DOI: 10.38027/ICCAUA2021268N5

Unhuman Entities that Shaped a Century: Non- Anthropocentric Analysis of the Case of Great Stink and Pandemic, Victorian London

* Dr. **Hidayet Softaoğlu**
Aladdin Keykubat University, Faculty of Art, Design and Architecture, Alanya, Turkey
E-mail: hidayet.softaoglu@alanya.edu.tr

Abstract
The history of architectural and urban design has expanded its scope and started adopting new philosophical approaches from other disciplines to explore the built environment. Theorist discusses whether we still live in a humanist world where a human being has more priority over the unhuman things or not to answer that; should we design architecture and urban within an anthropocentric approach. As a recent pandemic show, things that are not human, like animals or viruses, could control and navigate a new style of living. This research will introduce Bruno Latour's ANT and Graham Harman's Object-Oriented Ontology (OOO) as a new constructive method to analyse how human and unhuman bodies are equally the affective actors of daily practices in the urban realm. 19th-century Great Stink and epidemic in Victorian London will be a case study to picture urban dwellers of London that shaped determined the destiny of health and hygiene of London in 1858.
Keywords: OOO; ANT; Victorian London; Great Stink and Pandemic; Urban actors.

1. Introduction

The world today in the 21st century is still facing various degrees, including cybersecurity, global warming, earthquakes, epidemic, and diseases. While the world is getting developed, the trouble it produces evolving parallelly. The superiority of things has been changed as humans already lost their power over the other entities. The period we live in is no more renaissance when the human body has been the primary reference of the design. Therefore, there is a widespread debate about flat ontology that questions we should design architecture and city, whether with an anthropocentric or post-anthropocentric approach (Katz as cited in Henning and Walsh, 2020). Since Heidegger and Deleuze, the politics of the thing was a common subject of discussion in philosophy (Bedford, 2020). Both of those philosophers criticised things and their meanings in the world. Discussion of the theory of the objects is worth considerations today because the world has not controlled by human beings, and it may never be. In 2020, when the global pandemic occurred, people saw other things, apart from human beings in the world, who can do their own acts. Therefore, it is now time to think about objects and their actions when designing, analysing, and interpreting architecture and urban areas. This paper analyses a city that could survive an epidemic to see how the object theory can be a tool to examine the urban issue. Since the root of epidemiology was embedded in the Great Stink of Victorian London, this incident will be taken as a case study.

2. Material and Methods

Based on qualitative methods, this paper combines history grounded theory and philosophy. Since the case chosen for this paper belonged to the 19th-century Victorian era, this paper will explore the topic within its own history by using historical data like Victorian prints and archives. As this paper aims to take epidemic as an object that formed the city, the flat ontology will create the philosophical background of this research. As in flat ontology gives a head role to agencies and their actions ANT of Bruno Latour will be the tool to build this historical research to propose an alternative approach to analysing cultural and architectural built environment by considering agencies. First of all, the Object-Oriented Ontology (known as OOO or triple O theory) of Graham Harman will be used to explain what the object is. Then the history of the Great Stink will be inspected ontologically through these objects involved in this urban failure. Finally, those objects will be evaluated to create a new and original map of the Great Stink that illustrates objects as constructors of the stink.

3. What is an Object?

There are two kinds of things in the cosmos: human thoughts and others such as animals, plants, stars, unlived things, as modern philosophy assumes. Since human thought is the only certain thing, everything else is considered as less certain. The school of phenomenology started by 1900-01 with Edmund Husserl's illogical investigations in which he states that object comes first before the qualities (Spiegelberg, 1965). Therefore, we do not begin with the qualities or functions and then places this ambiguous object hiding behind them that does not exist; instead, we make direct contact with the objects or things. Merleau-Ponty's famous example of that a black ink pen and a black

executioner's hood are different colours even if they are the same wavelength of the lights. The qualities of those things seem measurably identical; nonetheless, they are different because the qualities are inflected by the objects to which they belong. While executioners black is ominous while the ink is more neutral and humane (Gratton, 2012). Every object has specific attributes; thus, the object comes first in phenomenology. Sometimes entities may have accidental quality. Then phenomenology must stripe those layers to get the essence of the thing. After Husserl, a former mentor of Heidegger, took phenomenology in another direction (Spiegelberg, 1965).

