

Learning from the Experiences of Past Cultures, Lost and Abandoned Urban Centers

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Abstract

The lure of discovering lost and abandoned cities has led adventurers, archeologists, men of science, and amateur explorers to probe the earth, to dive to the bottom of the seas, to scale mountains and to hack their way through jungles, and risk Tsunamis. More often than not, the dream ends in disillusion, even tragedy - but not always.

Keywords: *Ankor Wat, Peruvian Incas, Moche Pyramids, Pagan, Pompeii, Troy, Phoenicians Trojan, Tsunami, archeology, lost cities.*

Introduction

Strange and mysterious as they may sound, lost and abandoned cities do exist. The discovery of abandoned places over the centuries has occurred in a number of ways. Apart from sites which have become completely buried or sufficiently ruined to be unrecognizable. Some buried sites may have been anticipated as a potential archeological site before they were identified with a known historical place, as in the case of Troy. Often lost sites have been discovered, not quite by chance, but at least unintentionally. Explorers have set off in search of one place of which they have heard, only to discover another unknown place. Since 1883, there were known historical records of Tsunamis, but countries bordering the Indian Ocean choose to ignore the possibility as remote or costly to provide an early warning system.

Scope and Objectives

The scope of this study is limited to some lost and abandoned cities and their significance in the study of urban architecture. The objectives of this study are listed below:

- Angkor Wat, Cambodia
- Pagan, Myamar
- Machu Picchu, Peru
- Troy, Turkey
- Pompeii, Italy
- Lost cultures and urban centers to Tsunamis

Power of the Elements

Although natural disasters can sometimes occur suddenly, causing sites to be abandoned very rapidly, environmental disasters are usually slow and insidious, and cause a site to decline gradually, but eventually leading to abandonment. In many instances it is clear that such changes in the environment have actually been caused by people, through factors such as over-exploitation of agricultural land and deforestation.

Angkor: How Far Out the City Spread before Its Fall

The ruined city of Angkor Wat was once a major urban center.

The first temple to be constructed was the Bakong (AD 881), followed by a whole series that culminated in the largest temple in the complex, Angkor Wat. This was built in the early 12th century by Suryavarman II, and measures 1,550 x 1,400 m, and has over 1.6 km of sculpture. Angkor took about 25 years to build and is believed to be the largest religious structure in the world. It is a 3-storied pyramid topped by five towers, which symbolize the five peaks of Mount Meru, the dwelling place of the gods in Hindu cosmology.

In its heyday, the Angkor complex stretched more than 25 km east-west and nearly 10 km north-south. The Khmer kingdom then

appears to have weakened and suffered a series of foreign attacks and internal conflicts, after Suryavarman II died. There was a brief revival of Angkor's splendor under Jayavarman VII (1181- *ca.*1215), who adopted Buddhism as the state religion, and restored the fortunes of the Khmer kingdom. During his reign the walled city of Angkor Thom was constructed, including the Bayon temple. Angkor Thom contained more stone than all the Egyptian pyramids together! It was surrounded by extensive moats and walls. The Bayon towers have 54 towers rising to a height of about 45 m, but unlike other temples, it had no surrounding moat or wall.

After this though, the Khmer kingdom became impoverished and Angkor declined. In the 13th century the water management system broke down, although agricultural irrigation continued (Adkins and Adkins 1991).

The Greater Angkor Project's team learned the metropolitan area extended beyond Angkor Thom, the 700-year-old walled city that houses Angkor Wat. Angkor was home to about 750,000 people and covered some 1,000 sq.km. – much larger than any other pre-industrial development and similar to the shape and size of modern cities, Fletcher said.

"It's like a Los Angeles. It's not like Hong Kong," he said. "Lots and lots of open space, big gaps around the houses, huge freeways, which are the canals in this case". (Leitsinger 2004)

Bad Planning may have Destroyed Angkor

After resisting Siamese invaders for years, Cambodia's greatest city and civilization – the temple – studded Angkor – was dealt a death blow with its final sacking in 1431. Or, so say the history books. But an international research team thinks its demise was set much earlier, by something that is the bane of many urban societies – ecological failure and infrastructure breakdown (Leitsinger 2004).

"They created ecological problems for themselves and they either didn't see it until it was too late or they couldn't solve it even when they could see it," said Roland Fletcher,

an archaeologist working on the Greater Angkor Project. Project members are working on system of reservoirs and canals – for irrigation, trade and travel – that began to silt up as the population grew, and perhaps saw failures that caused flooding and water shortages. Experts say Angkor's demise is important to study because it can provide lessons for dealing with modern urban problems.

