

**Tom Cech, Co-Director**  
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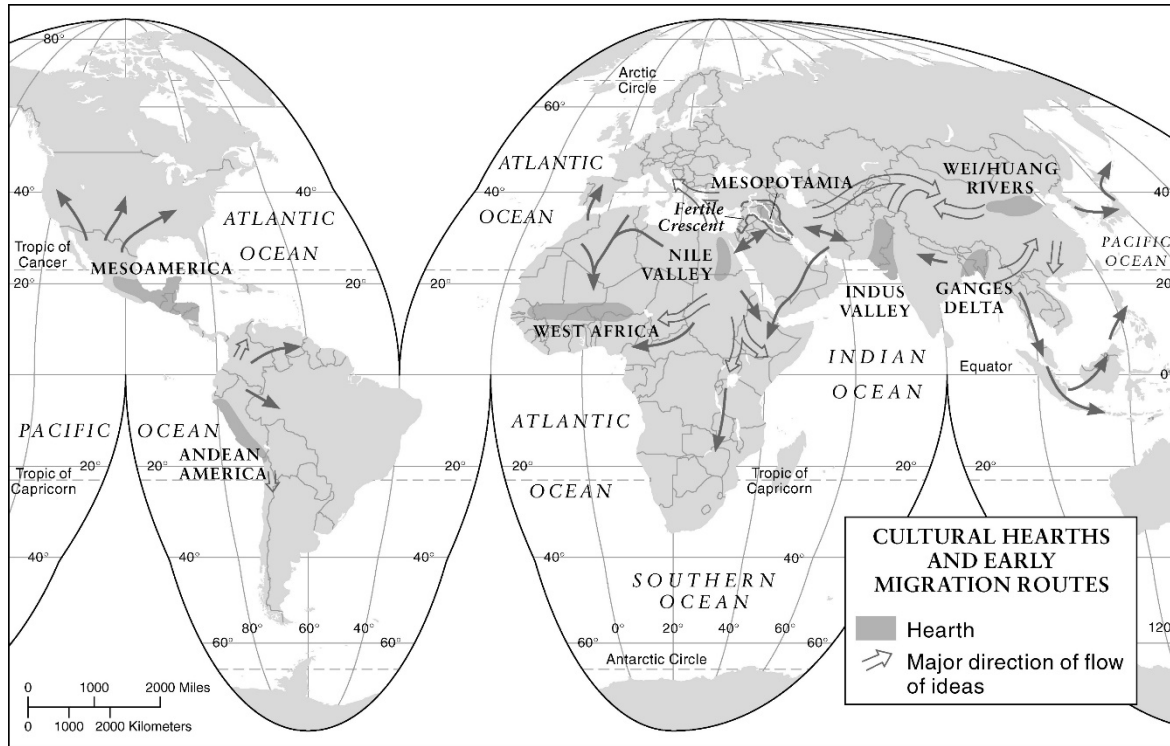