In contrast to Husserl, Heidegger believes that; things are not primarily present in the mind as what comes first is all the things we are taking for granted. For example, people would not focus on the oxygen or their breath unless they have a respiratory issue like asthma (Harman, 2020, pp. 21). There is an infinite number of features in an object, but as human being, we are limited to perceive them all. Object and qualities come together; hence there are no objects of no qualities; also, there are no qualities of an object. In art, there are specific connotations that the world object has, usually referring to solid physical objects instead of performances, conceptual art or other things that are not as physical as an art object has loaded.

Object-Oriented Ontology (OOO), or triple-O- O, is a term coined by Levi Bryant in 2009 and inspired by Bryant; Graham Harman, OOO is a flat ontology he says that everything is on the same footing at the beginning (Harman, 2020). While a car is one thing, a building is another, a human though another or a river is another; however, each object should have equal status before making a distinction from the beginning. Harman philosophically extends the definition of objects, so according to him, the object can be anything and everything that exists, including fictions and imaginary things (Harman, 2017). Therefore, the object does not have to be natural, durable or straightforward like rope, diamonds, armies, or other real things (Braidotti & Hlavajova, 2013). In this paper, the object can be anything such as cities, buildings, users, animals, or other entities like germ and viruses that we cannot see but exist. Latour assumes that an object is whatever it transforms, modifies, perturbs, or creates; therefore, they should be called actors, not objects, because objects act (Latour, 1999). Harman explains the philosophy of Latour by stating that an object is always something more than any of its actions right now because those actions can be changed; it is still the same thing within certain limits (Latour, 1993). Whatever there is in an entity that is not reducible to its fundamental components or its effects, OOO is there to produce explanations through object themselves (Gratton, 2014).

4. History of the Great Stink

Demonstrating the history of stink would take to go back to the past to excavate as many objects related to the Great stink as possible. Even though all the objects are equal, the toilet as an object of hygiene had a crucial role in London stink history. The history of lavatory technologies has backed to the civilisations where chamber pots and cesspits invented early on, about 6,500 years ago in the world's first cities. In comparison, flushing latrines could be seen between 3,000 and 5,200 years ago (Mitchell, 2015).

in 1700 BC, Greeks constructed with large earthenware pans connected to a flushing water supply the Palace of Knossos (Angelakis & Rose, 2014).

When the Romans came to Britain in AD 43, they brought civilisation and sanitation knowledge with them. They built particular communal usage of the toilet. AD 410, when Romans left Britain, Saxons could not adopt the toilet habits, and Londoner just reverted the type (Mitchell, 2015). In medieval England, people used *potties or chamber pots* and happily threw their contents through a door or window into the street. The more affluent would use a "*garderobe*", a protruding room with an opening for waste, suspended over a moat (Horan & Frazier, 1998). Peasants and serfs, however, relieved themselves in communal privies at the end of streets (figure 1). All public garderobe constructed in London emptied directly into the River Thames, causing stench and disease for the entire population. Until Victorians, the streets were open to the public convenience.

In the 19th century, Britain's population reached up to two and a half millions by the people who moved to the city to find a job after the industrial revolution (Sanders, 1999). Builders developed back to backhouses for the poor to supply the demand for flats. Victorians were frightened to talk about their bodily fluids. This fear prevented people from wanting a bathroom or water basin. It took Victorians back to develop sanitary productions or sewers since they would not discuss what should be done for hygienic problems. The number of toilets did not match this expansion. Many people might share a single bathroom in overcrowded cities like London, where sewage spilt into the streets and the rivers. The streets were stinky and dirty. When it was rainy, the rainwater would carry away the waste down to the river. Refuses from slaughterhouses, wastewater from paper mills and breweries, ordinary household waste directly joined the river (Blazev, 2014).