Damian Evans, an archaeologist working on the project, said Angkor's canals were the equivalent of today's freeways and our telephone lines are a form of communication that can be equated with the old elephant paths.

"It's the same kinds of problems manifesting themselves in different ways," he said.

Seeking evidence for its theories, the Greater Angkor Project team is excavating waterways and digging pottery and pollen grains. Members pore over radar ground-images collected by NASA and photographs taken from ultralight plane to map the remnants of the ancient civilization, such as rice paddies, houses, shrines and canals.

About 40 people are working on the current phase of the project, a joint effort of Australia's University of Sydney, the Ecole Francaise d'Extreme-Orient and the Cambodian government's Apsara Authority, which manages Angkor. In the past, archeologists primarily focused on studying the intricately carved stonewalls of Angkor's temples, which tell stories from Hindu mythology.

The greater Angkor Project's first goal was to determine how far out Angkor city spread before trying to determine what led to its fall.

The city's economy was based on rice, and rice paddies spread along dozens of canals, at least one up to 20-km long. A network of reservoirs, canals and bridges was created to move people and goods and to ensure there was enough water to grow rice. Angkor engineers even changed the direction that some rivers flowed in what essentially was "a human-built landscape for growing rice", Fletcher said. The system had three zones: catching water in the north, storage in the center, and dispersal in the

south. The engineers also created a manmade river to join two natural ones.

As Angkor's population grew, so did the strains on its intricate water system, the scientists said.

"The more modifications they made, the more problems they ran into, and the harder and harder it became to implement solutions to the problems," said Evans, who uses aerial photos, NASA images and on-the-ground investigations to generate a computer map of the water system.

The growing population also forced people to venture into the Kulen hills to cut down trees for fuel and to clear land for growing rice. That would have resulted in rain runoff carrying sediment down into the canal network, Evans said.

"Anything that happened to that water management system would have had a great deal of consequence for all the people", he said.

There are signs of apparent breaches and fixes to the water system, although it's hard to tell if they happened during the Angkor era.

"If you think of the freeway and the railway system failing in a modern city – it's like that," Fletcher said. "It's an infrastructure problem. Everything else might be working fine, but if the infrastructure goes, this thing can't function" (Leitsinger 2004).

Lost City of the Peruvian Incas

Often lost sites have been discovered, not quite by chance, but at least unintentionally. Explorers have set off in search of one place of which they have heard, only to discover another unknown place. Machu Picchu, for example, was discovered by Hiram Bingham in his search for Vilcabamba, the last capital and fabled lost city of the Incas. In his search for Vilcabamba, Bingham explored various Inca sites in the Peruvian Andes. The Incas were very powerful from about AD 1200 until the arrival of the Spanish in the early 16th century when the Inca civilization was destroyed and many settlements were abandoned.

Machu Picchu, the so-called "lost city of the Incas", lies on a ridge between two mountains at a height of around 2750 m. On

both sides of the city the land falls away in a series of man-made terraces before becoming a sheer drop to the valley nearly 600 m below, where the river Urubamba flows around three sides of the site. It is a walled, fortified city, with a single entranceway approached by steep stone steps from the road to Cuzco. When he found the site in 1911, Bingham named it Machu Picchu after the mountain that overshadowed it. Initially Bingham thought that the city was a refuge of the Inca Chosen Women, or Virgins of the sun, and this was supported by the predominance of female skeletons buried in caves, but he later concluded that it could be identified as the first Inca settlement, Tampu Toccu, and also as Vilcabamba, the last refuge of the Incas following the Spanish conquest. It was later shown by Gene Savoy that Machu Picchu was neither Tampu Toccu nor Vilcabamba, and the real ruins of Vilcamba lay at Espiritu Pampa (ironically a site which Bingham had rejected as a possible site of Vilcabamba). Nevertheless, Bingham had managed to discover and explore several Inca sites abandoned since the Spanish conquest, not least of which is Macchu Picchu itself. Machu Picchu remains an enigma. The site belongs to the late Inca period, but was abandoned well before the arrival of the Spanish in 1532, and was never found by them. It may not be the "lost city of the Incas", but it certainly one of the world's most evocative places (Adkins and Adkins 1991).

