Report on water

The history, present and future of water

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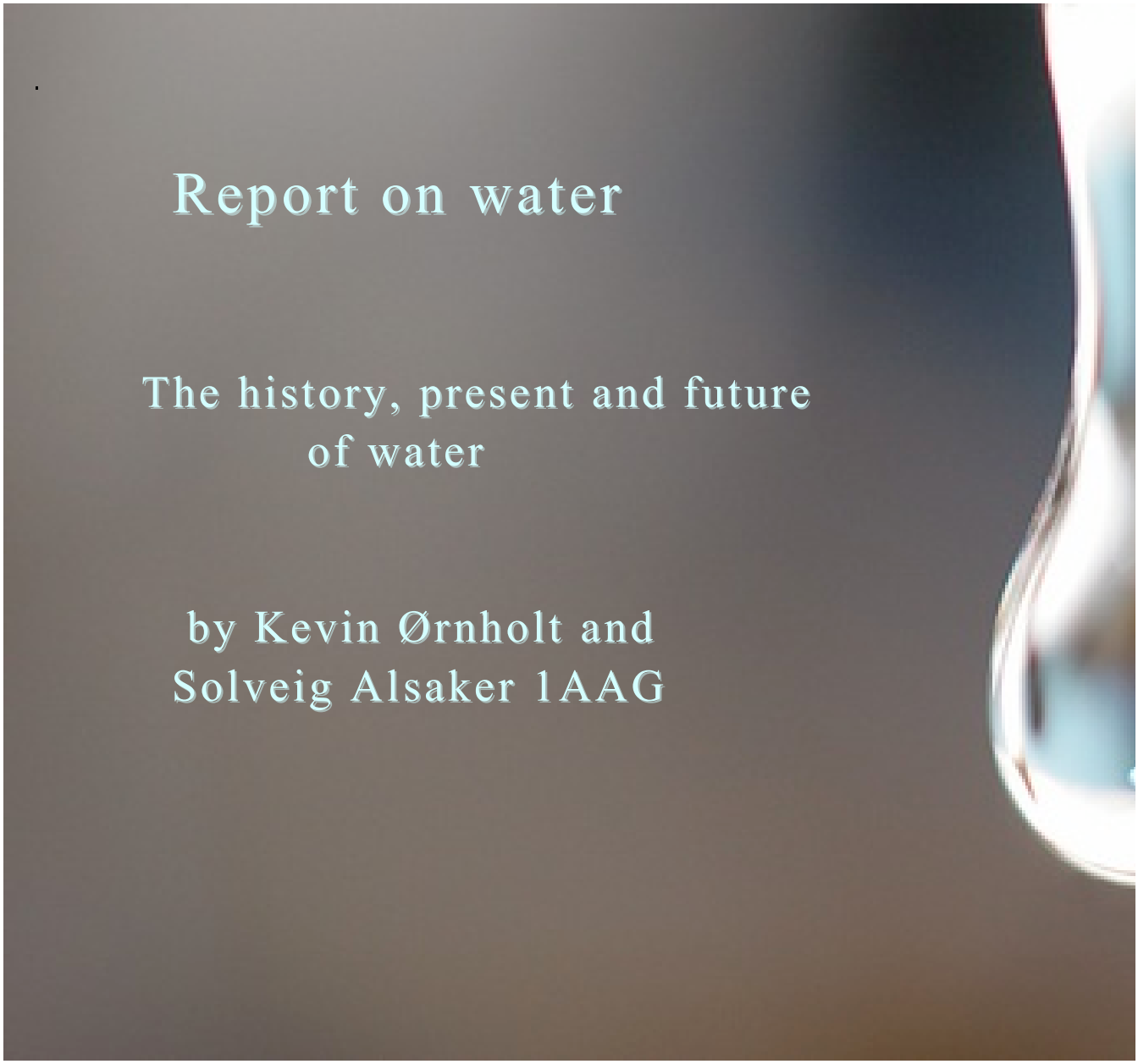

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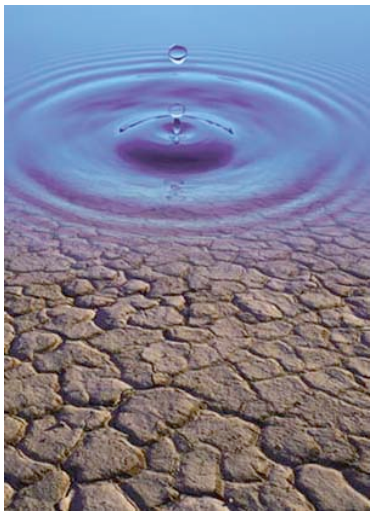
Introduction