Figure 1. Hogarth's picture about emptying a chamber pot over the window (URL 1)

As Londoners, though that Thames was connecting to the sea, all those dumpings could be swept by the sea. There was no central organised plan to dispose of affluent human; thus, London's drainage system was chaotic. In 1815 parliament passed an act that enabled affluents to be dumbed straightaway to the Thames. Even though Sir John Harrington invented the flush toilet, including a water closet and a raised cistern with a small downpipe through which water ran to flush the waste in 1592, it was not in public use by the Great exhibition (Perdew, 2015). George Jennings offered to design attendant for the public. People who saw the water closet in the Great Exhibition started installing them in their houses. Nevertheless, the modern toilets were attached to medieval sewage that polluted most of London underground, and streams and wells were due to the leakage from those sewers. Therefore, the poor people who draw the water from the wells were drinking their neighbours' excrement (figure 2).
Since the Thames was a tidal river, it would push the locked sewage back up to the river, where it collected and turned stagnant (Arias, 2009). Water companies took part in the tidal river to pump water from the sewage to people's houses.

Figure 2. This 1828 caricature shows a woman looking into a microscope to observe the monsters swimming in a drop of London water (URL 2).

The contaminated drinking water supply was brown when it came out of the pipes. Chemicals, horse manure and dead animals polluted the drinking water; consequently, tens of thousands died of water-borne disease, especially during the cholera outbreaks of 1832, 1849 and 1854, which quickly swept through London (Harrowven, 2002). It was mysterious of what caused it has not discovered yet. People tried any remedies to fight cholera; however, it was an unknown disease, there were many theories about it, and even its contagiousness was unknown. Thousands of people died from this epidemic by 1848, and each part of the river was affected. The hospitals were full of victims who could not be cured (Tulchinsky, 2018). The main thought about the cause was the miasmic theory since the belief was that the smells and odours present throughout London played a significant role in this spread (figure 3).

Figure 3. Cholera was depicted as air-borne (URL 3).

Nevertheless, physician Dr John Snow had refused the theory of miasma. He believed that cholera was water-borne, not air-borne (Cicak & Tynan, 2015). He saw that cholera occurred in some houses but not others. On further inquiries, they found that cholera houses all took their water from a single pump situated in Broad Street, Soho. Local people did not know that pump water was carrying cholera bacteria. Contaminated water from cholera suffers was leaking into the river. Forty-eight houses of forty-nine were affected by cholera within four-night, and 500 people had died in Broad street. Snow noted that the man who never drunk water there could survive. Then, he elaborately analysed every single building in Broad street to determine who involved in drinking water. He surveyed people around here to see who was dying, who needed help, and how many water supplies were in the area. He noticed the source as sweet-tasting water in the Broad street pump because he found that most of the people, who were ill, had drunk water from this well. The epidemiology of today was constructed on Snow's examination of cholera (Coleman, 2020). People who should have died but who did not die; then people who did die for no apparent reason. Snow detected both exceptional situations—for example, a group of brewery workers around Broad street mostly drunk beer rather than water. Also, there was a workhouse around the area where poor people could survive from epidemic since the workhouse had its own well in for clean supply. These two groups were the exceptions for who should have died but did not die. Snow also found a family living far whose family member brought water from Broad street to another neighbourhood (Lai, 2011). People who drank this water also instantly died (figure 4). John snow had enough evidence to say that this water caused disease as it was contaminated.

Figure 4. This caricature responses to the hypothesis of the English epidemiologist John Snow, who linked the cholera epidemic with sewage seeping into groundwater used for drinking (1866) (URL 4).