**One World One Water Center**

Metropolitan State University of Denver | Denver Botanic Gardens

**Today's Topic**

**Human Geography &  
Sustainable  
Water Development**



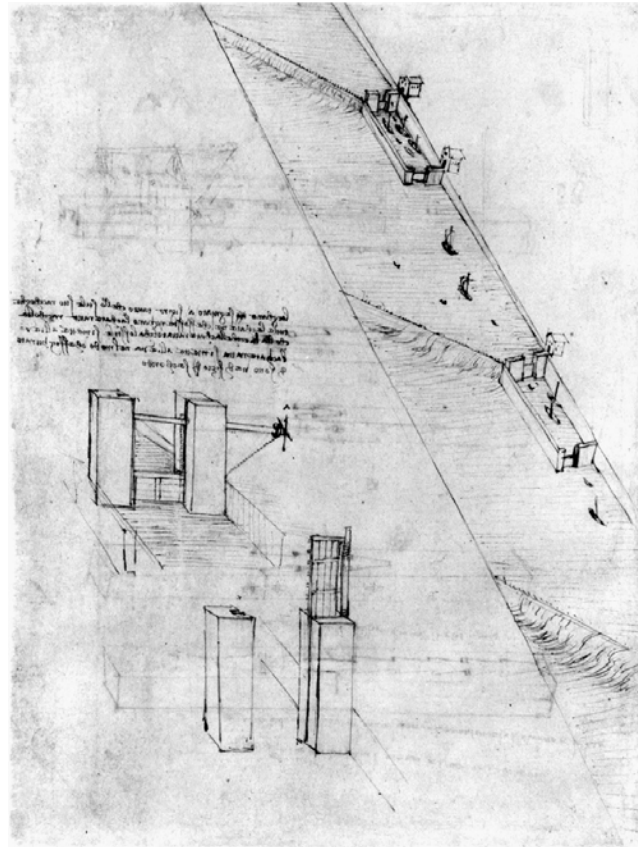


Crossing of two Roman aqueducts in Via Latina southeast of Rome. These aqueducts were described as *Romanae providentiae magnitudinis que primitiae* (“the first fruits of Rome’s foresight and greatness”) by author Raffaele Fabretti in 1680.

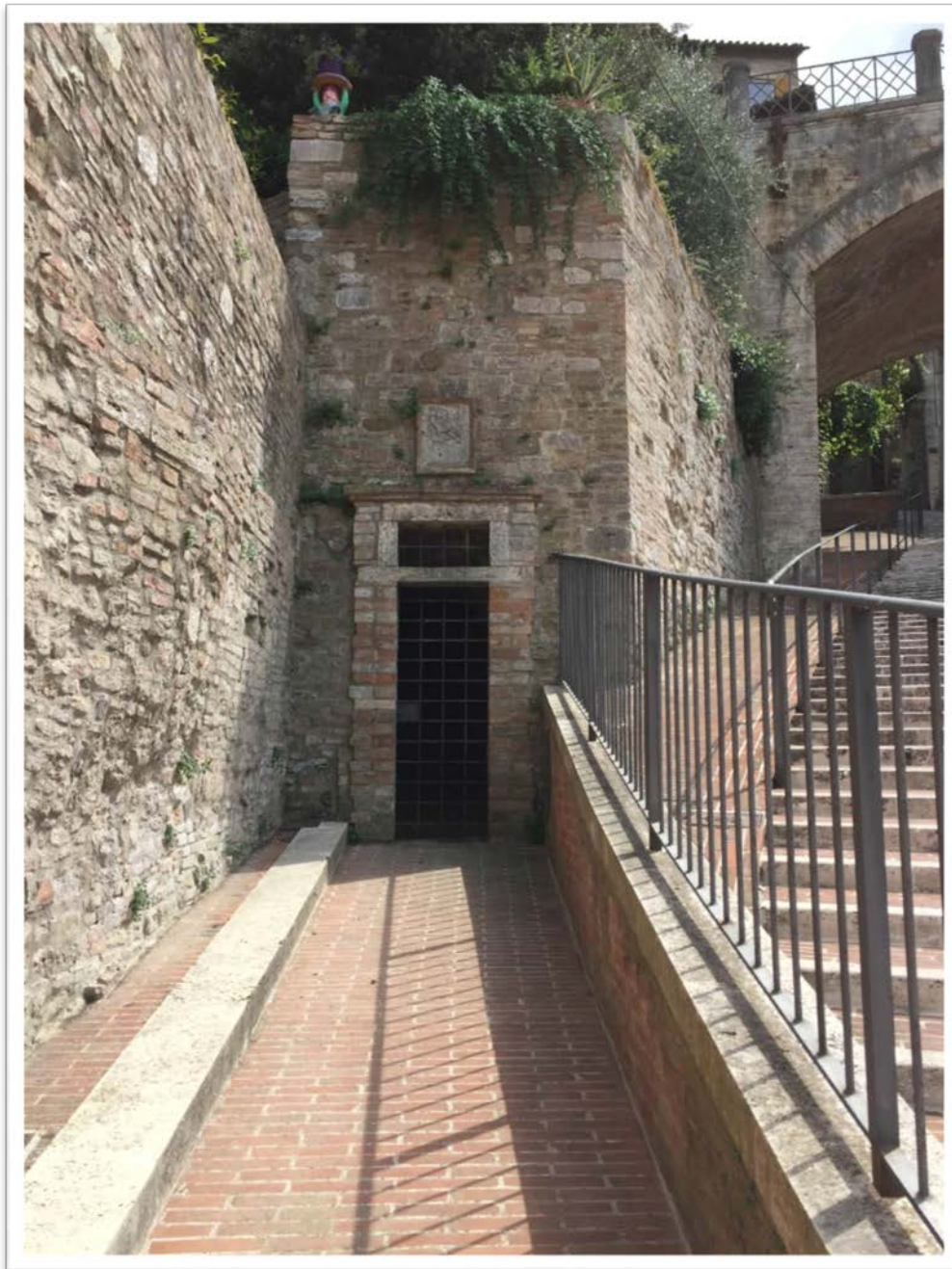
This painting, by Zeno Diemer, is on display at the Deutsches Museum, Munich, Germany.