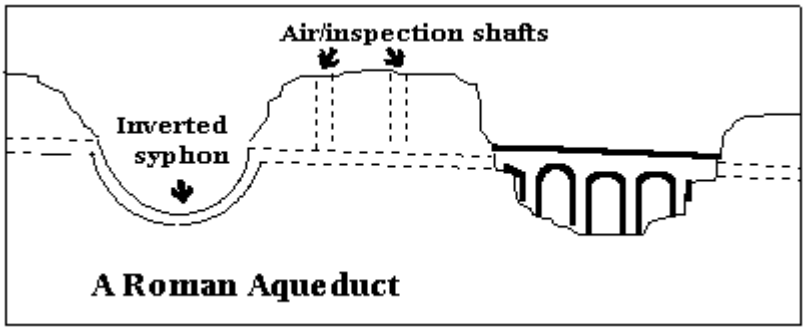
Since humans came to the world, humans have settled down close to a water source.
Water is absolutely essential for human and animal survival, yet water isn't really written much about in history.
People don't really think of water as a big part of history.
But without it there wouldn't be any life at all.

This part of the project will be containing information about what water have meant for humans in history.



The Romans

The Romans had pretty advanced technology with water. They are expected to have the first water pipe system. Aqueducts are known from roman building technology.
The first ones were built around 300 B.C. When a city's population was well over a million, the distribution system was able to provide over one cubic meter of water per day for each inhabitant: more than we are accustomed to use nowadays.
Closed pipes were occasionally used to cross valleys by the "inverted syphon" method: the pressure forced the water down and up again on the other side, to a level slightly lower than before. But this system was costly, as it required lead pipes (lead had to be imported from Spain or Great Britain) and it was difficult to make joints strong enough to withstand the pressure; so arches were far more common.

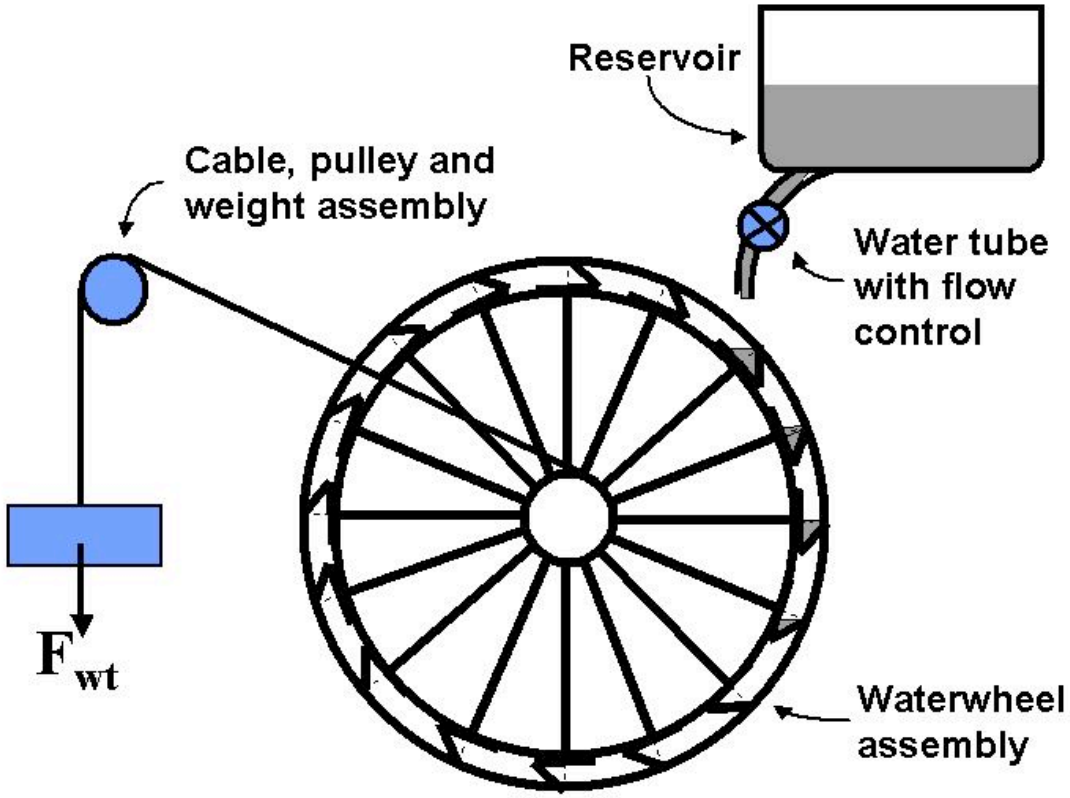


When the water reached it's destination it was usually were distributed to the city population by piping that were connected to a public water fountain, which was placed many places in a city so people could easily get water. Rich citizens, who were willing to pay, could have it piped to their private villas.
It seems like the Romans knew how important water and piping was. The public baths were usually connected to the pipe system which made refilling and drainage of water easy.

