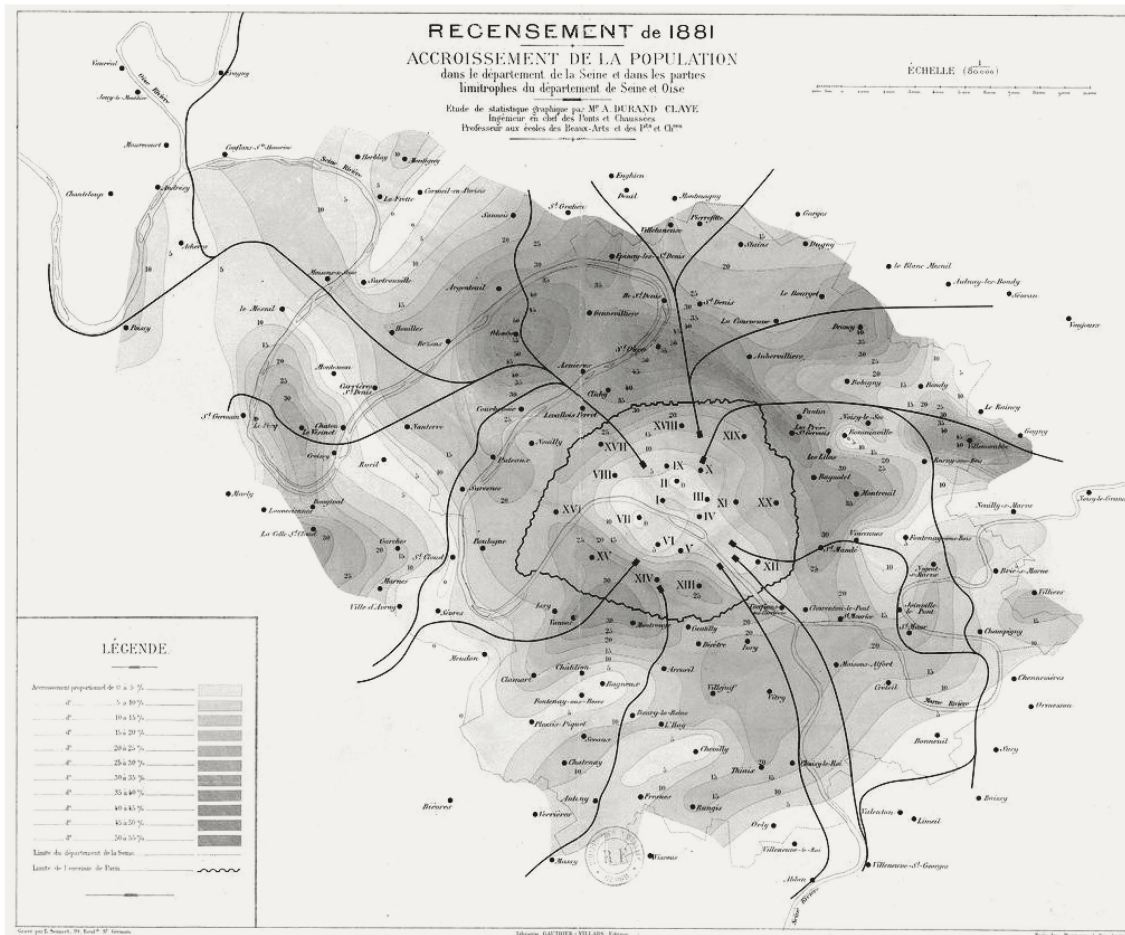
34 Werner Hegemann, *Der Städtebau, nach den Ergebnissen der Allgemeinen Städtebau-Ausstellung in Berlin* (Berlin: Wasmuth, 1911–13). For more on the exhibition, see Harald Bodenschatz et al., eds., *Stadtvisionen 1910/2010: Berlin, Paris, London, Chicago — 100 Jahre Allgemeine Städtebau-Ausstellung in Berlin* (Berlin: DOM, 2010). However, the volume overlooks the presence of statistics in the exhibition (and especially in the exhibition catalogue).

fig. 8 Richard Petersen, population density of Greater Berlin, 1880—1905 Source: *Wettbewerb Groß-Berlin 1910: Die preisgekrönten Entwürfe mit Erläuterungsberichten* (Berlin: Wasmuth, 1911), third prize, 9

35 This was a contemporary view, as demonstrated by a housing guide that presented the movement as "draining streams." *Die Berliner Vororte: Ein Handbuch für Haus- und Grundstückskäufer, Baulustige, Wohnungsuchende, Grundstücksbesitzer, Vorortbewohner, Terraingesellschaften, Hypothekenverleiher, Architekten u.a.m.* (Berlin: Baedeker und Moeller, 1908), XVI.

36 Peterson, *Wettbewerb Groß-Berlin 1910*; Markus Tubbesing, *Der Wettbewerb Groß-Berlin 1910: Die Entstehung einer modernen Disziplin Städtebau*, 41–144, (Berlin: Wasmuth, 2018); Kamleithner, *Ströme und Zonen*, 234–41, on the exhibition, cf. 9–19.