Snow convinced the government to take the handle from infected wells in Broad street in 1854, the number of the victims finally dropped. In 1855 the smell of the Thames had not changed and got worse to cause people to vomit. All animal, human and industrial waste have been collected in the river for years. Sir Michael Faraday warned and called attention to the desperate condition of the Thames. He perceived that the stink was distributed to the river as it was a giant sewer (figure 5). Faraday waned Londoners as "if we neglect this subject, a hot season will give us sad proof of the folly of our carelessness" (Schiller, 2019). In June 1858, the Great stink hit London as a heatwave worsened the situation of Thames unbearable. The population of London has been raised, but no action was taken for the Thames. As the Thames was a collector of any waste for hundred years, the water turned into tick, brown and opaque.

Figure 2. The waterside is thronged with dwellers in Southwark who shout their complaints: 'Give us Clean Water!' [thrice]; 'Give us pure water!'; 'We shall all have the Cholera' (URL 5).

The river dried up, and all the waste appeared. It was not only sewage that caused the stink because the river was clogged with dead animals, industrial debris, street runoff, animal faeces, leftovers from slaughterhouses, rotten food, and putrified garbage from decades. Londoners tried to escape from the smells by a mask made of scented handkerchiefs. They tried to cover odours rather than clean the river. When Parliament moved to their new place House of Parliament beside the Thames, they decided to take action. The Parliament passed a bill funding the development of a brand-new sewer that would repair the destruction created on the river and block further pollution. English civil engineer Joseph Bazalgette was chosen to save the city. he constructed a completely new and

modern sewer system that consisted of a network of sewers that run parallel to the Thames rather than into it. The waste was carried to flow out to sea directly without emptying into the river. Bazalgette's plan also included constructing water treatment stations, embankment to prevent loading waste and rising alternative freshwater sources. The Thames quickly returned into a healthy condition, and Londoners today still using the same system Bazalgette designed (Bell & Paskins, 2013).

Cholera and the great stink were connected as a matter of urban failure; however, many acts and actors took part to make this history of failure and development. OOO and ANT do not give privilege to humans. Therefore, humans will not be blamed or appreciate neither as a solution nor as a source of the problems. Instead, considering their flat ontology, cholera and the great stink map will be produced by all those actors. Then the map will illustrate how those objects acted individually with their nature in epidemic and stink.

4.1. Re-mapping the Cholera and the Great Stink of Victorian London

Numerous abstract or concrete objects involved in the Great stink as it was excavated from history, some of these objects were human. In contrast, some of them were thoughts, concepts, or unliving entities. Thus, the range of collected things/objects in the Great Stinks are as follows:

> "*lavatory technologies, chamber pots and cesspits, Greeks flushing water supply of Palace of Knossos, Romans sanitation knowledge, communal toilet, Saxons, Medieval England, potties, garderobe, Peasants and serfs, streets, River Thames, diseases, Victorians, the industrial revolution, back to backhouses, Victorian's bodily fluids, Victorians hygienic problems, overcrowded London, sewage, stinky and dirty streets, wastewater from paper mills and breweries, slaughterhouses, chaotic drainage system, Parliament acts, Sir John Harrington, flush toilet and water closet, the Great Exhibition, George Jennings, modern water closet, medieval sewage, London underground, streams and wells, sewers leakage, poor people, a tidal river, brown contaminated drinking water supply, Chemicals, horse manure and dead animals, deaths, cholera, epidemic, victims, the miasma theory, John Snow, Broad Street, Soho, bacteria, the survey of Soho, sweat taste water of Broad Street pump, brewery workers, workhouse, Sir Michael Faraday, hot weather, mask and scented handkerchiefs, House of Parliament, Joseph Bazalgette, modern sewer, new water treatment stations, embankments, alternative freshwater sources.*"

Although all these objects seem pretty irrelevant to one another, each of them took part to create a network that triggered The Great Stink.

Figure 6. Objects of Cholera and the Great Stink (Developed by Author).

