# *Significant Events in the History of Water and Why it Matters*

TWCA Keynote
March 6, 2024
Chairwoman Brooke Paup

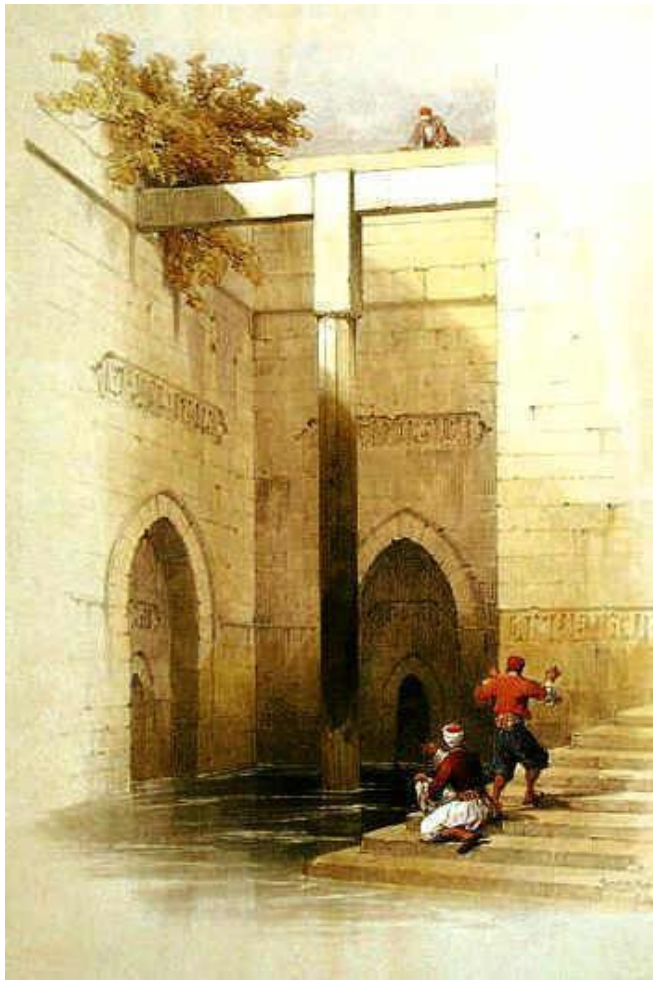
# Egypt

- The OGs of water infrastructure. Canals, dams, reservoirs, and land reclamation projects were a top priority of the pharaohs – mainly because 90% of the land is desert or arid.

- Developed an ancient form of our modern flood gages called a “nilometer” which measured water levels in the Nile and could help predict flooding.

# Egypt

## Ancient Nilometer



# Egypt

- Irrigation experts – The Nile was the source of all life for the Egyptians. They perfected a system of irrigation methods that manipulated the flows of the Nile.
- Sakia – A mechanical water wheel – usually pulled by oxen - that lifted water from the Nile to provide the constant flows needed for irrigation.

# Egypt

- Shadoof – A very simple wooden tool consisting of a pole with a bucket on one end and a weight on the other that raised water above the Nile and diverted it to a canal or ditch.

# Egypt

- Egyptians knew that clean water was essential to their survival. They discovered that adding aluminum sulfate to water trapped impurities and sediment by forming a gel that sinks to the bottom – leaving clean water on top.

