Human waste muddies the waters at the 2024 Paris Olympics

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"The sewer is the conscience of the city. Everything there converges and confronts everything else."

-Victor Hugo, *The Intestine of Leviathan*

With the Paris Olympics in full swing, athletes are being asked to swim in the river Seine, which, until recently, had untreated human waste flowing through it during heavy rains. The sewer system of Paris, though it has undergone recent upgrades, is still based on an archaic model, called a combined sewer system, where stormwater and wastewater are managed as one stream. This mixed wastewater is supposed to be treated before release to the environment. However, during heavy rains, the system must discharge directly into the Seine to prevent flooding of homes and streets, leading to health issues for those who go into the river.

Despite the cleanup efforts along the Seine, the central issues of a combined system and the mismanagement of utilities under capitalism continue to plague the city and the competitions held in it.

Testing of the Seine's water quality continued even after the start of the Olympics, with some events having to be delayed or limited in scope due to unsafe levels of bacteria. On Wednesday, July 31, athletes for both the men's and women's triathlon dove into the river to compete after days of questionable water quality had delayed the men's competition and forced cancellation of a test event where competitors could preview the route of the race.

These issues were associated with large storms, with heavy rains the Friday before being followed up by light showers, including during the beginning of the women's triathlon. Despite assurances by Paris officials of the water's safety, the actual data on bacterial levels were not released to the public, but only to "the governing bodies of each sport," according to the Associated Press. This left athletes swimming in the river unable to make an informed decision about their choice to compete.

The species of bacteria being tested for by Paris officials, E. Coli, while potentially dangerous by itself, is a more general indicator of fecal contamination. The bacteria does not live outside of animal intestines for long, meaning its presence in waterways is a clear sign of a recent deposit of human and/or animal waste. This means swimmers in waters with unsafe levels of E. Coli are likely exposed to a number of pathogens causing waterborne diseases such as cholera, dysentery, diarrhea, hepatitis A, typhoid and polio. Many of these diseases, if left untreated, could pose a serious risk to the health or even life of a person contracting them.

The source of these elevated levels of bacteria is not clear. In the Paris area, untreated stormwater from city streets can contain unsafe levels of pathogens from human and animal waste, as well as chemical pollution from cars and other heavy machinery.

This untreated stormwater can make its way directly to the Seine during heavy rains and circumvent the combined sewer system entirely. This could explain the presence of potentially harmful bacteria even though a basin constructed to capture excess combined outflow was only 20 percent full during the heavy rains preceding the competitions.

No river though, is beholden to a single city. The Seine in particular is impacted by agriculture, industry, and communities upriver of Paris. This leaves separate interests to fight over access to the same river as both a source of clean water and a sewer to discard their waste into. Agriculture in particular in the region produces huge amounts of sediment and chemical pollution in the form of excess fertilizer running off of fields. All of this contributes to disruptions in the local ecology and leaves the door wide open for pathogens to flourish downriver.

This balkanized management is a weakness of engineered water systems the world over. A single city might have separate authorities managing stormwater and wastewater even in a combined sewer system, while there might also be local, regional, and national water authorities, all of which have overlapping and sometimes contradictory mandates and political interests. The internecine conflict that results can prove a major stumbling block for the rationalization of water management systems.

Water as a social good, and a class issue

Access to clean water has been a social problem throughout history. From the arid scrub of western North America to the early sewers of Paris, people have approached this problem with all the tools at their disposal. In non-agricultural societies, this has often meant the careful choice of settlement or camp locations, as well as the management of wildlife and plants that may affect the availability of water.

As the agricultural revolution allowed humans to produce enough food to rapidly increase population densities, the old problem of access to clean water began to require engineered solutions to meet the scale of the need. This need includes both

bringing clean water to places where people live, as well as removing waste so it does not contaminate the clean water coming in.

