



The Aqueduct Hunters

The father-son team of Mike and Ted O'Neill creates documentary films on Italian history and culture. For four years, they have been on a mission to understand how the Roman aqueducts—by all accounts incredible feats of engineering—had such an enormous influence on modern civilization. In the process, the O'Neills made the kind of discovery that archaeologists dream about. This is their story.

by Michael O'Neill and
Edward O'Neill

The greatest environmental problem facing the world today is the lack of fresh drinking water. Dirty water and poor sanitation cause many preventable diseases that ruin the health and lives of many children and adults. Diseases such as cholera and malaria have been with us since ancient times and still cause countless tragedies in our modern world. But as we shall see, the ancient Romans found an answer to the water problem, and the result is, well, history.

A Little History

Rome was built on the banks of the Tiber River, on seven little hills surrounded by marshes and swamps. From prehistoric times, the earliest inhabitants of Rome used the river as a source of water for drinking, cooking, washing, and as a drain for sewage. As with many cities founded on the banks of rivers—New York and London, for example—Rome was subject to famines, fleas, and floods. Plagues were caused by waterborne diseases such as cholera, dysentery, and typhoid. Other water-related diseases were spread by insects such as mosquitoes that carry malaria and dengue fever.

Of all the ancient cities, Rome developed into a huge empire and became the foundation of western civilization today. The Romans built aqueducts, artificial underground channels that provided the city with clean water for drinking, public baths, sanitation, and industry—fresh water that allowed for rapid growth of a healthier, stronger population.

In 312 BCE, Roman censor Appius Claudius Caecus built Rome's first aqueduct, the Aqua Appia. (The censor was the senior officer of the Roman Republic responsible for maintaining the census of the population, supervising public morality, and auditing the government's finances.) From east of the city, the Aqua Appia supplied Rome with more than 16 million gallons of fresh water daily. The improvement in people's health enabled significant growth in the city's population. By the end of the first century CE, there were nine aqueducts, and the population of Rome had risen from about 50,000 to nearly 1.5 million.

Unfortunately, the hard water from east of the city carried calcium carbonate, which accumulated inside the ducts in the form of hard limestone, clogging the ducts and greatly reducing the amount of water they carried. At the beginning of the second century CE, Emperor Trajan constructed a new aqueduct to bring drinking water from west of the Tiber for the first time.

The Aqua Traiana

This new aqueduct's water came from many pure springs in the volcanic stone aquifers around Lake Bracciano and traveled along a 35-mile-long conduit to Rome. This water carried no calcium to block the ducts. At the confluence of springs, Roman engineers built a vaulted, three-chambered *nymphaeum*—a sacred shrine

to water nymphs—that also served as a water collection chamber. The Aqua Traiana was inaugurated in 109 CE.

Over time, the aqueducts became damaged, particularly during the barbarian sieges, when Goths and Lombards cut them. The Aqua Traiana was known to have been repaired in the 9th century, but by early medieval times Rome no longer had access to pure water. Water-borne diseases spread, and the population dropped from 1.5 million in the 1st century to about 13,000 in the 14th century. Eventually, the emperors and Popes left Rome for a healthier life elsewhere. But by the 1500s, the Vatican, concerned with the appalling poverty and new epidemics, decided to restore the ancient aqueducts. The population rapidly increased to over 250,000 in the 17th century, bringing health and life back to the city—and with it, art, culture, and science: the Renaissance.

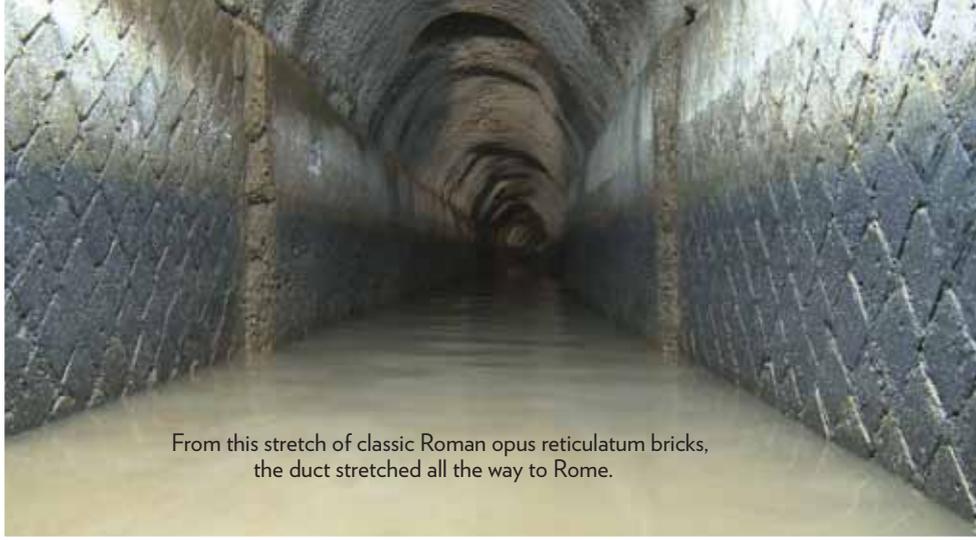
Retracing History

In medieval times, a church was constructed around the nymphaeum and the water was eventually diverted to supply the town of Bracciano. Over the centuries, Trajan's aqueduct and the ancient use of the springs were all but forgotten. The great explorers of the late 19th and early 20th centuries tried to trace the Aqua Traiana back from Rome to the lake, but the spring water sources had been lost.