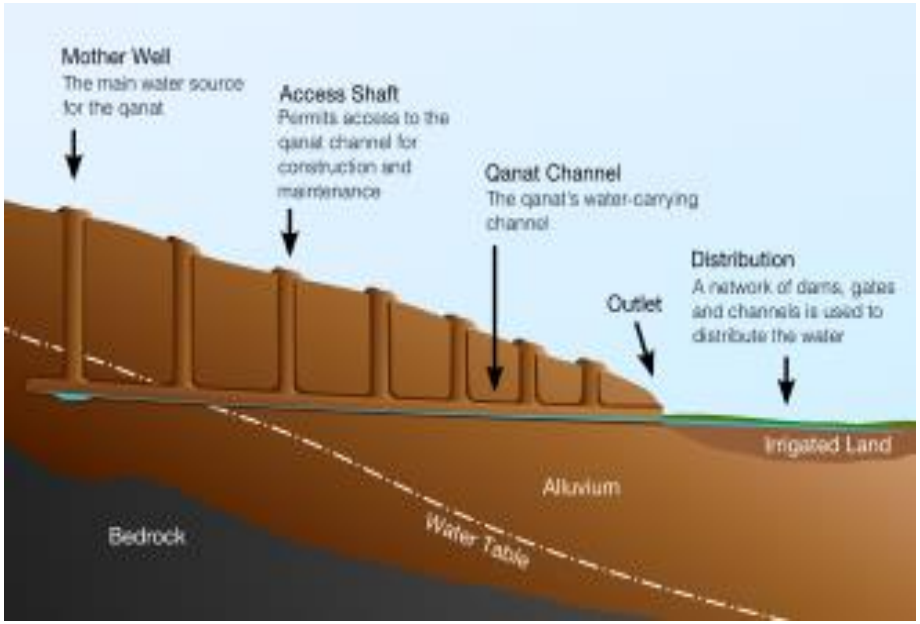
# Persia

- Made their desert bloom.  Developed the “qanat” method of artificial irrigation.
- Elaborate underground tunnel systems for extracting groundwater in the dry mountain basins of present-day Iran.
- Hand-dug series of well-like vertical shafts, connected by gently sloping tunnels. Delivered large amounts of subterranean water to the surface without need for pumping. The water drained by gravity.

