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From cholera to COVID-19 in Copenhagen

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# Urban Porosity and Material Contamination

## *From Cholera to COVID-19 in Copenhagen*

▼ **KEYWORDS** Urban porosity, urban environmental history, epidemics, materiality

▼ **ABSTRACT** As a way of approaching the multiple ways a pandemic affects urban life, the authors suggest the notion of porosity. Through this, the article revisits the Danish capital during the cholera and typhus attacks, noticing how porosity is mobilized around contagious materials and bodies. Relating this to the COVID-19 outbreak, the article goes on to note how the porosity also can be seen in a temporal sense, stretching out from the fragile present to the promise of a new normality for the city and its metabolism.

## Introduction

In a 1924 essay with Asja Lacis, Walter Benjamin developed the idea of ‘porosity’ as an urban phenomenon by reflecting on Naples’ spatiality (Benjamin 1924, 1986). In this catholic city of southern Italy, Benjamin noted, nothing stood still: Sunday’s religious festivals filled the city, suddenly to make space for Monday’s everyday public space; cafés were designed for staying only a few minutes, digesting an espresso, and in the labyrinthic courtyards, staircases and backyards, swarms of people and sociality streamed through without any space for retreat or privacy. While private life flushed out into the streets, featuring chairs and tables, public gatherings were sucked into the home, kin and friends flocking the already overfilled apartments. Even the materiality, Benjamin observed, was fleeting. Public space was filled with paperwork decorations of catholic practices, written prayers, temporary cardboard altars, paper flowers and so on, blowing in the wind, decaying in the muddy waters of the gutter. In the heated pace of a southern European metabolism, nature pervaded the urban space; public and private interpenetrated. This is an obvious theme for Benjamin, whose unfinished passage work on Paris returns to this

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idea of porosity – interestingly enough meaning ‘passage’ in the root of the Greek word, pore. However, in the Naples text Benjamin went further than Paris by including the environment as part of the metabolism. Though the essay might touch problematic notions of northern and southern Europe – and global north and south – the concept itself about ‘urban porosity’ remains relevant, and even though Naples is a city on cliffs, Benjamin’s concept has inspired recent research of wetland cities and their permanent pervasion of water, among others (Giblett 2016).

What Benjamin was addressing was, in a sense, a permanent state of instability, for him linked to assumptions on, you could say, a distinct southern European urban metabolism. However, the concept can also be an entry to understand how states of exception affect urban spaces, objects and subjects on a more general scale. In this essay, we will explore the intensification of porosity across bodies and materials during outbreaks such as cholera, typhus and COVID-19. Reflecting on historical cases as well as our own survey among city dwellers during COVID-19, we argue for a renewed attention to how the porosity of subjects as well as objects come to the fore in situations of urgency. Porosity become the issue both as a concrete and metaphorical figure in people’s understanding of environmental crises, and thus an important object of study in comprehending the very materiality of urgency.

## Fixing the City

In 1853, when the third global cholera pandemic reached Copenhagen, it came with a delay. Already two years earlier, the disease had been present in northern Europe, but had spared Denmark. The cause for the illness to bypass the city, Copenhageners gossiped, would have to be the layer of limestone on which the city rested, and which was known to have a protective effect. However, when cholera finally struck and killed almost every twentieth inhabitant of the city, the common narrative lost its strength. This was, however, only momentary, as we shall later see the return of limestone as materiality of avoiding contamination.

The aftermath of the cholera pandemic almost took shape of catharsis in the Danish capital: a comprehensive sewer plan was implemented only three years later. Municipal hospital plans were accelerated, and a more green, ‘healthy’ quarter, Brumleby, was erected on the outskirts of the city for working class citizens; the municipal doctor’s office became an expanded function for both the city and the state in matters of social medicine; legislation on buildings and health was tightened, prioritising access to privies and water; a new police department – the ‘health police’ – was established ten years later to enact quarantines and oversee meat provision; and not least, the fortifications that since the sixteenth century had been surrounding the cramped city were being pointed out for demolition, starting a major turning point for the Danish capital’s growth and spatial layout.

Also, large investments were made in a drinking water system, beginning with 100 km of iron pipes connecting selected buildings to a large waterworks designed in a new, more industrial style. These buildings, it was noticed in the press and among architects, were somehow cleaner. The building project was the first in Denmark to use a combination of cast and wrought iron providing a strong, light and more transparent construction, and the public facades were unadorned except for simple lines in the yellow brick. All buildings were in the same, functional style, hailing a difference from the heavily decorated, historicist architecture of the time. The aesthetic expression was mediating cleanliness, and clean buildings were metaphorically processing clean water.