Moche Pyramids' Centuries of Floods and Looters

When Peruvian archaeologist Regulo Franco first saw the ruins of El Brujo in 1990, his heart sank. Hundreds of looter holes pocked the landscape. "It looked like the moon", he recalls. But Franco noticed something in the rubble that gave him hope: Part of an ornate frieze showed a life-sized man with a rope around his neck. After that, he says, "I suspected this place still held many secrets".

From above, El Brujo's Huaca Cao Viejo – a mud-brick pyramid, or *huaca*, situated by sugarcane fields and the Pacific shore – reveals little of its former splendor. Centuries of flooding have transformed what was a grand

cathedral of the Moche era into a mud mound. But beneath roofs they built to protect the site, excavators have dug out a warren of rooms and terraces decorated with colorful wall art.

Serving as religious centers along a 300-mile stretch of Peru's coast, dozens of pyramids dot arid valleys where the Moche built farming and fishing communities and made exquisite pottery and jewelry. Over time, Spanish explorers and others looted most of the pyramids' treasures. Archaeologists have found little gold in Huaca Cao Viejo, but its art casts a spell. Says Franco, "I expect to be here a long time".

In its day, the Huaca - or pyramid - was an architectural wonder. Built in seven phases (*ca.* AD 100 to 700), Huaca Cao Viejo included a plaza larger than a football field and six-tiered pyramid.

A Culture Disappears

Archaeologists have noted evidence of flooding and earthquakes that could have ruined the irrigation canal systems critical to Moche farms. They suspect a series of *El Ninos* - which has altered ocean currents, disrupted fishing grounds, and dramatically increased rainfall - drove the Moche from coastal river valleys in the eight century when they dispersed, leaving little evidence of their fate.

After the Moche has gone, later cultures regarded their pyramids as sacred. Archaeologists have exhumed a number of artifacts dating from the Lambayeque people (*ca.* AD 900), including a copper mask buried in front of the Huaca Cao Viejo. Such objects carry steep price tags on the antiquities black market, an evidenced by the legions of looter holes at the excavation site. One tantalizing exception is a star-shaped gold ornament dug up in Huaca Cao Viejo, possibly related to the calendar mural. More rooms, their contents unknown, lie buried, awaiting discovery by Franco and others eager to learn their secrets. (Gwin 2004).

Social Strife

Rioting, rebellion, and above all, war, are probably the most common reasons for the

destruction and abandonment of sites. Many ancient cities were destroyed during wars, and sometimes the destruction is well documented in ancient literature, as in the case of Pagan, Myanmar and the Roman destruction of Carthage.

Pagan, Myanmar

In the mid-11th century, Pagan was one of the most magnificent cities in Asia, a burgeoning Buddhist metropolis that encompassed temples, monasteries and communities. Just two hundred years later, it rapidly fell into decline.

Today it is a crumbling mass of spires, turrets and golden basilicas, all built from brick that spans an area of over 40 km. The panorama of a plain of 13,000 spires clothed in dawn mist is breathtaking, no matter what the season. However, the lush greenery of November stands in stark contrast to the scorched yellow dust landscapes seen after Myanmar's January heat begins (Sommers 2001).

Defying an international outcry, Burma's military rulers have begun building a nearly 60-m tall viewing tower in the midst of the ancient temple city of Pagan, one of Asia's greatest archaeological sites. The project is adding to the severe criticism already heaped on Burma's junta for its allegedly unplanned and inaccurate rebuilding of many ruins.

"It's a cultural crime," said, a Pagan expert at the French Research School of the Far East, based in Thailand.

The 1,000-year-old temple complex is on par with Cambodia's Angkor temples - an unmatched vista of thousands of Buddhist temples and monuments spread among rice paddies.

There are giant circular pagodas with soaring domes, small temples with corncob-shaped spires, and exquisitely proportioned ziggurats, or terraced pyramids.

More than 4,400 pagodas and 3,000 other religious structures of bricks and stones were built in Pagan, Burma's former capital, during a 243-year period from the 11th-13th centuries, the result of extraordinary Buddhist fervor.

Today, 2,237 ruins and temples remain, many of them still used by worshippers.

The junta says the 59.4 m tower, roughly 16 stories, will give tourists a bird's-eye view of Pagan and they will be barred from clambering over ancient pagodas that are being damaged by thousands of invading feet every day.

UNESCO, the UN agency that has the power to grant or withhold prestigious World Heritage status and the accompanying funding, has spoken loudly against the tower.