4.2. Re-mapping the Great Stink via the actors

This network above is based on the relationship between objects. The history of the Great Stink as an urban failure was taken as a black box of the plane. Same as the investigation of a crush via black box, which inspired the development of Actor-Network Theory (ANT) (Miller, 2013), here the Great Stink was examined with the objects involved in it. Principally, Actor-Network Theory (ANT) was developed by Bruno Latour and Michel Callon in the 1980s, although it is usually considered as a tool instead of a true theory. It, therefore, does not stand for a method but rather contributes as a tool. ANT uses actors and actants as agencies to discuss the urban imaginary in terms of non-material, symbolic and physiological dimensions that construct cities (Rydin & Tate, 2016). Thus, while agencies compose the stories through their ontology, ANT is used as a thread to tie history. According to ANT, agencies could consist of people who are called actors; they might also be non-humans/non-living things that are actants (Latour, 2005). Although they are essential to unfold the nature of lived space, actors and actants are also significant elements to understand perceived space as well because such space can only be analysed by the senses or perceptions of the people, including touch, taste, sound, smell and sight. ANT helps to understand the complex nature of society, so it is a helpful tool to add to the decoding process. ANT believes that society is the assembly of

elements in which the relationship between elements, rather than the elements themselves, are the key focus (Rydin & Tate, 2016).

Harman believes that everything is relational; as Bruno Latour also proposed in network theory, there is nothing more to a thing than how it acts. For Latour, truth is putting actors together and creating more convincing statements by putting together evidence from inanimate objects, evidence from humans and all those things go together for the sake of a strong network, and this is what truth is. Therefore black boxes can be assembled to create this network. ANT (actor-network theory) proposes a web between the actors suggested above to demonstrate the politics of the object in the modern world (McGee, 2014). For that reason, the world of architecture and urban design can be taken as objects in OOO and ANT to visualise the truth behind their acts. This act can be either a problem in the city or a happening. Considering the Great Stink 1858 in the Victorian Period, ANT and OOO analyse the city of London to visualise the truth behind this urban failure in the form of the map below in figure 7.

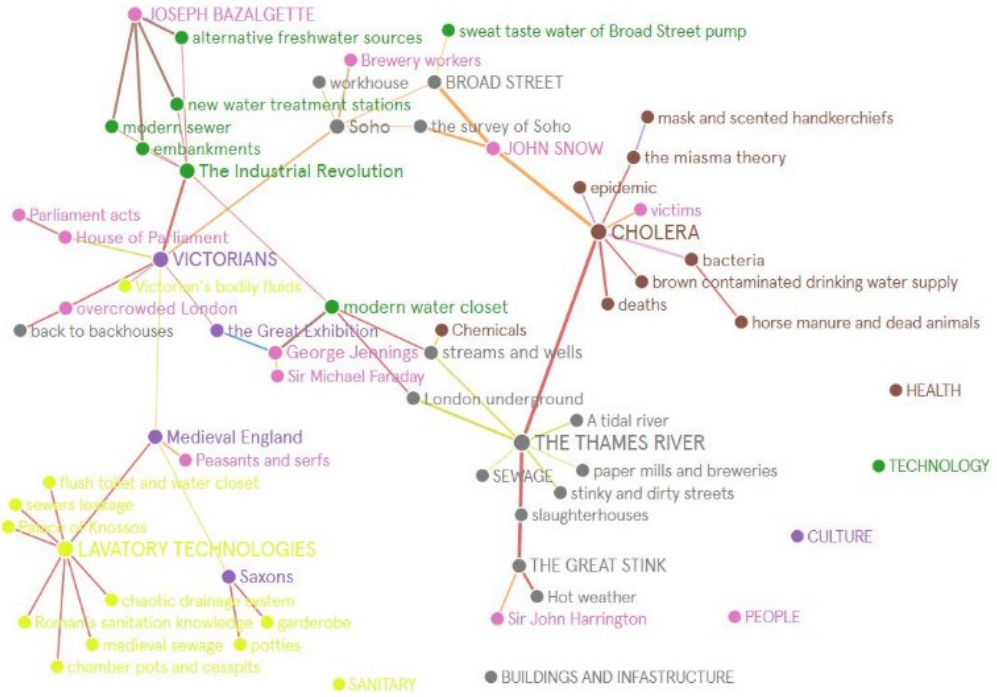

Figure 7. Network based on the actions of the objects of Cholera and the Great Stink (Developed by Author).