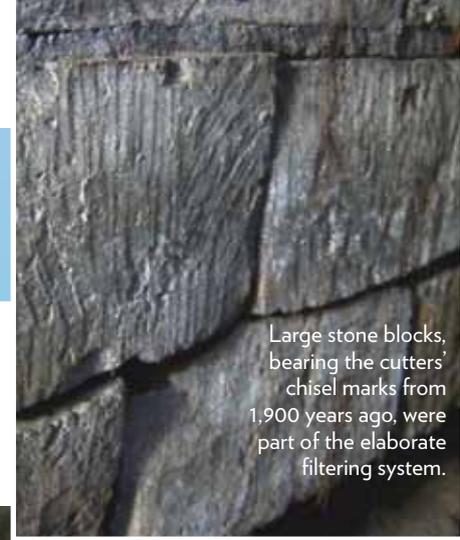
The aqueducts weren't all that were lost. For the past 1,000 years or so, the major source of building materials in Rome has been bricks, pillars, and blocks from ancient Roman monuments. Many of the great churches in Rome, including the Basilica of Saint Peter, were built with marble and granite torn from Roman temples. Thousands of Roman marble statues have been burned in enormous kilns to make cement. Much has disappeared or been wantonly destroyed, including the remains of Rome's port, Ostia Antica, and Pompeii, which were excavated only 100 years ago but now lie unpreserved, crumbling in the Italian sun.



Mike and Ted O'Neill, the Aqueduct Hunters, in the spring chamber of the Santa Fiora nymphaeum.



From this stretch of classic Roman opus reticulatum bricks, the duct stretched all the way to Rome.



Large stone blocks, bearing the cutters' chisel marks from 1,900 years ago, were part of the elaborate filtering system.

As historians, we wanted to document and record what remained. In 2008, we had been researching the ancient Roman aqueducts. We were investigating the lost aqueduct Aqua Alsietina when an officer from the local parks authority suggested we visit a lost water source under a ruined church near the city of Bracciano.

In the side wall of the church, we found a tiny wooden door held in place by a tangle of wire. Beyond the door, we could make out a deep, dark underground chamber. There was no ladder or lights, and we were unable to see anything more.

A local amateur historian, introduced to us by the mayor, insisted that tunnels underneath the medieval church were the head of a Renaissance-age aqueduct built to carry water to the city of Bracciano. After careful study of the historical records, we believed we were dealing not with a Renaissance aqueduct from the 1600s but a Roman aqueduct 1,500 years older.



Cristina Tomassetti, an expert in fresco paints, analyzes the paint on the walls of the Santa Fiora church and nymphaeum.

Where Water Nymphs Once Swam

In May 2009 we returned to Santa Fiora, this time with a ladder and our cameras. No one—not even the famous archaeologists of the 19th and 20th centuries who studied the Roman aqueducts—had seen what we saw the first time we entered the tiny secret wooden door. Cross-vaulted ceilings richly decorated with Egyptian blue paint—a very expensive paint used only in Roman times—suggested that Emperor Trajan himself had been here for his aqueduct's inauguration. A complex filtering system of huge stone blocks led to a stretch of beautiful, classic Roman *opus reticulatum* bricks. From here, the duct stretched all the way to Rome.

We showed our footage of the church structure and underlying tunnels to Professor Lorenzo Quilici of the University of Bologna, the most distinguished scholar in the contemporary study of aqueducts. He asked us to take him to the site, and, delightedly, we agreed. We didn't realize it at the time, but the Aqua Traiana had been dedicated on June 24, 109 CE. On June 24, 2009—precisely 1900 years later—we met Professor Quilici in the small town of Manziana to show him the location of the Santa Fiora church.

Entering the church, he exclaimed, “È tutto romano!” (“It's *all* Roman!”) The structure known in modern times as the church of Santa Fiora was, in fact, entirely Roman. Professor Quilici recognized it immediately in the shape of the building. It wasn't a church at all. It was a Roman nymphaeum.

A Magnificent Engineering Accomplishment

One of the most important features of the find is the engineering of the water collection chambers and galleries, a never-before seen genre of Roman hydraulic engineering. It is also the only aqueduct water source that is visible and functional—or would be functional, if local engineers didn't pump all the spring water to supply the city of Bracciano.

Though amazingly strong, the structure is crumbling due to neglect and infiltration by thirsty fig tree roots—made ever more aggressive by the increasingly lower water table. We are actively recruiting local authorities, research organizations, scholars, and enthusiasts to support ongoing preservation, excavation, and opening to the public. We're also trying to raise funds to film the Aqua Traiana. It is our hope that our efforts and our documentary will keep it alive for a long time to come.

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View trailers of *The Aqueduct Hunters'* work and learn more about their project at www.aqueducthunter.com.