The director general of the Department of Archaeology (of Myanmar) says his department has old documents that make precise reconstruction possible. He said the tower, in the southeastern corner of Pagan, is far from the historical heart where a few tall temples are the tourists' favorite.

"We selected the site with care," he said. "It won't obstruct the ancient beauty".

Pagan's golden age ended in 1287, when it was overrun by the Mongol warrior, Kublai Khan. It became a ghost town, home to bandits and spirits (Joshi 2003).

Kublai Khan - Genghis Khan's grandson spread the Mongol empire to Southeast Asia, became the first emperor of China's Yuan Dynasty (Anon. 2004a).

Palace Site Unearthed

Archaeologists have unearthed the site of Genghis Khan's palace and believe the long-sought grave of the 13th-century Mongolian warrior is somewhere nearby, the head of the excavation team said.

A Japanese and Mongolian research team found the complex on a grassy steppe 250 km east of the Mongolian capital of Ulan Bator, said Shinpei Kato, professor emeritus at Tokyo's Kokugakuin University.

Genghis Khan (*ca.* 1162-1227) united warring tribes to become leader of the Mongols in 1206. After his death, his descendants expanded his empire until it stretched from China to Hungary.

Genghis Khan built the palace in the simple shape of a square tent attached to wooden columns on the site at around 1200, Kato said.

The researchers found porcelain buried among the ruins dated to the warrior's era, helping identify the grounds, he said.

A description of the scenery around the palace by a messenger from China's Southern Tang Dynasty in 1232 also matched the area, he added.

Genghis Khan's tomb is believed to be nearby because ancient texts say court officials commuted daily from the mausoleum later built on the grounds to the burial site to conduct rituals for the dead.

Kato said his group was not aiming specifically to find the grave. Still, he said finding it would help uncover the secrets of Genghis Khan's power.

"Genghis Khan conquered Eurasia and built a massive empire. There had to have been a great deal of interaction between east and west at the time, in terms of culture and the exchange of goods," Kato said in an interview. "If we find what items were buried with him, we could write a new page for world history."

Genghis Khan's gravesite is one of archaeology's enduring mystery.

According to legend, in order to keep it a secret, his huge burial party killed anyone who saw them en route to it; then servants and soldiers who attended the funeral were massacred.

Kato said an ancient Chinese text says a baby camel was buried at the grave in front of her mother so the parent could lead Khan's family to the tom when needed.

Archaeologists have been forced to abandon their searches for Khan's grave in the past, however, due to protests that excavations would disturb the site.

In 1993, Japanese archaeologists terminated a search for the tomb after a poll in Ulan Bator found the project unpopular.

According to Mongolian tradition, violating ancestral tombs destroys the soul that serves as protector.

According to ancient texts, 13 or 14 Khan warriors, including Genghis and Kublai, are buried in the same place (Anon. 2004b).

Who were the Phoenicians?

Although they're mentioned frequently in ancient texts as vigorous traders and sailors, relatively little is known about these puzzling

people. Historians refer them as Canaanites when talking about the culture before 1200 BC. The Greeks called them the *phoinikes*, which means the “red people” – a name that became Phoenicians – after their word for a prized reddish purple cloth the Phoenicians exported. But they would never have called themselves Phoenicians. Rather, they were citizens of the ports from which they sail, walled cities such as Byblos, Sidon and Tyre (Gore 2004).

Merchant Mariners

Rooted in the Canaanite culture of the eastern Mediterranean coast, the Phoenicians became skillful traders and sailors whose colonies and ports of call stretched to the Atlantic. They remained a loosely affiliated group of cities dominated by powerful neighbors until Carthage finally forged an empire (Gore 2004).

The following is their history in brief:

- *3200 BC:*

As early as the predynastic period, Egyptians imported prized cedars from Phoenician traders of Byblos.

- *2500 BC:*

Major ports on the Phoenician coast – Byblos, Sidon, Tyre, and Beirut – emerged as independent city states.

- *1200 BC:*

A phonetic alphabet of 22 consonants developed, along with a distinct Phoenician language and culture.

- *877 BC:*

Assyrian King Ashurnasirpal II visited the cities of Phoenicia, which soon began to send gifts as tribute to his empire.

- *814 BC:*

Expanding westward, Tyre founded Carthage – Qart-hadasht, or “new city” – an early Phoenician colony in Africa.