All those objects found in the assembly of Victorian Great Stink are essential agencies to structure the network of this assemblage. ANT suggests that space is not static, but it lives and progresses in a temporal process. Moreover, during this process, agencies might be equally someone, something or somewhere, and they have the "will" to do something, and this "will" causes another thing to happen (Clegg & Haugard, 2009). Consequently, various actors create this texture with their various activities regarding their background. For example,

Parliament act is (something) that passed (will),
Sir John Harrington is (someone) who invented (will)
a modern water closet is (something) that is installed
sewers are something that leakage (will),
a tidal river is something that pushes and pulled water (will)
cholera is something that spreads (will)

All of the other objects are also someone or something, and their actions also depend on their objectness. Therefore no one expects sewer to invent something. This very own nature of the objects depends on their ontology that Graham Harman took attention to the flat ontology of the things and their powers.

5. Discussion and Conclusions

There are only two kinds of knowledge in the universe to explain things; first, what is it made of and second, what it does. Thus OOO is to find a third explanation in between the above twos. An object can never be translated into any language since the object is something more than anything that can be said about it or anything that can be done with it (Harman, 2009). In this paper, OOO took the objects of the Great stink while ANT webs them into each other to show how simple objects can generate big happenings in the city.

Harman' ontology proposes studies on object individually, including observation of objecthood or thingness. For example, what makes something a bacteria or what bacteria wants to be? What is water, what makes water stinky and what water want to be? Or what is a sewer? How does a sewer want to act? These questions can be asked for each of those objects to examine their thingness. In the end, the answers will be different for each of them since they are ontologically different. If the same network is created in another city, the results may not be a great stink, although the objects share similar qualities, which does not mean their action will be the same. In other words, even though those objects have not come together again, there might be still a great stink or cholera because each epidemic or stink is loaded with its individual quality and will. As each object has its unique quality, it can act similarly but not the same. Uniqueness in the action quality of the object is why pandemic today is still unknown.

In 2020 when the pandemic appeared first, many people have not predicted how fast it would spread to the world. By the middle of regarding year, covid-19 was almost everywhere on the planet. It has caused a big fear since neither the initial source nor its original remedy has yet been discovered. Ontologically, the covid was an object that does act with its own will and with its own quality. It is known that the virus is contagious, and it constantly mutates itself. Scientists predicted it might transmit via breath and air (similar to miasma theory in cholera); therefore, all of us were warned to wear masks to reduce the risk of its infection. There are numerous vaccines for the virus, and still, none of them is the ultimate solution. Also, there are many exceptions to the virus. Similar to the analysis of John Snow's, today, there are people who should have been infected by covid-19 but not infected. Also, there are some other people who should not have been infected, but they are infected. These exceptions and their reasons have not been obvious yet; still, many assumptions are made about the blood type of people, wet and humid space, age, and chronic illness change the quality of virus and its behaviour.

All in all, this paper offers ANT and OOO together as an alternative method to analyse our world ontologically. Various methods are taken to evaluate urban and architecture with the specific spatial terms and categories like; borders, edges, monuments, lines, as Lynch did. Nonetheless, putting those elements of the cities in limited categories may disable us to perceive how other elements have also power and force to change our lifestyle as pandemic did.

The world has been full of objects, neither with nor without us. As a result, in the post-anthropocentric era, the world seeks alternative methods to examine its environments.

Acknowledgements

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of Interests

The Authors declare no conflict of interest.