For the first time, Copenhageners could drink directly from a tap in their kitchen sink, and without worrying about infection. Through mechanical filtration processes at the water works, surface water from lakes in northern Zealand some kilometres away was sifted through sand of different grain sizes, sedimenting minerals and other impurities; a process celebrated in the press as a modern purification technology. The porosity of the sand, inspired by Berlin's waterworks, became part of a narrative of Copenhagen's clean water, but that story was to become even better. After a few decades, city growth meant higher demand for water, and after a long series of drilling tests in the hinterland, engineers found that the renowned layer of limestone mentioned above was stretching out west and north of the city, effectually working as a purification filter for rainwater. Through a complex process, the city turned from using surface lake water – less 'pure' – to ground water, clean from – and by – the underground. The porous limestone, earlier invested with almost magic healing power, now intersected with new hygienic regimes, intensified by the cholera epidemic, where bathing halls, water closets and bathtubs began to make their way into the Copenhageners' everyday life.

## Porosity and Material Contagion

But why the limestone again? Throughout the 1880s and until the environmental movements of the 1970s and the pesticide debates of the 1990s, the Danish ground water and its aquifers of limestone has been an almost mythical figure. In the imaginations that meanders in and out of the discourse, the ground water becomes part of a narrative comprising a cleanliness that is both civilised and in direct contact with the environment, or nature. And throughout, it is the limestone that secures this 'natural' purity, often contrasted with artificial methods such as chlorination. The porous material quality is considered even more natural, since its story goes back to the Weichsel Glacial Age 10,000 years ago, where these layers have been formed under Denmark and southern Sweden in different thickness and compound. The composition of minerals and the porous structure of the limestone provides cleansing of nutrients and minerals from the water moving through, and the limestone layer suppresses the water. The hydrostatic pressure allows for arterial wells, where the clean

water, directly from Nature, spurts upwards when a hole is drilled. In a sense, this hard but permeable rock underneath the swampy surface provides a strength through its very porosity, and the compound ability to be both container, medium and ‘motor’ of the purified water. The limestone, as the waterworks’ architecture, simply produced purity.

The historical example highlights how certain objects rematerialize along lines of what we can call ‘porosity’ during these epidemic, but also environmental, crises. Limestone is a porous material in the vocabular of physics and geology, pointing to its capacity for containing, purifying and providing passage for fluids such as water. This is a vital point for the “envirotechnical system”, as coined by Sara Pritchard, that produced Copenhagen’s clean water (Pritchard, 2011: 11). But it is also porous in a broader sense, that we could extend to the city’s whole interaction with nature, in what Tim Ingold would call its “zone of interpenetration” (Ingold and Pálsson, 2013). Built on a former wetlands layer above the limestone, the Danish capital have permanent relations with water slowly flowing through the city’s underground, saturating it and moving dissolved materials around, constantly negotiating the pressure between nature and city (Giblett et al., 2016).

One example of this comes in the late nineteenth century, when the city was at its peak of growth. Population was multiplied by five from 1800 to 1900, and when reaching a half million inhabitants, the urban metabolism came under pressure. The municipal doctor’s office that, as we know, expanded due to the cholera epidemic, was at the time very interested in the spread of disease through water, and the chief medical officer, Christian Tryde, investigated the city as a system of flows. In 1888 he presented a mapping of the water system and also assessed the amount of solid matter – garbage, faeces and so on – being dissolved and led through the city to the sea. Inspecting the urban flows, he found bottlenecks, for example at the quarter of Christianshavn, where mud was obstructing the stream. Examining samples of mud for months, Tryde could isolate several microorganisms thriving in the muddy compound, “sleeping” as he called it, until they found a human host to infect and multiply. Tryde was especially looking for the typhus bacteria, and he explicitly targeted the place of obstructed circulation as a habitat for disease. In a way, Tryde represents both the paradigm of miasma concerned with movement of air, and the later bacteriological view, emphasizing contagion as waterborne. For him, the porous material of mud was the centre of attention in explaining and fighting disease. Here, the search for microbes afforded a growing attention to the ways in which the city is penetrated and infected by contagion hidden in water flows. When disruptions arrive, porosity can be a way of understanding how cities are de- and reterritorialized (de Landa, 2007).