- *573 BC:*

After his predecessor defeated Assyria, King Nebuchadnezzar II of Babylonia besieged and gained control of Tyre.

{The earliest evidence of Phoenician settlement at Carthage dates from the eighth century BC, although ancient literary sources

claim that the foundation of the city took place some years earlier in 814 BC, Carthage was originally a trading colony of the city of Tyre; Tyre and Sidon, on the Lebanese coast, were at the time the principal Phoenician cities. In the following two-and-a-half centuries, Carthage prospered and expanded, founding trading colonies of its own. By 500 BC it had been cut off from the Eastern Phoenician cities, which has been taken over by the Assyrians, and from this point the people are usually referred to as the Carthaginians. The Carthaginians expanded their operations during the 4th century BC, setting up trading centers along the southern and western coasts of the Mediterranean. The city of Carthage itself expanded, exploiting the fertile agricultural land of northeast Tunisia. It was the wealthiest city in the region, and the dominant power in the western Mediterranean. Two harbors were built in Carthage in the 3rd century BC – one for the merchant fleet and one for the navy (Adkins and Adkins 1991)}.

- *539 BC:*

Persian Emperor Cyrus the Great captured Babylon, and Phoenicia became a province in his vast empire.

- *332 BC:*

Alexander the great crushed Tyre, the only Phoenician city to offer serious resistance to his conquest of Persia.

- *265 BC:*

The First Punic War began as Carthage and Rome fought for control of Sicily. A second war started in 218 BC in Italy.

- *146 BC:*

Rome burned Carthage, ending the Third Punic War and annihilating the last major center of Phoenician culture (Gore 2004).

Phoenician Development

Although the Phoenicians themselves reportedly had a rich literature, it was totally lost in antiquity. That’s ironic, because the Phoenicians actually developed the modern alphabet and spread it through trade to their ports of call. In the sixth century BC a king named Tabnit obtained an Egyptian sarcophagus and added an inscription so he could use it himself.

The Phoenicians imported so much papyrus from Egypt that the Greeks used their name for the great Phoenician port, Byblos, to refer to the ancient paper. The name Bible, or “the book,” also derives from Byblos.

Shipwrecks of Phoenicians discovered in the Bay of Mazarron near Carthage are providing a different type of information – about how Phoenicians constructed their ships. The ships reveal that the Phoenicians used *motise-and-tenon* joints, giving their boats more strength than earlier boats, which were basically made of planks sewn together.

Researchers found evidence that the metals used to make their weapons came from Turkey or Cyprus since 1950 BC.

Today, Spencer Wells says, “Phoenicians have become ghosts, a vanished civilization.” Now he and Zalloua hope to use different alphabet, the molecular letters of DNA, to exhume the ghosts.

The two geneticists became friends in 2000 at Harvard University. Wells was pioneering genetic methods for tracing migrations of ancient peoples by looking at the chromosomes of their living descendants; Zalloua was looking for ways to use science to help heal his country, ravaged by 15 years of civil war between its many religious factions.

Pierre Zalloua was particularly interested in understanding the genetic relationship between the modern Lebanese and their Phoenician ancestors.

Wells and Zalloua are seeking markers – mutations that arose in Phoenician times that can still be found in blood today. The markers would be extremely subtle, changes in a few letters out of three billion in our genetic instructions. But they would be enough to identify descendants of Phoenicians.

Wells and Zalloua have come to Carthage to seek help from Tunisian colleagues. They need local DNA to find what’s left of Phoenician chromosomes here. That’s a complex job: A lot of Middle Eastern people, as well as Africans and Romans, have left their genes in Carthage over the centuries. Calculating when a particular set of chromosomes emerged is difficult, but Wells and Zalloua say they can date mutations relatively accurately.

Who were the Phoenicians?

The answer deciphered from their vials of DNA both pleases and frustrates the scientists. Perhaps most significantly, their data show that modern Lebanese people share a genetic identity going back thousands of years.

“The Phoenicians were the Canaanites – and the ancestors of today’s Lebanese,” says Wells.

That result extinguishes Wells’ theory that the migrating Sea Peoples interbred with the Canaanites to create the Phoenician culture.

“The Sea Peoples apparently had no significant impact on populations in the Levant,” he explains. “The people living today along the coast where the Sea Peoples would have interbred have very similar Y-chromosome patterns to those living inland. They are basically all one people.”

That result delights Zalloua; it supports his belief that both Muslim and Christian Lebanese populations share an ancient genetic heritage.