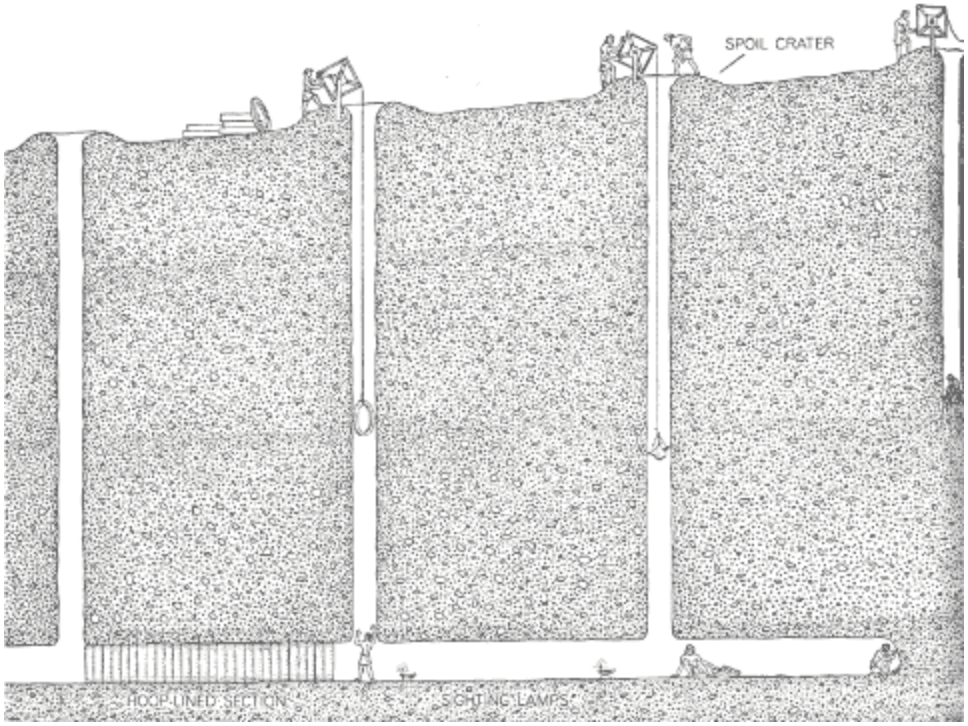
# Persia

- Qanat water system

https://video.nationalgeographic.com/video/0000015c-31cb-d3f8-afdc-ffdbe9b10000



# Persia



# Roman

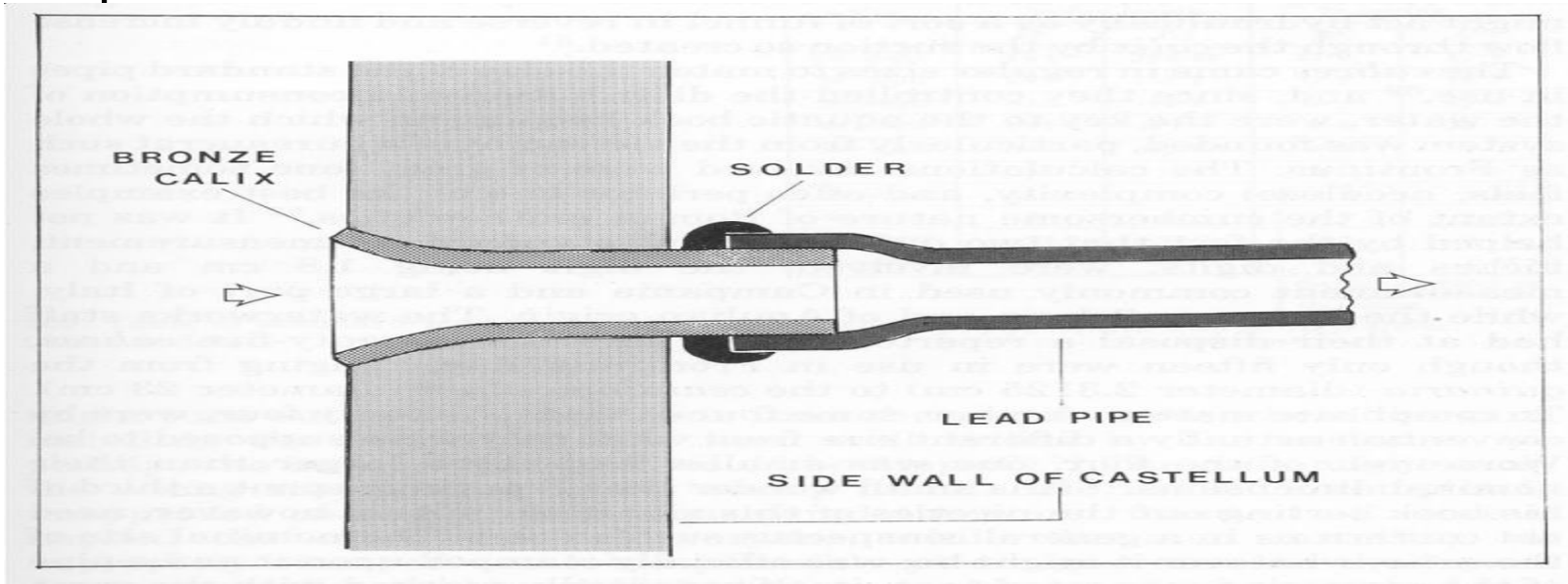
- Aqueducts – The Roman SWIFT program

# Roman

- Aqueducts - Piping system that used gravity to bring clean water to its diverse populations.
- Majority of the aqueducts ran underground. These water channels were dug below the surface or bored through rock. Approximately 315 miles supplied Rome – of that about 30 miles were actually visible.
- Most flowed to into castella or cisterns – built at the highest point in the community – and flowed to the population through a huge network of lead pipes.

# Roman

- Private homes were charged for water based on the diameter of their access pipe – which led to scams where citizens placed a much larger pipe than they paid for. Their solution – an invention called a calix, a sleeved pipe fitted into the wall to prevent alterations.



# Water Infrastructure and Pandemics

## Malaria

- Malaria aka Roman Flu
- Thought to be responsible for millions of deaths in ancient Rome.
- Stagnant water leads to mosquitos, mosquitos spread malaria.
- Decline of the Roman Empire led to water infrastructure issues and water stopped flowing, allowing for malaria to flourish.

# Middle Ages

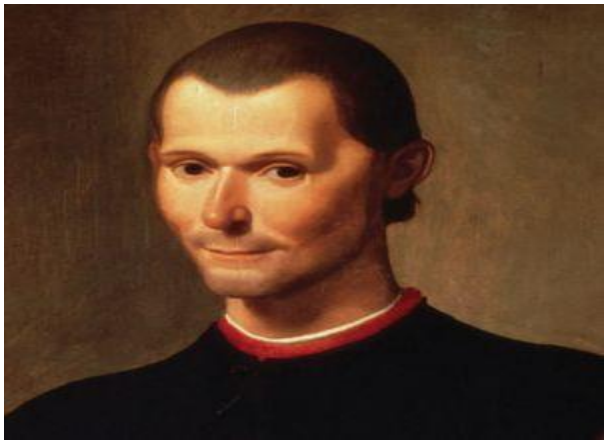
- Great Conduit – Established in 1245 AD. It was a gravity-fed pipe that brought spring water 2.7 miles to a reservoir in center of London.