In a sense, we see in the above, how disruptions such as cholera or typhus intensifies porosity as a critical aspect of the city, in quite concrete, material ways. But it is not only in the relation between microbes, water and buildings, that intensification unfolds. A form of ‘material contagion’ intensifies during outbreaks, where not only objects but also individuals are no longer delineated

by their body proper. They leave parts of themselves behind wherever they move in space: cigarette smoke, a fart, a fingerprint, a drop of sweat. Thus, in a sense they are not individuals anymore, but “dividuals” (Marriott 1976; Strathern 1988): assemblages of bits, parts and potentialities, with more fluid transactions between person and surrounding, than strictly separated. As Marriott notes, “to exist, dividual persons absorb heterogenous material influences. They must also give out from themselves particles of their own coded substance” (1976:111). This becomes acutely present during vector disease attacks, and thus change the relation between bodies and materials, humans and non-humans. The anthropological notion of dividual corresponds to the observations by Benjamin of the way the city ‘folds’ its inside out and mediating decaying material traces – in short, the porosity seems of the body and the city seem to have similarities, and, we argue, both become intensified as either causes or solutions during outbreaks.

The porosity, material contagion and circulation of bodies across the membranes of private and public, inside and outside, can be seen as a basic condition of the city; although in the instance of an epidemic it is accelerating and putting these same membranes at risk. This introduces the central issue of processes to regain control, which, in many cases, happens between the scale of the citizen’s body and the urban space.

## Materialising New Normalities

In the aftermath of the cholera, the city never went back to the normality of the past. Changes occurred in light of the outbreak, and previous shifts already in the making, were accelerated so urgently that the former order of hygiene and health became history. And so, it seems, with crises such as epidemics, that a new normality appears unavoidable, almost to a degree that transformations become the expectation. The epidemic may both boost new momentum for novel ideas on city development, as well as new developments in light of the crisis. The new normal is thought of, not in terms of ‘if’ but in terms of ‘how’ society will be mutating, and a central feature here is the ability to communicate one’s visions of the future. There seem to be introduced a temporal porosity, allowing for governmental interventions, facilitating acceleration of visions previously only dormant, or halting otherwise dominant tropes.

Turning 177 years ahead in time, this impossibility of returning to the old normal is also the immediate experience with COVID-19. Media coverage has been filled with city planners, architects and designers arguing – with more or less empirical grounding – for their visions of the post-crisis city. Some may for instance be calling for a greener and more sustainable city – visions consistently put forward over the last many years – yet now with a strengthened rationale. Others can be stating that now the middle class will leave the central city for the green suburbs. Hitherto, the arguments for the development of the city have been a mix of citizen health, rainwater or pollution handling,

but now enhanced with a more powerful argument of spatial distance and psychological welfare.

The first couple of days within the outbreak of COVID-19 in Copenhagen, it seemed like citizens experienced a sharp distinction between intentions and behaviour, a search for rational and defensible reactions. In one of our interviews among 50 informants in the two largest cities in Denmark, a Copenhagener recounts the transformations of the city and its public space. Reflecting on the source of anxiety she feels at this early point of the outbreak, she notes that cardboard – prominent in supermarket packaging – seem more prone to carry the contagion that is still ‘living’ for long after an infected body has touched it – the soft, fluffy stuff where fluids can saturate and keep pockets of contagion within it – regardless of the actual evidence of such a claim. In Copenhagen’s urban environment, as in so many other contemporary cities, cardboard is one of the core, taken-for-granted material categories along with other more or less stable categories such as glass, concrete, steel, plastic, brick or asphalt. Other materials, being subcategories of ‘environment’ in a sense, could be grass, water, tree, or limestone, the latter notably more porous than the former ones. It quickly flourished in (social) media that the virus had various effects on various materials, e.g. cobber less than steel. Designers quickly realised that contact objects, such as buttons and handles, was better equipped with one rather than another material. One interviewee, for instance, reflected upon the inconsistency in that he would wear gloves when grocery shopping, but then returning home, he would touch the grocery without gloves,

but it is damn difficult to get one’s head around. It can be on the handle, on cobber, if the handle is made of cobber, which it is some places, it can live up to 4 hours, and if it is made from metal it is 48 hours or something. It is difficult to remember that list, and you can’t sanitise every time you touch something. You can’t live like that, it would become compulsive behaviour, so I don’t.

It took our informants some effort to realise that the separation between body and world is first of all very difficult to guard, and secondly, that even the materiality of the surroundings keeps being in a porous relation to their own body. What was at stake was the boundedness of the body itself. The range of things the body interacted with became contact zones for permeation of fluids. The virus may potentially sieve into the urban fabric and be transmitted through contact with body openings. The new normal, thus, installs and accelerates a distance to things and bodies either through avoiding touch, the use of mediating objects such as gloves, or post and pre-touch cleaning.