The data from Tunisia also help redefine the legacy of the Phoenicians.

“They left only a small impact in North Africa”, Wells says. “No more than 20 percent of the men sampled had Y chromosomes that originated in the Middle East.

“They were a slippery people,” he says. “They came. They traded. They left. I guess that only adds to their mystery.”

And so – for the time being, at least – the Phoenicians remain glorious ghosts (Gore 2004).

The Real Trojan War

Legendary Troy, perched on a hilltop in what’s now northwestern Turkey, draws thousands of visitors every year. And their overwhelming reaction is disappointment. “Most tourists get there and say, “This is it”, says Eric Cline, an archaeologist at George Washington University. The place of which Homer sang – a rich city with “lofty gates” and “fine towers”, temples to Apollo and to Athena, the palace of King Priam with a grand throne room and 50 marble chambers, a land in which thousands of warriors defended the

beautiful Helen against an invading Greek force – looks like a rude ruin on a dusty hill. Mostly, there's a fort with big walls, but they encircle an area only about 200 yards across. Around it some scattered stones. Says Andrew Sherratt, an archeologist at Oxford University: "It seems like pretty small bee."

Visitors are not the only ones who feel let down. The small size and the relative poverty of the ruins on this mound, called Hissarlik, have led many archaeologists and historians to doubt this was the place of the heroic battles of *The Iliad*. Frank Kolb, from the University of Tübingen, Germany, has described the site as "a miserable little settlement".

But Troy is getting bigger - much bigger. Recent excavations have unearthed an extensive town outside the citadel walls, dated to around 1300 BC – the approximate time when Homer's Trojan War is supposed to have occurred. "The town makes Troy about 15 times larger than previously thought," reported Manfred Korfman, the University of Tübingen archaeologists directing the dig, in a 2004 issue of *Archaeology*. That would raise the Trojan population size, too, from several hundred to perhaps 10,000 – enough to form a sizable army. The new work has also unearthed fortifications, imported pottery, swords, and a seal that reveals trading ties to far-flung cities. "Clearly, Troy at this time was clearly wealthy, incredibly strong," says Brian Rose of the University Cincinnati, who also excavated on site. More and more, Troy is looking like something worth fighting for and a place worthy of an epic poem.

In the 12th century BC, the rich Mycenaean towns and palaces fell into a decline or were destroyed, trade with the east decreased, and Greece entered a dark age. During the next few centuries, stories of the great Mycenaean civilization which had gone before were handed down from one generation to the next in the form of poems. Two of them, the *Iliad* and *The Odyssey*, had survived. They reached their final form in the eighth century BC at the hands of the poet Homer, whose poetry was admired throughout the Greek world. The *Iliad* describes how a city called Troy, on the west coast of modern Turkey, was besieged by a Greek army led by King

Agamemnon of Mycenae. It describes the heroic deeds of Greek and Trojan soldiers like Achilles and Hektor. The *Odyssey* tells the story of the return home from the Trojan War of one Greek hero, Odysseus. It took him ten years and he had many dangerous adventures. The Homeric stories reflect real incidents of wars, battles, and sieges from an earlier age. It is probable that war was waged between the Greeks and the Trojans, possibly over the ownership of lands and crops at a time when the Mycenaean world was falling apart, and not over Helen of Troy.

In 1870, German archaeologist, Heinrich Schliemann (1822-1890), discovered the site of ancient Troy near the Mediterranean coast in modern Turkey. His excavations revealed not just one city, but more than nine of them, built on top of each other. (It is not certain of which layer is the city described in the *Iliad*. In her lifetime, Schliemann's wife wore some of the superb jewelry found in Troy (Pearson 1992).

Pompeii, Italy

The origin of the city of Pompeii is obscure. It lies on the Bay of Naples in southwest Italy, and there is evidence of early Greek and Etruscan influence, but the town was taken over by the Samnite tribes around 420 BC. It remained Samnite town of Oscan-speaking inhabitants until it was besieged and captured by Sulla in 89 BC. In 80 BC a colony of war veterans was established at Pompeii, and this brought rapid Romanization, enhanced status and wealth, as well as villas in the surrounding country side. The town prospered for over a hundred years until a violent earthquake nearly destroyed the town in AD 62. Despite widespread damage, large-scale rebuilding was put in hand, some of which was still incomplete when the city was engulfed on the morning of 24 August, in AD 79 when Mount Vesuvius erupted.