For industrial use, aqueducts brought water to mills that were able to ground grain to feed about all of the population of a city.

Waterwheels

Water has been a source of energy for over 4000 years. The first technology for water energy is the waterwheel. They were mostly connected to mills for groaning grain.
It's said that the Egyptians were the first one to build waterwheels along the Nile about 2000 B.C. Use of water energy didn't become more common before the middleages. Around year 500, it was impossible to produce enough flour in Europe to feed everyone.



Steam-energy

Energy from water pressure is very common, this technology is used still today many places. The point is to keep water in a tank which you heat and make the water boil and create steam pressure then be used to move things like an engine or a turbine.

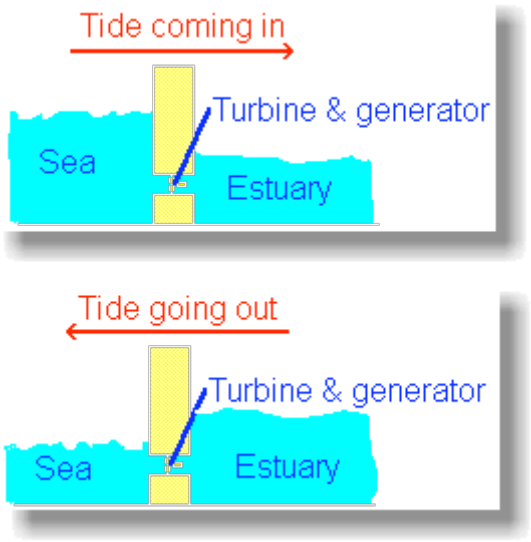
Tidal Barrages

These work rather like a hydro-electric scheme, except that the dam is **much** bigger.

A huge dam is built across a river estuary. When the tide goes in and out, the water flows through tunnels in the dam.

The ebb and flow of the tides can be used to turn a turbine, or it can be used to push air through a pipe, which then turns a turbine. Large lock gates, like the ones used on canals, allow ships to pass.

If one was built across the Severn Estuary, the tides at Weston-super-Mare would not go out nearly as far - there'd be water to play in for most



of the time.

But the Severn Estuary carries sewage and other wastes from many places out to sea. A tidal barrage would mean that this stuff would hang around Weston-super-Mare an awful lot longer! Also, if you're a wading bird that feeds on the exposed mud flats when the tide goes out, then you have a problem, because the tide won't be going out properly any more.

Our planet, Tellus, is covered by more water than dry land. Although 70% of the world surface is covered by water, only 2,5% of it is fresh. Nearly 70% of the freshwater is frozen in ice caps, and most of the remaining is either soil moisture or lying deep underground. Less than 1% of the world's freshwater resources is accessible for human use.

Even though there is a lot less freshwater than saltwater it falls enough rain every year to cover the water-need for every single person in the world.

The problem is that the water is not evenly spread around the world. In some parts of the world there is an overflow of freshwater, like in the land of the fjords.

In Norway we have no problem getting hold of clean water. We take it for granted that when we turn on the tap

the water that comes out is in great condition. Which means it has no flavour, no colour and no smell.

In other places 1,1 billion people (18% of the world's population) lack access to safe drinking water. More than 2.2 million people in developing countries, mostly children, die each year from diseases caused by consumption of contaminated water. Often in developing countries it is the women who have the job of hauling water.

It is estimated that over 10 million person-years are spent by women and female children carrying water from distant sources every year.

About 65% of the freshwater is used for agriculture. However most irrigation systems are inefficient. 60% of the water is lost to evaporation or return to rivers. Inefficient irrigation not only wastes water, but causes also risks for health and environment.

Irrigated agriculture accounts for about 70 % of water withdrawals, and up to 90 % in the dry tropics. Water withdrawals for irrigation have increased by over 60% since 1960.

In areas in the United States, China and India groundwater is being consumed faster than it is being replenished so rivers often dry before they reach the sea.

 Pollution 

There are different types of pollution that can harm water and the living things that use it.

In developing countries, between 90 and 95% of sewage and 70% of industrial wastes are dumped untreated into waters where they pollute the local water-source.

About 94 % of city dwellers had access to safe water at the end of 2000, while the rate for rural dwellers was only 71%.

Other central pollution-sources are spillings from the industry and fertilizer that has been used in agriculture.

25% of the freshwater on earth is used by industry. Mostly for cooling machines down. After it is used the water is returned to the river in which it came from, only now it brings with it chemicals which destroy the plant and animal life in and near the river.

