



WRIGHT
PALEOHYDROLOGICAL
INSTITUTE

Paleohydrology is "the study of water use and handling by ancient people."

Wright Paleohydrological Institute (WPI) is a non-profit organization established in 1996 for the study of ancient water use. WPI is a public foundation with a proud record of public interest activities related to ancient water management.

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Wright Paleohydrological Institute

To further the knowledge of past civilizations through the study of ancient water management and practices.

Fall and Winter 2016

2016 Pompeii Field Work

Wayne Lorenz and Gary Witt traveled to Pompeii in late September 2016 to continue research on the Roman aqueducts that fed Pompeii and the Naples area. (In Roman times, Pompeii was a port city.) They will further WPI research on the 100-mile-long Augusta Aqueduct from its spring water source to the ancient naval base near Naples.

A secondary goal of the trip is to network with a group

of Roman archaeology experts and historians there.

The third objective of the trip is for award-winning photographer Gary Witt to take some expert photos, possibly for use in future presentations and WPI calendars.



The ancient town of Pompeii was buried in-situ by volcanic ash from the eruption of Mt. Vesuvius in A.D. 79, allowing experts from WWE to have a snapshot of Roman life and water use.

Babylon, Iraq

WPI's Dr. Andrew Earles traveled to Babylon, Iraq, to evaluate issues related to groundwater and drainage on behalf of the World Monuments Fund (WMF).

Babylon is home to the famous Ishtar Gate, which was built by Nebuchadnezzar II. The Ishtar Gate is one of the greatest treasures at Babylon but it suffers from moisture due to a shallow groundwater table, a strong evaporation gradient from groundwater due to high

temperatures and surface drainage modifications over time.

WPI prepared a "cure" report for the WMF following our field visit and we are awaiting further instructions on how we can assist to ensure the site's longevity.



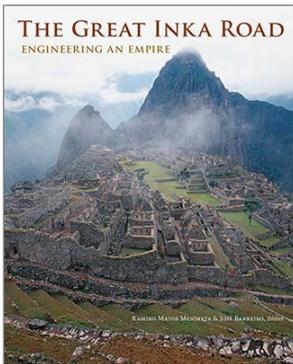
Babylon dates from 2300 B.C. It has been estimated that Babylon was the largest city in the world from about 1770 to 1670 B.C., and again between 612 and 320 B.C. It was perhaps the first city to reach a population above 200,000.

Thanks for Your Support in 2016 and beyond!

WPI continues to study how ancient people dealt with water and how modern water can affect ancient

structures. Your generosity helps make this happen. You can support our public education efforts in 2016

with donations from \$5 to \$200. Ruth and Ken Wright match contributions at two to one.



Ken and Ruth Wright were pleased to contribute a chapter to this book, available at nmai.si.edu.



Around the time that the ancient Greeks were battling the Persians at Thermopylae, on the other side of the world, a band of late-Archaic-period Native Americans were huddled around this hearth, likely preparing a meal.

The Great Inka Road: Engineering an Empire

All of us at WPI were delighted to learn that our friend and colleague, Dr. Ramiro Matos, received the Secretary's Research Award, which includes a \$2,000 prize. Dr. Skorton of the Smithsonian Institution

presented the award on September 14 at the National Museum of American History.

Dr. Matos' award is for editing the museum book, *The Great Inka Road*:

Engineering an Empire.

Coupled with this book was his extraordinary success in planning and building the Great Inka Road exhibit at the National Museum of the American Indian.

Ancient Fire Pit at Buena Vista

WPI became involved in a Wright Water Engineers (WWE) well drilling and construction project in Buena Vista, Colorado, when the excavation contractor encountered an ancient hearth about three feet below the modern ground surface.

Immediately upon the hearth's discovery, the Town Manager, the State Archaeologist and a Bureau of Land Management (BLM) Archaeologist were contacted. The initial judgment, after examining the evidence, was that the fire pit was a significant find

that had been left largely intact by ancient people and was in good condition. The archaeologist, who visited the site and took both charcoal and fill samples, also indicated that this was a significant archaeological discovery that may shed additional light on the history, lifestyles and diets of the people native to Colorado.

In response to the discovery, WPI, the Town of Buena Vista and the BLM joined together to have pertinent material collected and dated using Carbon-14 dating technology.

Following the analysis of a charcoal sample in which the tree rings were still visible, it was determined that this hearth was being used around 480 B.C. (+/-30 years).