Pompeii, near Naples in Italy, was a city buried during a volcanic eruption. The location of the Roman city of Pompeii, though, was not totally forgotten, because references to the city and its destruction survived in the works of classical authors. A graphic account of the destruction of Pompeii in AD 79 is given in a

letter by Pliny the Younger to the historian Tacitus, where he describes the rain of cinders, "then pumice-stones, and stones scorched, blackened, cracked by fire" which fell on the area. It is clear from his account that many of the inhabitants were overcome by poisonous fumes before they could escape, with the result that excavators of the site, many centuries later, were able to make plaster casts of the hollows left in the ash by the bodies of the victims. The exact site of the city was rediscovered in the middle of the 18th century, when tunneling took place to plunder objects from the site. Excavation began in earnest in 1860 and has continued until recently. Three-fifths of the site has been exposed, but the work is still inadequately published. Efforts are now concentrating on conservation of the remains that are gradually deteriorating.

The importance of Pompeii lies in its quality of being a time capsule, having been buried and sealed by volcanic ash in the space of few days. It provides a mass of evidence to help archaeologists date other sites because it has preserved a range of artifacts which were in use in AD 79, and it also provides a much more complete and comprehensive picture of a wealthy Roman city than can be gained from other excavated sites. More than this, by pouring plaster of Paris into voids in the ash, casts have been made of the bodies of some of the victims of the disaster. In some cases, we know the occupation and status of the victims and even their names. It is very rare for archaeological evidence to give such a complete and vivid picture as Pompeii provides today (Adkins and Adkins 1991).

Lost Cultures and Urban Centers to Tsunamis

A Tsunami is a series of waves caused by an earthquake or other disturbance under the sea. Once a Tsunami is generated, it can travel at speeds up to 800 km/hr.

Tsunamis are among the rarest of natural disasters, and the stealthiest, hiding the energy of a hydrogen bomb in an almost invisible swell. They are as hard to predict as the earthquakes that cause them, which is to say, virtually impossible. Tsunamis actually represent

the double uncertainty, because they depend essentially on unknown factors such as exact topography of the seabed at the epicenter of a quake. Even watching their seismographs jump, geologists could not have predicted with any certainty that the sea would rise up in Sri Lanka, 1,600 km away from the epicenter (Adler and Carmichael 2005).

More than 36,000 were killed by Tsunamis following the explosion of the volcano Krakatua in the Sunda Strait near Java on 27 August 1883. Many estimates in that disaster were even higher.

Following the 1883 eruption, waves estimated as high as 27m slammed ashore on nearby islands, wiping out coastal communities in what is now Indonesia. They had been the deadliest Tsunamis of modern times until now.

The earliest description of a Tsunami-type wave comes from 479 BC in the northern part of the Aegean Sea in 1500 BC caused a Tsunami that brought widespread devastation in the eastern Mediterranean and Crete.

Thousands of coastal residents in Spain, Portugal and North Africa were killed by waves spawned by an earthquake in Lisbon, Portugal, in 1755.

Over the centuries, Japan has been the land most plagued by the Tsunamis, with at least 66,000 deaths recorded there since 684 AD.

Among the deadliest Tsunamis was one that struck Honshu, Japan in 1896, killing an estimated 27,000 (Anon. 2004d). Many coastal residents were in the streets celebrating a holiday when the wave struck. The next day, fishermen returning home found a scene of devastation, strewn with bodies and ruined homes for kilometers.

Indonesia has seen more than 50,000 deaths in more than 30 Tsunamis over the centuries - not including the most recent disaster.

On 1 April 1946, a Pacific-wide Tsunami was generated by a magnitude 7.8 earthquake near Unimak Island in Alaska's Aleutian Island chain. A huge wave destroyed the US Coast Guard's Scotch Cap lighthouse on Unimak, killing all five of its occupants. The lighthouse was a steel-reinforced concrete structure standing about 27 m above sea level. That Tsunami reached the Hawaiian Islands about

five hours later, obliterating Hilo's waterfront and killing 159 people. Altogether, 165 people died including children attending school at Hawaii's Laupahoehoe Point, where waves reaching up to 7.6 m struck. As a result of this wave, two years later the United States established a Pacific Tsunami Warning Center in Hawaii.

Other notable Tsunamis have included:

16 August 1976: A Tsunami generated by a quake on Mindanao in the Philippines killed between 5,000 and 8,000 people in the Moro Gulf region.