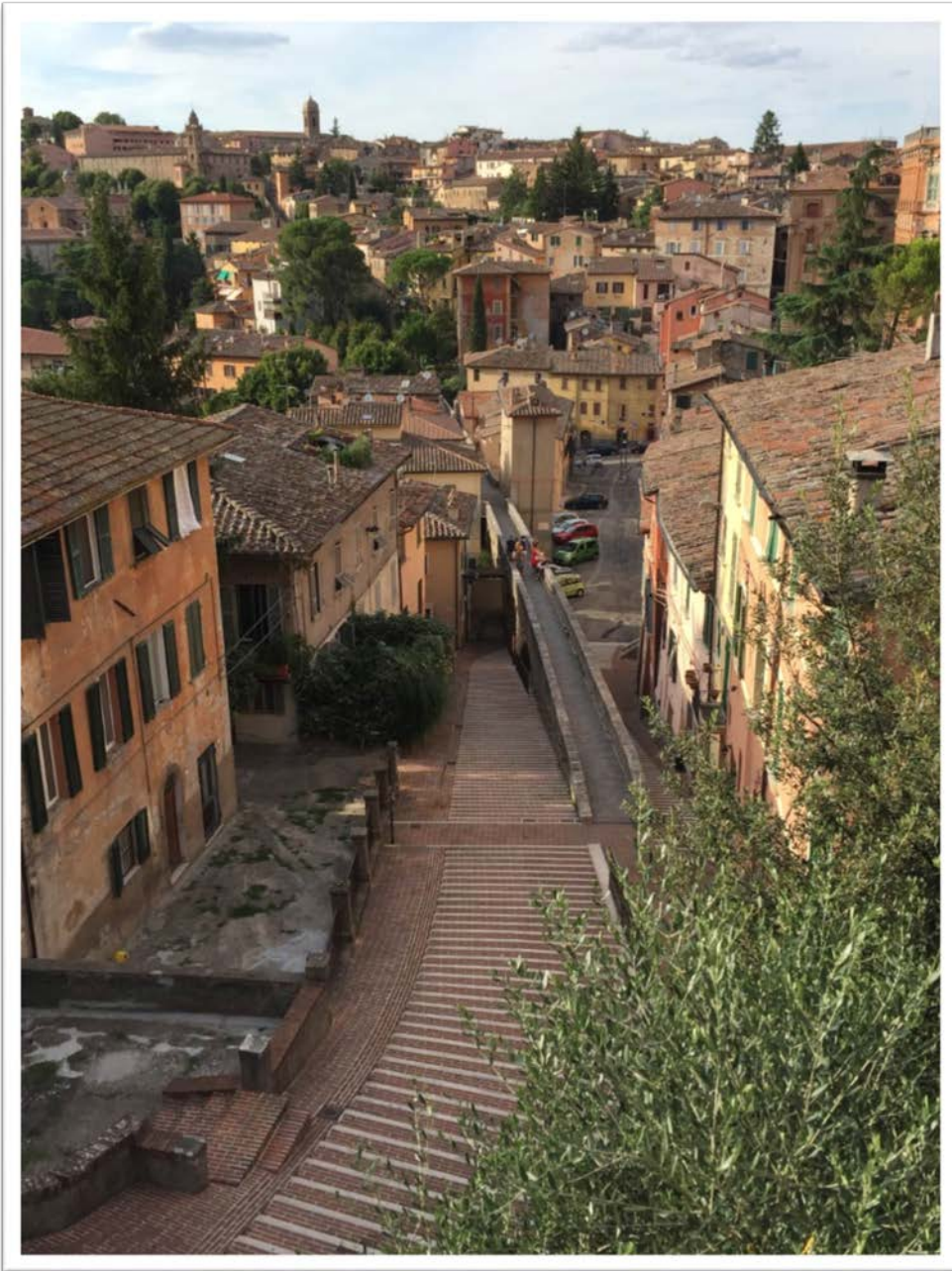
The first Roman aqueduct (an elevated water delivery system made of stone) was built in 312 B.C., and by 300 B.C. there were 14 aqueducts in Rome delivering 40 million gallons (over 151 million l) of water daily to Roman citizens.