# Renaissance Era

The strange partnership between Leonardo da Vinci and Niccolo Machiavelli… Odd bedfellows to say the least.

# Renaissance Era

- Worked together to divert (or steal) the Arno river.
- The plan called for the construction of one wide channel, deeper than the Arno itself, which when combined with a dam, would divert the entirety of the river away from Pisa and into the Stagno (marshland) The channel was intended to be eighty feet wide at its mouth, sixty-four feet wide at its end, thirty feet deep, and a mile long.




Emilia Romagna
Apennine Mountains
Adriatic Sea
Carrara
San Marino
Lucca
Fiesole
Florence
Stia
Pratovecchio
Poppi
Marche
Pisa
Arno
Empoli
Pontedera
Livorno
Montevarchi
Arno
Tiber
Arezzo
Tuscany
Umbria
Siena
Ligurian Sea
Cortona
Lake Trasimene
Arno River - Tuscany, Italy
0 10 20 30 40 50 km
0 10 20 30 miles
Cartography: MapDesign
North

# 18th and 19th Centuries

Water Fountains – important political symbols

- 1857 – London opens its first public water fountain. Thousands come out for its unveiling.

Science & Society Picture Library via Getty Images

# Water Infrastructure and Pandemics

## Cholera

- Cholera outbreaks – A constant killer that was thought to be transmitted by foul air called “miasma”.
- A British doctor named John Snow mapped every outbreak in London and realized they all were related through a drinking water pump.
- His discovery led to an effort to improve drinking water sanitation and helped slowly eradicate cholera and typhus through chlorine disinfection.

# 19th and 20th Centuries

- 19th Century New York City – First public drinking fountain was installed in 1855, but funding lapsed six months later. It took 30 years to see a real expansion of fountains in the city.
- Most active proponents of the water fountains were temperance advocates.

