Reflection #2

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Water 4.0 is a book written by Professor David Sedlak, which discusses the most abundantly found natural resource on earth, water. The professor takes into account different aspects of water: availability, purification, drainage, and future technologies and systems. The title "Water 4.0" indicates these four aspects of water systems respectively.

# Summary of the Book from Chapter 1 to Chapter 9

The societies in early ages used to fetch water from rivers, canals, and wells. As urbanization started, people felt the need of devising ways of importing water to their cities. The earliest recorded attempts reveal that people made tunnels to direct water towards cities. However, it was the Romans who invented proper systems for routing water to cities. They made use of pipes for importing water, disseminating it to the desired places within the cities, and finally sending it back to nature. With the fall of the Roman Empire, there were no government departments to look after these water systems.

The societies in Europe lost the developments in water systems after the fall of the Roman Empire. People had no choice except the “buckets’ to fetch water for their use. Digging wells had its limits because it was quite risky and burdensome to fetch water out of them. Later, people started crafting fountains by creating tunnels that started from the mountains and ended in the designated populated areas. They built water basins to collect water from.

The writer considers efforts made in London and Paris for regulating the supply of water and eliminating wastes that polluted the water sources in the densely populated areas. Techniques were developed to use local as well as imported water effectively and remove wastes by throwing them off into the rivers or reusing as fertilizers.

With the advent of industrialization, there was a massive increase in population in the metropolitan areas of America. Consequently, the need for developing water distribution and sewage systems grew stronger. They built ducts to import water and a network of tunnels for sewage disposal. There arose a problem of water infections that resulted in diseases like cholera and fevers. It became necessary to make water clean by developing technologies.

The Americans devised ways for water purification. They started filtering water by running it through sands. Later, the bacteriologists discovered that the biofilm is also useful for eliminating bacteria found in water. Therefore, they started purifying water by filtering it with the use of biofilm as well as sand. The results were hopeful but not satisfactory. It helped in reducing cholera and typhoid fever.

In the twentieth century, the researchers found that chlorine helps in protecting users from pathogens found in water. They started treating water with chlorine for further purification. The filtered water treated with chlorine was the solution to all problems. However, it was observed that using chlorine-treated water regularly resulted in health problems by producing byproducts. This became a dilemma that needed to be solved by upgrading the systems of water purification. Removal of humic substances from water by using activated carbon was suggested for the ultra-purification of water.

The sewage problems arose because the volumes of wastes flowing through the pipes were not regulated. This was tackled by making ponds for holding these wastes at regular intervals of the network. Microbes grew naturally in these ponds and they helped in purifying wastes before getting thrown off into the rivers.

Sedlak shows his concern about the future of water import and export systems. He is not satisfied with the current systems. He hopes for the emergence of new water treatment technologies that will be more effective. He emphasizes the need for upgrading the old and current drinking-water and waste-water systems to solve the problems related to these systems. The author also indicates the rising costs of operations, materials, electricity, and overhead expenses associated with these systems (Sedlak, 2014).

# A Real-Life Example Relating to the Book

The issue of water contamination by lead in America needs to be addressed immediately. Research showed that almost twenty-one million people used water that came from utilities violating health standards. The reason quoted was the lack of funds for fixing the issue. The biologists say that lead consumed even in the least amounts results in serious health hazards. Children are severely affected by the consumption of lead, as it destroys the central nervous system significantly and causes many behavioral problems. Another research revealed that nearly five hundred thousand people in America have been reported to have a high lead level in blood.

Lead levels in water sources available for drinking have been reported significantly high in many areas across the country, especially in the very small communities. There are several on the record violations of the rules that regulate purification of water from lead and copper.

The service lines that come from the water purification plants have significant lead levels. Due to the corrosion in the water pipes, lead is added to the running water. This is a big problem. Almost 30 percent of the water systems in North America have been reported to have lead in their service lines. To solve this problem, an intervention by the federal government is needed. The states have to monitor and upgrade their systems. The measures necessary to be taken by the system administrators include reducing corrosion in water pipes and replacing the service lines that are made of lead. To this end, sufficient funds must be allocated by the government to the operating authorities (Allaire & Bing, 2019).

References

Sedlak, D. L. (2014). *Water 4.0: The past, present, and future of the world’s most vital resource*.

Allaire, M. C., & Bing, Q. (2019). How to address America’s lead crisis and provide safe drinking water for all. Retrieved September 20, 2019, from The Conversation website: <http://theconversation.com/how-to-address-americas-lead-crisis-and-provide-safe-drinking-water-for-all-118153>