References

Angelakis, A. N., & Rose, J. B. (2014). Evolution of sanitation and wastewater technologies through the centuries (pp. 7-13). London: IWA Publishing. ISBN: 9781780404851. https://doi.org/10.2166/9781780404851

Arias, R. (2009). Haunted Places, Haunted Spaces: The Spectral Return of Victorian London in Neo-Victorian Fiction (pp. 137). Palgrave Macmillan, London. https://doi.org/10.1057/9780230246744_7

Bell, S., & Paskins, J. (2013). Imagining the Future City: London 2062 (pp. 90). London: Ubiquity Press. https://doi.org/10.5334/bag

Bedford, J. (2020). Is there an object oriented architecture?: Engaging Graham Harman (pp.4). London: Bloomsbury Academic. ISBN:978-1-3501-3345-7. 10.5040/9781350133488

Blazev, A. S. (2014). Power Generation and the environment (pp. 427). River Publishers. ISBN: 978100315179. https://doi.org/10.1201/9781003151791

Braidotti, R., & Hlavajova, M. (2018). Posthuman glossary (pp. 296). London : Bloomsbury Academic. ISBN: 978-1-350-03024-4. 10.5040/9781350030275

Cicak, T., & Tynan, N. (2015). Mapping London's Water Companies and Cholera Deaths. *The London Journal*, 40(1), 21-32. 10.1179/0305803414Z.00000000057

Coleman, T. S. (2020). John Snow, Cholera, and South London Reconsidered. SSRN: https://ssrn.com/abstract=3696028. http://dx.doi.org/10.2139/ssrn.3696028

Clegg, S. R., & Haugaard, M. (2009). *The SAGE handbook of power (pp. 126)*. SAGE Publications Ltd. https://www.doi.org/10.4135/9780857021014

Gratton, P., & Morin, Marie-Eve. (2012). Jean-Luc Nancy and plural thinking : Expositions of world, ontology, politics, and sense (pp. 125). Albany: State University of New York Press. ISBN: 9781438442266.

https://www.worldcat.org/title/jean-luc-nancy-and-plural-thinking-expositions-of-world-ontology-politics-and-sense/oclc/815897005&referer=brief_results

Gratton, P. (2014). Speculative realism: Problems and prospects (pp. 101). London: Bloomsbury Academic. 10.5040/9781472594051.ch-004

Harman, G. (2009). Prince of networks: Bruno Latour and metaphysics (pp. 4-15). Melbourne: Re.press. https://www.worldcat.org/title/prince-of-networks-bruno-latour-and-metaphysics/oclc/718391151&referer=brief_results

Harman, G. (2017). Object-oriented ontology : A new theory of everything (pp. 30-35). London : Pelican. ISBN: 9780241269152. https://www.worldcat.org/title/object-oriented-ontology-a-new-theory-of-everything/oclc/1032275593&referer=brief_results

Harman, G. (2020). In *Is There an Object-Oriented Architecture? Is There an Object-Oriented Architecture?: Engaging Graham Harman* (pp. 21, 15–39). London,: Bloomsbury Academic. http://dx.doi.org/10.5040/9781350133488.ch-002

Harrowven, J. (2002). Origins and tales of London town (pp. 231). Borrowdale. ISBN: 9780954034924. https://www.worldcat.org/title/origins-and-tales-of-london-town/oclc/59378491&referer=brief_results

Horan J. L., Frazier, D. (1998). *Sitting Pretty*: *An Uninhibited History of the Toilet* (pp. 202). London: Robson. ISBN: 9781861052094. https://www.worldcat.org/title/sitting-pretty-an-uninhibited-history-of-the-toilet/oclc/41960676&referer=brief_results

Katz, E. (2020). Anthropocentrism and the Anthropocene. Climate change ethics and the non-human world / edited by Brian G. Henning, Zack Walsh. (1st ed., Routledge research in the Anthropocene). London: Routledge. ISBN: 9780429356988. https://doi.org/10.4324/9780429356988

Lai, A. (2011), London Cholera and the Blind-Spot of an Epidemiology Theory. Significance, 8, 82–85. i.org/10.1111/j.1740-9713.2011.00493.x

Latour, B. (1993). The pasteurisation of France / Bruno Latour ; translated by Alan Sheridan and John Law (pp. 163). Cambridge, Mass. ; London: Harvard University Press. ISBN: 0674657608. https://www.worldcat.org/title/pasteurization-of-france/oclc/249667686?referer=br&ht=edition