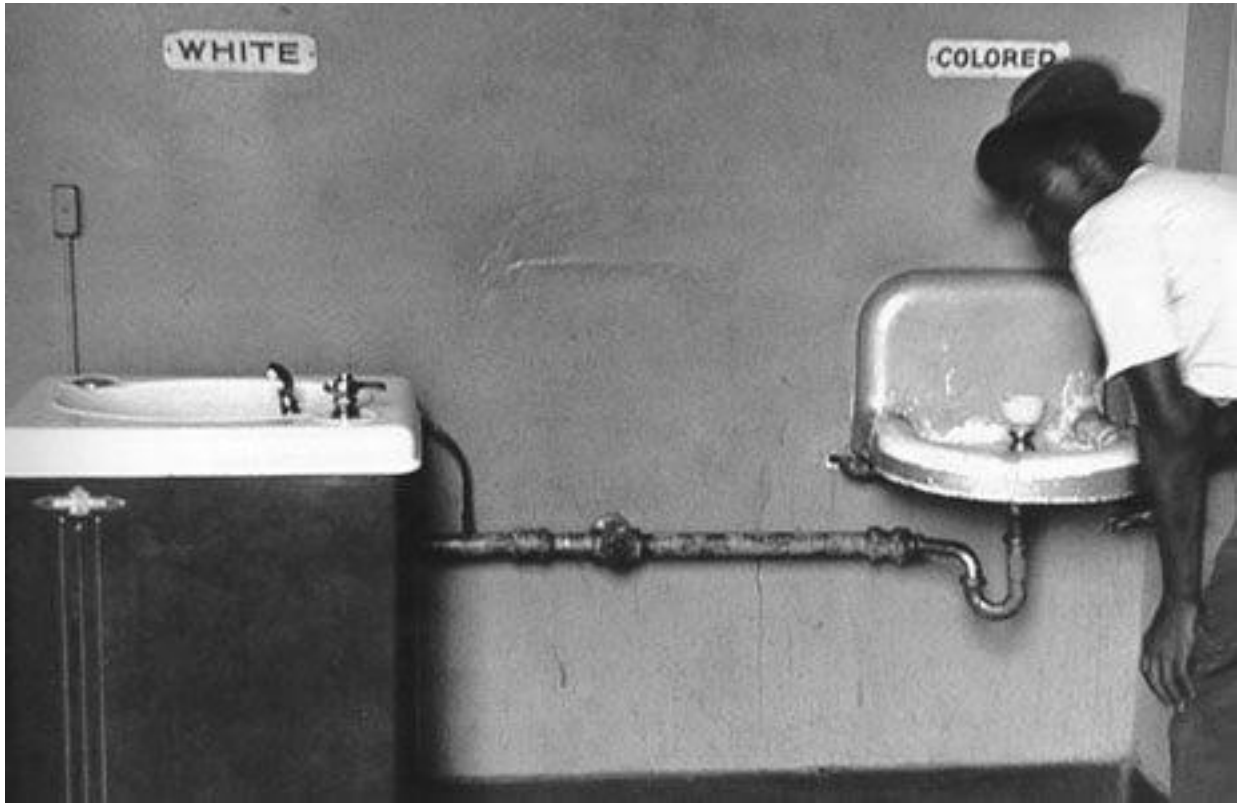
# 19th and 20th Centuries

# 19th and 20th Century

- "Ban the Cup" campaign.
- Led to new water fountain design called "bubblers" where the water shot straight up.

https://www.youtube.com/watch?v=yBIAwJeUJI0

# 20th Century




The water fountain becomes a symbol of Jim Crow. Again, water is intensely personal.

# Why does this all matter?

# Our future depends on our ability to learn from our past.

# Why does this all matter?

- Civilizations either flourish or perish based on their access to clean water.
- Texas is no different. We are growing by approximately 1300 citizens EACH DAY. Water is crucial to sustaining our growth.
- There is no Texas Miracle without Texas Water.

# TWDB Mission Statement

"To lead the state's efforts in ensuring a secure water future for Texas and its citizens"

# Texas Water Infrastructure Needs

- State Water Plan
  - $80 billion capital cost
- State Flood Plan
  - $52 billion capital cost
- State Revolving Funds
  - Eight times oversubscribed

# What's the solution?

# What's the solution?

# What's the solution?

- Invest in your people.

- Invest in our water future.

# 88th Legislative Session

# TWDB Budget

**Project Funding**

- $1 billion – Texas Water Fund
- $625 million – Flood Infrastructure Fund
- $125 million – Federal match for SRF programs

**Employees**

- 5% pay raise across the board
- $3 million: Targeted salary increases for key positions
- Funding for about 80 new positions

# SB 28 / Proposition 6

- Created the **Texas Water Fund**
- **$1 billion** deposit
- Resounding approval from **voters**
  - 78% voted for Prop 6
  - 1.97 million votes
- **$750 million** to supplement TWDB programs that already exist
- **$250 million**: New Water Supply for Texas Fund

# Texas Water Fund: Uses

- May only be used to transfer money to the following funds or accounts:
  - New Water Supply for Texas Fund (brand new fund)
  - State Water Implementation Fund for Texas (SWIFT)
  - Drinking Water and Clean Water State Revolving Funds (SRF)
  - Rural Water Assistance Fund
  - Texas Water Development Fund II
  - Statewide water public awareness account

# Texas Water Fund: Priorities

- Specifically mentioned in **SB 28**:
  - Rural communities
  - Cities under 150,000 population
  - Projects where all permitting is complete
  - Statewide public awareness campaign
  - Water conservation strategies
  - Water loss mitigation projects

# New Water Supply for Texas Fund

- Goal: create new water supply sources for TX
- $250 million deposit
- Examples:
  - Desalination (both seawater and brackish groundwater)
  - Produced water treatment
  - Aquifer storage and recovery
- Public-private partnerships allowed

# Stakeholder Engagement Opportunities

- March 20: Informal Stakeholder Meeting
  - Austin: in person
  - Virtual option
- April 10: Work session in Lubbock
- Stakeholder surveys on TWDB website