These are chemicals such as PCB, PAH, zinc and quicksilver which are very dangerous for all living creatures. Some have the ability to stay inside the animal body

Fertilizer that comes in small pebbles dissolve when it gets in contact with water. Fertilizer contains organic materials, like manure, and synthetic chemicals, like nitrates, to increase the soils ability to support plant growth.

There for when fertilizer has been spread around and there it a lot of rain, the water carries the dissolved fertilizer with it into the nearest river or lake.

Because of the unnatural amount of minerals in the water the plants and micro organism start to grow which may later cause algae blooming.

This leads to a lack of oxygen in the water and makes it impossible for fish to live there.

Dissolved oxygen is extremely important to the health of the water ecosystem. It can range from 0- 18 part per million (ppm), but natural water normally require 5-6 ppm. When there is pollution is the water the oxygen level drops.

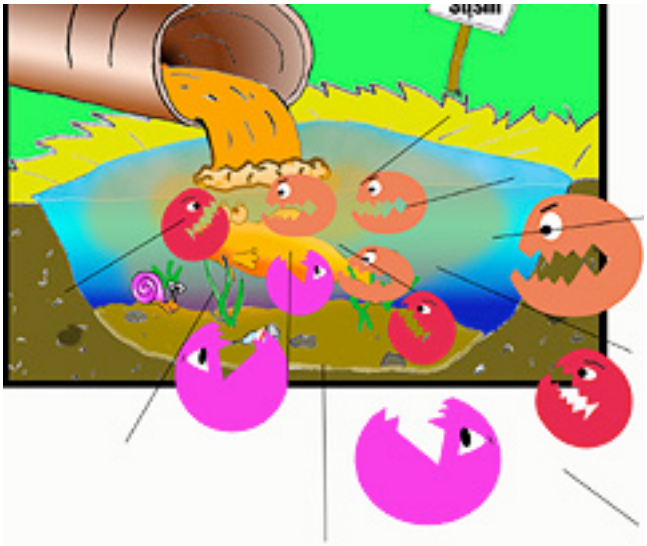
This mini-cartoon illustrates it:

This fish lives in a healthy lake.
The oxygen level is 6 ppm

Pollution, heavy in organic matter, enters the lake

Decomposition:

Micro organisms degrade the organic matter and uses up almost all the dissolved oxygen.



Oxygen-level: 5 ppm

Ways of cleaning water

If you go to London and drink water straight from the tap, you are drinking the same water that 12 others have used before you. As time goes by that number becomes even bigger. Rinsing water so it can be used again is a very important factor in the future of the water.

There are several ways of doing this. First there is the mechanical rinsing. Drain-water is strained so that big particles are separated from the water, but the water is not fully clean.

Then there is Chemical Rinsing. Different chemicals are added to dissolve Phosphate and Nitrate.

Last but not least there is the Biologic rinsing. Now it is bacteria that is added. They dissolve the organic particles like urine, blood and food.

When a lake or sea is polluted, there are several ways of fixing the problem. The pollution source must be found, and hopefully stopped. In London, to rinse the Thames they use filterbeds made of different types of sand. This is a good way to rinse the water because it is a very cheap way of doing it.

Changes for the future

At the International Conference on Freshwater in December 2001 the governments, ministers and water experts agreed what has to be done in order to reach the Millennium Development Goal. This goal is to halve the proportion of people worldwide without access to freshwater by 2015.

-2.2 billion people will need improved sanitation systems and hygiene awareness.

- A global investment for infrastructure of up to $180 billion is needed. Investment levels amount to an estimated $70-80 billion. However, to meet people's needs for drinking water and sanitation, the investment required is closer to $23 billion a year.

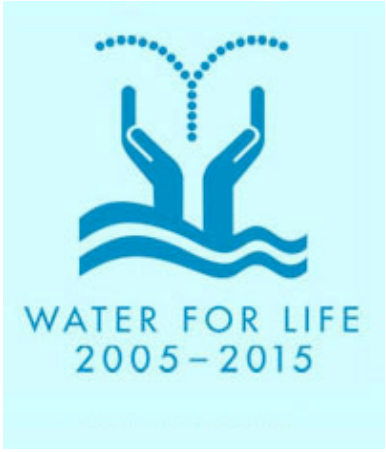
- Prevent dumping of rubbish, untreatened sewer and oil in the sea

- Find alternative solutions for water-need in industry

- Clean all used water before letting it out into the sea again.

Ending

Water for life



"..World Water Day also marks the beginning of the "Water for Life" Decade. Our goal is to meet the internationally agreed targets for water and sanitation by 2015, and to build the foundation for further progress in the years beyond." (Kofi A. Annan)

The World must work together to accomplish the goal of clean water supply for everyone. We must take care of the most precious thing this earth has, which is worth much more than gold and silver, because if we lost it and what would lead to doom if we lost.