Latour, B. (1999). Pandora's hope : Essays on the reality of science studies (pp. 34). Cambridge, Mass. ; London: Harvard University Press. ISBN: 9780674653351. https://www.worldcat.org/title/pandoras-hope-essays-on-the-reality-of-science-studies/oclc/538114247&referer=brief_results

Latour, B. (2005). Reassembling the social : An introduction to actor-network-theory (pp. 131). Oxford: Oxford University Press. ISBN: 9780191531262 9780191531262 https://www.worldcat.org/title/reassembling-the-social-an-introduction-to-actor-network-theory/oclc/1156912903&referer=brief_results

McGee, K. (2014). Bruno Latour : The normativity of networks (pp. 1-10). London: Routledge. ISBN: 9780203093726. https://doi.org/10.4324/9780203093726

Miller, A. S. (2013). Black Boxes. Speculative Grace (pp. 82-84). New York, USA: Fordham University Press. https://doi.org/10.1515/9780823252244-024

Mitchell, P.D. (2015). Sanitation, Latrines and Intestinal Parasites in Past Populations (pp. 41-45, pp. 2). Routledge. https://doi.org/10.4324/9781315607603

Perdew, L. (2015). How the Toilet Changed History (pp. 17). Minneapolis: MN ABDO Publishing. ISBN: 9781629695723. https://www.worldcat.org/title/how-the-toilet-changed-history/oclc/1025310063?referer=br&ht=edition

Rydin, Y., Tate, L. (2016). Actor networks of planning exploring the influence of actor network theory (pp. 112-113, pp. 131). London: Routledge. ISBN: 9781138886407 https://www.worldcat.org/title/actor-networks-of-planning-exploring-the-influence-of-actor-network-theory/oclc/980935984?referer=br&ht=edition

Sanders, A. (1999). Dickens and the spirit of the age (pp. 6). New York: Oxford University Press. Print ISBN-13: 9780198183549. 10.1093/acprof:oso/9780198183549.001.0001

Schiller, R. (2019). Between one culture : Essays on science and art (pp. 204). Cham : Springer. ISBN: 978-3-030-20538-6. https://doi.org/10.1007/978-3-030-20538-6

Spiegelberg H. (1965). Martin Heidegger (1889-) as a Phenomenologist. In: The Phenomenological Movement (pp. 297- 298). Springer, Dordrecht. https://doi.org/10.1007/978-94-015-7394-8_7

Tulchinsky T. H. (2018). John Snow, Cholera, the Broad Street Pump; Water-borne Diseases Then and Now. Case Studies in Public Health, 77–99. https://doi.org/10.1016/B978-0-12-804571-8.00017-2

URL 1. *The Four Times of Day*, by William Hogarth (1738-1794) © The Trustees of the British Museum. https://www.britishmuseum.org/collection/image/1613632214

URL 2. A *Woman Dropping Her Tea-cup in Horror upon Discovering the Monstrous Contents of a Magnified Drop of Thames Water Revealing the Impurity of London Drinking Water*, by William Heath (around 1828). Courtesy of the World Digital Library. https://www.wdl.org/en/item/3956/#q=cholera+london

URL 3. *Cholera, Tramples the victors & the vanquished both*, by Robert Seymour in1831. The National Library of Medicine believes this item to be in the public domain. https://collections.nlm.nih.gov/catalog/nlm:nlmuid-101393375-img

URL 4. *Death's Dispensary*, by George John Pinwell, 1866. http://www.environmentandsociety.org/arcadia/first-cholera-epidemic-st-petersburg

URL 5. *Royal Address of Cadwallader-ap-Tudor ap-Edwards ap-Vaughan, Water-King of Southwark, Sovereign of the Scented streams*, by George Cruikshank, 1832. © The Trustees of the British Museum. https://www.britishmuseum.org/collection/image/190018001