Excess water from these delivery systems was used to power the city's fountains and flush sewage into the Tiber River.

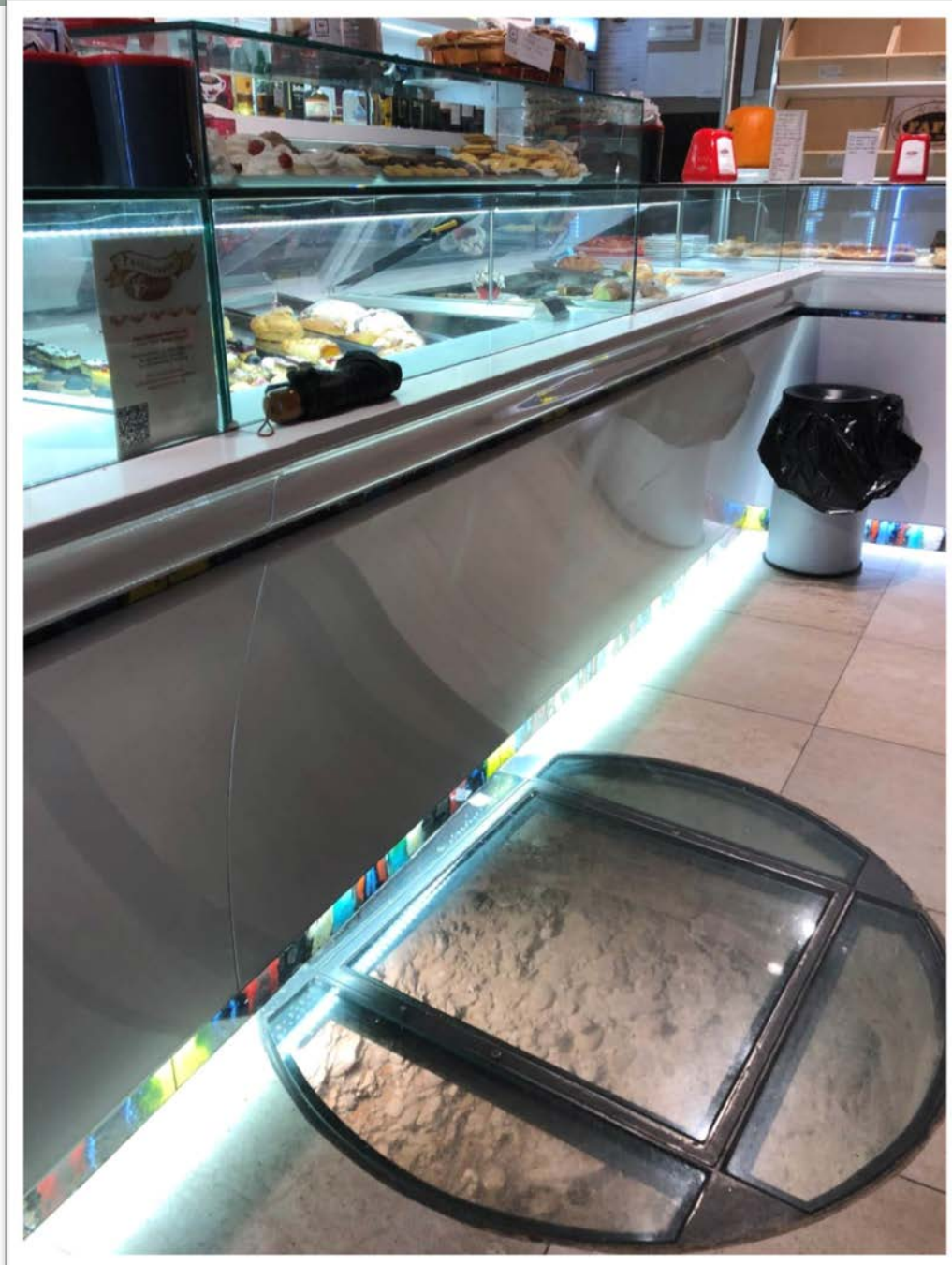


These sketches are based on Leonardo da Vinci's studies of navigation on rivers with irregular flow rates. The left side of the drawing shows two sketches of drop-down sluice gates designed to allow boats to go either upstream or downstream. The annotation explains how the gates are operated by means of a winch. The drawing is from *Il Codice Atlantico di Leonardo da Vinci nella biblioteca Ambrosiana di Milano*, Editore Milano Hoepli, 1894–1904. The original is at the Biblioteca Ambrosiana in Milan, Italy.