By creating surplus resources beyond those available to more primitive hunter-gatherer societies, the agricultural revolution made possible the differentiation of the population into social classes, and water became a class issue. Those possessed of wealth could secure access to clean water and protection from wastewater, at least so far as technological advances made this possible.

The importance of these services, even before a scientific conception of disease was possible, was understood at some level by societies around the world. Public works serving either or both of these linked needs have been found in ancient Mesopotamian and Indus Valley civilizations, though some of the most well-established systems can be seen in the relics of the Roman Empire.

The earliest known example of wastewater treatment dates to 2450 BC in the ruined city of Mohenjo-Daro, a part of the Indus Valley Civilization. In Mohenjo-Daro a network of closed sewers moved wastewater away from the city, but not before solids were allowed to settle out in a series of cesspools. Likely done to keep the wastewater flowing effectively, this practice is still a critical component of modern sewers, including the Paris sewer, and has been adapted for drinking water treatment as well. Even the practice of removing those solids and subsequently using them as fertilizer on farm fields was shared by both Mohenjo-Daro and Paris in different historical periods. However, as sanitation concerns mounted and inorganic fertilizers improved, that practice was discontinued in the area around Paris.

These ancient systems, however, pale in comparison to the scale of the sewers needed by modern society. Instead of the estimated 1 million people in Rome at the height of its power, Paris would have a population of over 2 million by 1900 as the construction of its sewer network wrapped up, with that population continuing to grow.

In step with such technological developments as the sewers of Paris, the birth of public health as a science-based social practice in the 19th century created opportunities for even greater improvements. The 1854 Broad Street cholera outbreak in London marked a turning point in the scientific study of disease that had immediate implications for sanitation. During the outbreak, physician John Snow sought to use evidence and statistical analysis to find its source. He successfully identified drinking water from the Broad Street pump as the most likely risk factor for disease, convincing local authorities to shut down the pump by removing its handle.

For the hundreds already dead from the cholera outbreak, this intervention came too late. However, it established methods of analyzing the spread of disease that had the potential to save countless lives when paired with emerging sanitation technology. The potential benefits of clean drinking water now had solid evidence to justify the expense of substantial infrastructure. As the sciences of public health, medicine, and chemistry grew more sophisticated, though, many of the problems in even such cutting-edge sanitation technology as the Paris sewer began to be seen more clearly.

One of the great sources of difficulties in sanitation was the combined sewer systems that many old cities, such as Paris, had built for their efficiency in moving large amounts of stormwater intermixed with wastewater to prevent both flooding and disease. While the simplicity of such systems appealed to early adopters, their issues became more apparent as the scale of the problem and necessary solutions came into focus throughout the 20th century. In an industrialized world, where chemical pollutants were dumped directly into waterways, the need for extensive treatment of drinking water and wastewater for human health became painfully obvious.

Such extensive treatment was expensive and resource-intensive, meaning it was most efficient to prevent as much pollution as possible. For this reason, many cities with younger sewers separate wastewater and stormwater, and require water treatment at industrial sites. This reduces the quantity of water they need to treat, since during a typical rainstorm in a combined sewer, stormwater often far exceeds the volume of wastewater. Moreover, this prevents the issue possibly at play in the Seine, where untreated sewage is discharged directly into the river when the amount of stormwater exceeds what the combined system can hold.

There are many older industrial cities around the world that still have similar combined sewer systems, despite their flaws. In the United States alone some 40 million people live in cities with combined sewer systems. Despite the vast wealth accumulated by the profit system in the course of the 20th century and the first two decades of the 21st, little or nothing has been done to bring such systems up to the new standards made possible by developments in science and technology.

Flint, Michigan, became a global horror story because profit-gouging led to the systematic lead poisoning of an entire generation of young children. Similar issues have emerged in Jackson, Mississippi, and even in parts of Washington D.C., the US capital. Now in Paris, one of the world's great cities, young athletes are being subjected to conditions that their ancestors would (literally) have turned up their noses at.