37 Chapel, *L'œil raisonné* 16—26, 43—65.

38 Periton, "Urban Life," 12–15, 31–35; Chapel, *L'œil raisonné*, 65—80.

39 Chapel, *L'œil
raisonné*, 37, 82—83.

40 On this readiness
to compromise, cf.
Juan Rodríguez-Lores,
"Stadthygiene und
Städtebau: Zur
Dialektik von Ordnung
und Unordnung in den
Auseinandersetzungen
des Deutschen Vereins
für Öffentliche Gesund-
heitspflege 1868—1901,"
in Juan Rodríguez-Lores
and Gerhard Fehl,
eds., Städtebaureform
1865—1900: Von Licht,
Luft und Ordnung in
der Stadt der Gründer-
zeit, vol. 1, (Hamburg:
Christians, 1985),
19—58. On the different
hygienic requirements
for working and living,
cf. Hans Christian
Nußbaum, Die Hygiene
des Städtebaus (Leipzig:
Göschen, 1907), 12,
20—21.

the periphery, however, Corbusier focused on the emptying city center, using the demographic shift to justify the proposed demolition of the old Paris. **39** For Chapel, these are two quite different interpretations of the same maps—interpretations, though, that in the German planning discourse were seen as two sides of the same coin and as the future of the city in general. With London in mind (where circulation had fostered urban differentiation), for German reformers the modern city consisted of tall buildings for working in the center and spacious buildings for living on the periphery. This seemed to be a good compromise between their hygienic demands and the constraints of the booming property markets, which were pushing rents and buildings up in the center and driving residents out. **40**
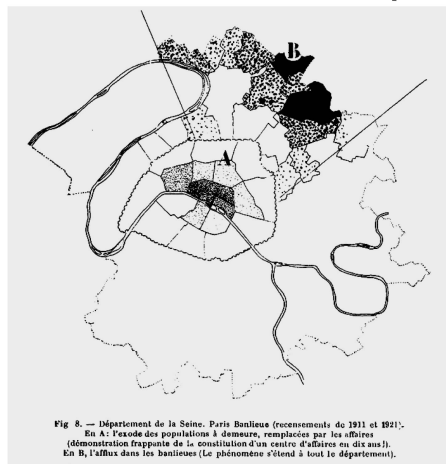
The patterns of urban statistics conveyed the impression that the population could be treated as a natural phenomenon (growing, dying, moving, distributing) and, with some aptitude, be steered into healthy paths. This epistemic frame, which transformed city dwellers into a viscous mass, defined urbanism for more than a hundred years. Ebenezer Howard, the inventor of the garden city—which was to become the most important strategy for the development of large cities—gave us a hint of how strong this framing was at the beginning of the twentieth century. In 1904, after a lecture by Patrick Geddes for the Sociological

Society, Howard opened the discussion, led by Booth, with a striking image. While Geddes described the "stages by which the city grows and swells, with the descent of the population from the hillsides into the valleys," that led to a "tide" flowing "resistlessly onward to make more crowded our overcrowded tenements" and "to make the atmosphere more foul," Howard was convinced that there was a way to reverse this process by "imitating the skill ... of Nature" and "creating channels through which some of our population shall be attracted back to the fields; so that there shall be a stream of population pouring from the city into the country, till a healthy balance is restored." 41

Even at the beginning of the twentieth century, after the triumph of bacteriology, Howard thought in miasmatic terms when he feared an "atmosphere" that was "foul" by overcrowding and should be removed by decongestion. These ideas were far from those of contemporary epidemiology. Epidemiology and urban hygiene were two different things anyway, because the latter was a practical compromise. But by the beginning of the twentieth century, hygiene had become a mere buzzword used by urban planners to indicate sound design. For them, a healthy urban development was first and foremost a healthy distribution of the population — in other words, a balanced visual pattern on a piece of paper. The visual culture of urban planning, 42 and especially of urban research, makes a difference. In this respect, modern urbanism and cholera were related: cholera pushed statistical mapping, and it was this new kind of knowledge practice — rather than specific epidemiological findings — that would change urbanism. This, quite likely, will also be true for the current pandemic. Before anything else, the pandemic will accelerate the datafication of the city, which, since in its current form is in real-time and gives us insights into individual movement patterns as well as an overview of mass phenomena, will change the way we look at cities.

Fig. 8. — Département de la Seine. Paris Banlieue (recensements de 1911 et 1921).
En A: l'exode des populations à demeure, remplacées par les affaires
(démonstration frappante de la constitution d'un centre d'affaires en dix ans!).
En B, l'afflux dans les banlieues (Le phénomène s'étend à tout le département).

41 Ebenezer Howard in Patrick Geddes, "Civics: As Applied Sociology," *Sociological Papers* 1904, no. 1 (1905), 103—38, here 119—20.

fig. 10 Population growth in the surroundings of Paris 1911—1921 Source: Le Corbusier, *Urbanisme* (Paris: Crès, n.d. [1925]), 105

42 Andrew Shanken has only recently called for this field of research to be cultivated. See Andrew M. Shanken, "The Visual Culture of Planning," in *Journal of Planning History* 17, no. 4 (2018), 300—19.