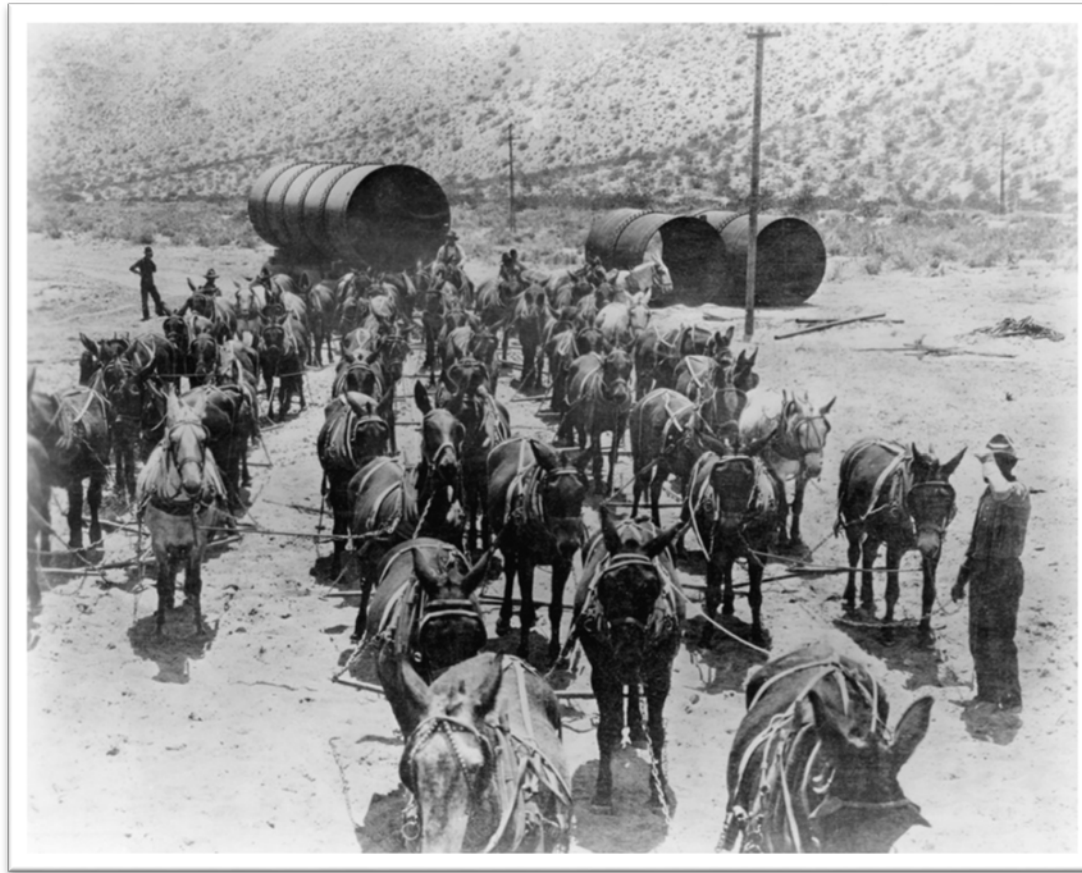




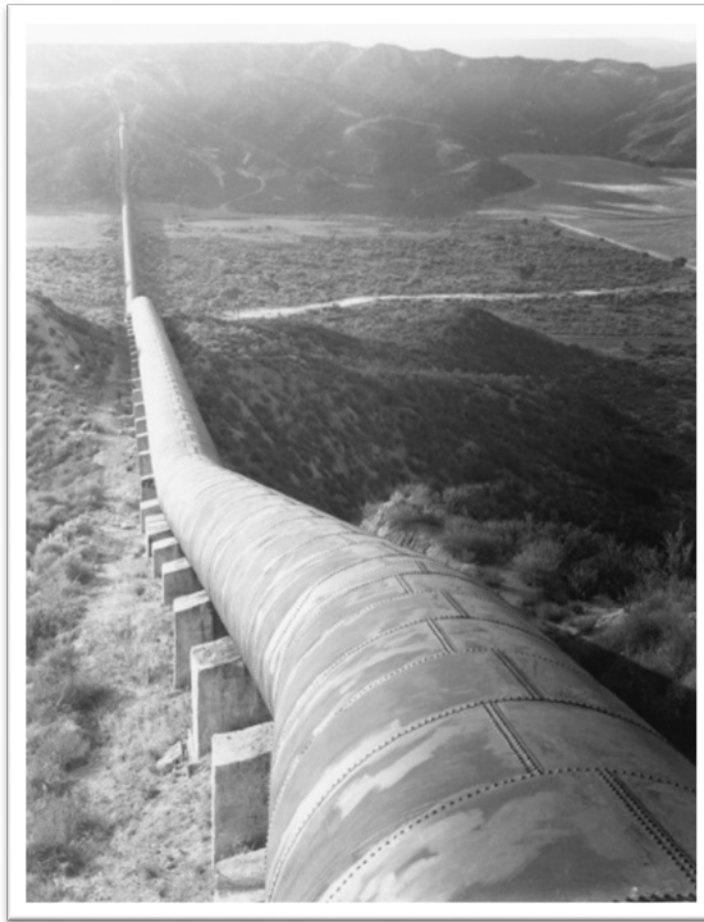




**Bijou Irrigation Ditch - Colorado**



This classic construction photo (circa 1908) shows a 52-member mule team moving 1-inch-thick (25 mm) steel pipe to construct the Jawbone Siphon along the **Los Angeles Aqueduct**. Steel pipe was extremely expensive to use, since it was produced on the East Coast of the United States. Because of its size, the pipe had to be transported to California by ship around Chile's Cape Horn.



A portion of the completed Los Angeles Aqueduct, which greatly expanded the supply of water to Los Angeles. Without the project, the city would have been limited to a population of approximately 500,000, since no additional water supplies existed in the local area. Notice the extremely dry terrain in the photograph.



**Aqueduct in California**



**The Los Angeles River today.**

<https://www.youtube.com/watch?v=kWMMpmaQPPA> 2.08

<https://www.youtube.com/watch?v=rPmbEiwD2XQ> 0.47



# Los Angeles and Water Imports

<https://na01.safelinks.protection.outlook.com/?url=http%3A%2F%2Fwww.ecology.com%2F2013%2F07%2F25%2Fsustainability-water-los-angeles-water-imports%2F&data=02%7C01%7Ctcech%40msudenver.edu%7C9003e848cd474a7a92ed08d6468fd36e%7C03309ca417334af9a73cf18cc841325c%7C1%7C0%7C636773980866495198&sdata=jYsgb7XkJrcXzdFPZ2yUgDpKxpfBG1GBJ1sJb3GHXgA%3D&reserved=0>

5.15