22 May 1960: The largest earthquake – 8.6 on the Richter scale – of the 20th century occurred off the coast of south central Chile. It generated a Pacific-wide Tsunami, which was destructive locally in Chile. Waves damaged the waterfront in Hilo, Hawaii, and killed 61 people.

13 August 1868: A massive wave struck Chile, carrying ships as far as 4.6 km inland at Arica. Death totaled 25,000 or more (Anon. 2004d).

26 December 2004: At least 42 islands in the tourist paradise of the Maldives were flattened with 67 people killed while another 42 were confirmed missing in the devastating tidal waves that caused havoc to the nation of 1,192 coral islands (Anon. 2004e). Meulaboh was a thriving town of 60,000 people. Two weeks after the tidal wave that destroyed half the town, Meulaboh's ruined streets were still strewn with corpses in Banda Aceh. No one knows how many died. Some people say 5,000 died, others say 50,000 (Anon. 2005).

Conclusion

Complex patterns of destruction, rebuilding and abandonment, such as Troy, still take place today. Current political and economic pressures can still cause the abandonment of places for a whole variety of reasons, particularly in countries absolutely observed ideologies. Increasingly, the damage to the environment in many parts of the world threatens to bring about the abandonment of whole regions. Over-exploitation of

agricultural land can cause a dust-bowl effect, while the devastation of forests and the pollution of the air are changing the climate, causing severe drought and desiccation in some areas. In the former USSR, the Aral Sea used to be Asia's second largest lake, 65,000 sq.km. in area. The diversion of water from the two main rivers as part of a policy of irrigation of farmland for increased production has led to the Aral Sea shrinking in size – so far to about half its original area. This is causing an environmental disaster to the region (Adkins and Adkins 1990).

Maldives faces the prospect of extinction from sea levels as a result of global warming. The President of Maldives had warned that a 1-m rise in sea level could totally submerge his country (Anon. 2004e). Rising ocean sounds insignificant alongside the Indian Ocean Tsunami, yet an almost imperceptible annual rise in the world's oceans may pose a huge threat to ports, coasts and islands by 2100 (Doyle 2005).

Natural disasters are just likely to cause the abandonment of sites today as in the past. The Tsunami on 26 December 2004, the worst in more than a century and triggered by a 9.0 magnitude earthquake off Indonesia island of Sumatra, has left a trail of death and destruction across Asia. Indonesia, Sri Lanka, India, Thailand and Maldives are the worst hit. But also bearing the brunt are Burma, Malaysia, Bangladesh and even African countries Kenya, Somalia and Tanzania. The death toll is expected to touch 150,000, while millions are homeless and now exposed to the threat of epidemics (Anon 2004 h).

Deutsche Presse-Agentur reported that several attractive southern Thai beaches popular with Asian and western tourists lay in ruins, while countless hotels, shops, bars, restaurants and roads were severely damaged or completely destroyed in a matter of minutes (Anon. 2004c).

Millions of people around the Indian Ocean scrambled for food and clean water on 30 December 2004, with the threat of disease and hunger stalking survivors of the most devastating Tsunami on record. Well over a million people have been left homeless. Hospitals were overwhelmed with the injured,

an estimated 100,000 or more across the region. The quake was so powerful (9.0 magnitude), US scientists said it made the earth jolt on its axis and shifted islands. Insurers estimated damages at \$13.6 billion but that does not include the cost of lost business and productivity (Anon. 2004f). The rich world stingy or not have a moral obligation to help pay the bill (Anon. 2005).

A former Director-General of the Meteorological Department of Thailand, has been warning about the possibility of giant waves striking Thailand's west coast since 1993, following a wave disaster in Papua, New Guinea. His warning fell on deaf ears however, and many ridiculed him, suggesting he was crazy (Anon. 2004g). The sum required to establish an early warning system now looks pitifully small compared to the cost of the disaster in terms of the hundreds of thousands of lives lost and the billions of dollars in damage caused. Learning from this experience a proper and well-equipped warning system around the Indian Ocean, as well as good judgment, is crucial in preventing future tragedies from the Tsunamis.

Countries must take measures to rehabilitate mangrove swamps, which are actually the indigenous natural barriers between the sea and land areas to improve the ecosystem. Nature has taught us an expensive lesson; we should learn from it, or ignore it at our own peril.

Learning from life's lessons, urban planners, tourist operators and property owners are hoped to transform crisis into opportunity by rethinking development priorities.

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