It is not surprising that in an epidemic outbreak, circulation, contact and contagion becomes key features of concern. The interesting aspect is that the porous situation allows for a strict regulation of bodies and their movement, and the causal chains of logic following this. We can look to epidemic



countermeasures long before bacteria, viruses, or other microorganic life had stepped onto the scene of scientific vocabulary. In 1711, for example, when a plague hit Copenhagen, quarantine was the standard precaution. The absolutist king ordered a set of rules actually mirroring the ones we experience today: no gatherings, destruction of infected clothing, tracing possible incoming individuals, guarding ships in the port, which was as intensively surveyed as the airports today. Copenhagen University produced cheap health guides, passing on available information. Besides that, other measures were taken, such as common prayer and health passes (Christensen, 2017). In epidemic history, as in other histories of impurity, isolation and surveillance plays a central role.

Importantly however, sometimes even the porosity can be accelerated in order to gain control. Around 1800, an outbreak of cowpox in Denmark was countered by the new practice of inoculating people with the disease to immunize them. The vaccine had been tried earlier in southern England and was regarded as a success. It did not, however, create trust in the local Danish parishes. People resisted having material from a sick cow injected into their body, and satirical popular drawings circulated, depicting humans mutating into cows as result of the vaccine (Bonderup, 2001). One thing is acknowledging the porous nature of oneself and the world, another is to accept what pours through the body.

## Urban Porosity and Metabolism

The contestation that bacteriological science posed for existing theories of contamination and contagion was, as we know from medical history, a very political one (Evans, 1987). The old establishment of European cities mobilised their influence and networks on the side of the miasmatical universe of contagion, focusing on static air or mud as sites of emerging disease germs. This view was challenged by the bacteriological discoveries of Koch, Virchow, Snow and others. Despite their obvious differences, in a way, the miasmatical and the bacteriological sides each engaged porosity as a central feature. The former pointing to the still pockets as sites of new, threatening life, and the latter rejecting the idea of new life at all, making the issue one of entries and exits in the flows.

Despite the challenge, the miasmatical networks nonetheless kept their ground for some time by refining and to a degree adapting their explanations. With the bacteriological side pointing to water as the primary carrier of contamination, the miasmatical side pointed to certain life forms reaching water from the air, for an unknown amount of time being there in a sleeping, 'saprophytic' state before attacking again when entering air or the human body. Christian Tryde partly adopted this idea, when he described his findings in the Copenhagen canals in the 1880s. But this was not only an isolated battle among biologists and medical officers. While the miasmatical paradigm had



guided a whole set of urban design practices, providing for example street pavement (El-Khoury, 2006), and broad boulevards affording flows of fresh air, it had also exercised a profound impact on citizens' behaviour and relations to each other and to the environment, or nature.

As environmental historian William Cronon proposed in the 1980s, the growing city attracts and transforms nature to a degree where it is questionable whether the two can be distinguished anymore, producing a constantly changing 'third nature' instead. With insights from critical geography, we could see this process as an urban metabolism with significant social implications also, affecting and framing the social and cultural (Cronon, 1992; Swyngedouw et al., 2019). In a way, we can interpret the behaviour of the citizens of the nineteenth century western cities, and especially the expanding middle classes, as an example of this social and biological entanglement, emerging with the wave of industrial urbanisation. New hygiene, cleanliness, the contained bourgeois home and other strong biocultural waves of urban life in the period were not only a product of the epidemics and unhealthy conditions pervading industrial cities. On a broader scale, we can also see it as a negotiation of the porosity that modern technological networks had enhanced, for example by exploiting the vast, underground hinterland for water. And maybe the battle between miasmatical and bacteriological positions in medical discourse was part of this negotiation. In any case, they both promoted certain materials as being closely related to contamination, air versus water, just as we could note limestone, cardboard and cobble above. And in the cases of an epidemic striking, these materials took centre stage as contending agents of porosity and contamination.

## Material Effects

The central argument here is, to sum up, that subjects and objects alike seem to be porous, and as such it seems like porosity is somehow entangled in both the material composition of our bodies and urban objects, and in the interaction between these entities. When a crisis of contamination is unfolding, as in epidemics, this porosity comes to the fore, and is accelerated to play a central role in the re-intensified circulation of fluids, matter and microscopic enemies that provoke the prolonged state of exception we currently find ourselves in. We find this in historical outbreaks as well as the present COVID-situation, and the interesting question is the obduracy of these relations; that is, the production of transformation and continuity. As we can see in cases such as the cholera, a radically new normality emerged, and we can see clearly in the interviews from the COVID-19-pandemic how informants also expect a 'new normal'. When a future is negotiated on, say, a weekly basis, the rules concerning social interaction can become hardened and absolute, both from urban and national authorities, but also on the

microscopic level of the everyday, where attention is drawn to the ability of people and things to sieve through one another. When the future this way is somehow suspended or put on standby, the porous subjects appear from the black-boxed reality of their humdrum normality to suddenly become agents with possible influence on the ‘new normals.’

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