# Sirens warn of a coming flood in Venice

[https://na01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fyoutu.be%2Fx\\_QXZCu0QCM&data=02%7C01%7Ctcech%40msudenver.edu%7Ca3f0d70f2a054bd94aa408d64804fefe%7C03309ca417334af9a73cf18cc841325c%7C1%7C0%7C636775583637573481&sd ata=5j%2FFHYa%2BqFUkm4nYGet0YMIFIAXj3Wtl3lGmZLmMAq0%3D&reserved=0](https://na01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fyoutu.be%2Fx_QXZCu0QCM&data=02%7C01%7Ctcech%40msudenver.edu%7Ca3f0d70f2a054bd94aa408d64804fefe%7C03309ca417334af9a73cf18cc841325c%7C1%7C0%7C636775583637573481&sd ata=5j%2FFHYa%2BqFUkm4nYGet0YMIFIAXj3Wtl3lGmZLmMAq0%3D&reserved=0)

1.55



# Columbia Icefield Glacier Jasper National Park Alberta, Canada





# Columbia Icefield Glacier

Alberta, Canada

[https://www.tripadvisor.com/LocationPhotoDirectLink-g154917-d186988-i46097290-Columbia\\_Icefield\\_Glacier\\_Adventure-Jasper\\_National\\_Park\\_Alberta.html](https://www.tripadvisor.com/LocationPhotoDirectLink-g154917-d186988-i46097290-Columbia_Icefield_Glacier_Adventure-Jasper_National_Park_Alberta.html)

<https://www.theguardian.com/world/2018/may/04/back-from-the-brink-how-cape-town-cracked-its-water-crisis>

10.34



Villagers at a community well use ropes tied to jugs to retrieve drinking water from the Jaspar village well in northern India. This photo was taken on June 13, 2003, and the temperature in the village was 107F (42C) with no rain forecast.



**Toronto, Canada**



GRAZIE

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