The Town of Buena Vista has chosen to relocate and realign the well project to preserve this cultural resource and reduce further impacts to the site. The town has continued to pursue options to further investigate the site and to learn more about it and its history.

Saqsaywaman 2016 Research

In July, an engineering team from the University of Virginia (UVA) conducted research related to the preservation of Inca walls at Saqsaywaman for the sixth summer running. The UVA team was supported by the Cotsen Institute, the Universidad Nacional de Ingeniería (UNI), the Universidad Ricardo Palma,

and the Universidad Andina Del Cusco. Arminda Gibaja and Oscar Montufar served as team archaeologists.

The research was performed by three teams focused on seismic refraction studies, total station measurements and ground penetrating radar.

The work was led by Professor Richard Miksad of UVA with his student and WWE intern Gina O'Neil coordinating the work and translating for the teams. Fermin Díaz was the local Director of the work.

Dr. Miksad is beginning work on a book on the Saqsaywaman research.



The Saqsaywaman site from the air in 1954.

Waikiki Natatorium in Hawaii

We are working with the National Trust for Historic Preservation's (NTHP) Brian Turner on the development of several alternatives regarding the Waikiki Natatorium just outside of Honolulu, Hawaii. The structure was built in 1927 as a memorial to Hawaii's World War I

veterans and has both exceptional architectural features and historical significance.

This ocean water swimming pool, approximately 100 meters long and 33 meters wide, is one of the last (if not the only) ocean water pools in the United States.

Through field inspections, a series of meetings and the further assessment of several design alternatives, Dr. Andrew Earles and Karl Kingery (both swimmers) are working with the NTHP in the hope that this historic landmark can ultimately be preserved and re-opened to the public.



The historical Waikiki Natatorium (center of above photo) uses water from the Pacific ocean but is free of sharks and jellyfish. (Photo by Ron Slausen.)

Presentations and Papers

A big part of WPI's public education mission involves public lectures and publishing papers.

On August 25, 2016, Ken Wright gave a Digital Earth Machu Picchu presentation in the Gates Planetarium of the Denver Museum of Nature and Science. Ken took the sold-out audience on an aerial tour of part of the ancient Inca empire.

Wayne Lorenz has been invited to do a similar show on Pompeii and its aqueducts at DMNS next spring.

Other big presentations by Ken Wright include one on the new *Incamisana* book at the Portland ASCE convention in September, one on Tipon at the U.S. Council on Irrigation and Drainage meeting in Fort Collins in October, and one on the Ollantaytambo water temple at the Environmental and Water Resources Institute meeting in Sacramento in May 2017.

Wayne Lorenz has written a new technical paper describing the 160-kilometer-long Augusta Aqueduct from its spring water source to the ancient

naval base near Naples. The paper was coauthored by four Italian scientists and was presented to the International Water Association in Portugal in September.

Another recent paper by WPI's Dr. Phil Wolfram and Wayne Lorenz focuses on the reverse engineering of Roman arches. It was recently published by The Newcomen Society. Dr. Wolfram, a WWE Research Associate, is also a scientist with the Los Alamos National Laboratory.



Ken Wright, Dr. Ka Chun Yu and Ruth Wright. Dr. Yu navigated the satellite imagery to accompany Ken's presentation at DMNS.

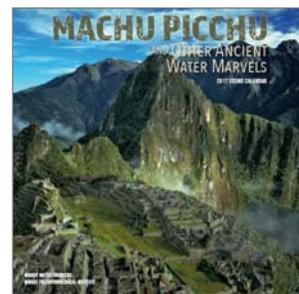
Machu Picchu and Other Ancient Water Marvels

Please mark your 2016 *Machu Picchu Trails* calendars—the 2017 calendar, *Machu Picchu and Other Ancient Water Marvels*, will be available in late October!

The 2017 calendar, designed by Todd Clary, features 11 different sites where WWE

experts have studied prehistoric water management. Photo locations include Italy, Jordan, Peru, the United States, Myanmar, Iraq and Thailand. Several of the sites were projects undertaken for the World Monuments Fund.

Photos by our award-winning photographers Ruth and Ken Wright are supplemented by photos by Wayne Lorenz, Will Allender, Andrew Earles and Gary Witt. We hope that you enjoy this special calendar as much as we enjoyed creating it!



Machu Picchu and Other Ancient Water Marvels features many WPI projects.

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AGAIN, WPI THANKS YOU FOR YOUR SUPPORT

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