

ATLANTIS:

by Nicholas Tschoegl



Archeologists pieced together this delicate and vivid fresco of two boys in a playful boxing pose from hundreds of fragments found at the excavation of a Minoan town on Thera near the present village of Akrotiri. The fresco had been buried for over 3,400 years.

The idea of a rich and powerful island civilization that perished in a sudden cataclysm has held man's imagination ever since "Atlantis" was first mentioned in the writings of Plato. Accumulated scientific and archeological evidence now indicates that the "Lost Continent" may have been located on the islands of Crete and Thera, which were devastated by volcanic eruption in about 1450 B.C. Recent archeological discoveries on Thera, including surprisingly beautiful frescoes, add to the compelling evidence of a peaceful ancient civilization which corresponds in many striking respects to Plato's description of Atlantis.

Although the number of books that have been written about Atlantis could fill a small library, they are all based on a single literary source: The Platonic dialogues, *Timaeus* and *Critias*. Plato (427 to 347 B.C.) was related through his mother's family to Solon, the Athenian poet and socioeconomic reformer who became chief magistrate of Athens in 594 B.C. Solon had learned the story of Atlantis from a priest of Neith (the equivalent of the Greeks' Athena) while visiting Egypt, and it was passed down in the family of Plato. The *Timaeus* and *Critias* contain the essence of the Atlantis legend:

Long before the classical Greek civilization of Solon's time, another civilization existed on the Greek mainland. This earlier civilization had a powerful rival in the great and wonderful island empire of Atlantis, an empire that was at first a veritable model of the ideal commonwealth. In time, however, it became corrupted, and endeavored to subjugate and enslave the rest of the world. The Greeks defeated the Atlanteans, but afterwards there were violent earthquakes and floods. In a single night and day of disaster, the island of Atlantis disappeared into the depths of the sea.

According to the narrative, the main island of Atlantis was fashioned by the sea god Poseidon, also known as the "earth-shaker," whose cult was intimately associated with the bull. The island, clearly volcanic in origin, was shaped by Poseidon into alternating belts of sea and land. The Atlanteans bridged over the sea zones surrounding the Ancient Metropolis, making a road to and from the royal palace in the center. They bored a canal 300 feet wide, 100 feet deep, and 5½ miles long from the innermost circular channel to the open sea. Since the banks of the canal were a considerable distance above the water, the Atlanteans were able to cover over the channels and still leave room for ships to maneuver.

A schematic of the Ancient Metropolis prepared from the description in *Critias* is shown at the right. Its splendor, described by Plato in great detail, indicates that the Atlanteans were wealthy, probably from the proceeds of

Cradle of Western Civilization?

a lucrative maritime traffic. The rest of the country, the so-called Royal State, is said to have been a large, roughly rectangular plain, 2,000 by 3,000 stadia (about 340 by 230 miles). The exact geographical relationship between the Ancient Metropolis, or Royal City, and the Royal State is not clear in the narrative.

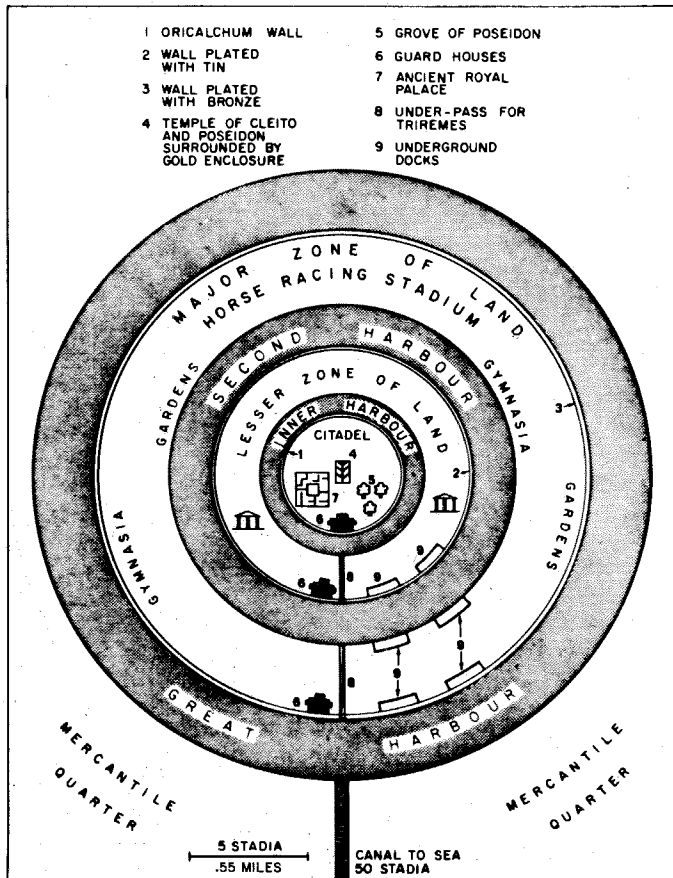
The empire is described as being ruled by a Royal House of princes, all descended from a common ancestry and bound never to take up arms against one another. Every fifth and sixth year alternately, the reigning members of the royal family left their cities on the plain and gathered in the Ancient Metropolis to deliberate on matters of common interest. These meetings were accompanied by an elaborate ritual comprising the sacrifice of a bull which had to be captured with the use

of staves and nooses only. The sacred bulls were free to range the temple of Poseidon.

Is the Atlantis story fact or fancy? Both views have been argued with equal eloquence, ingenuity, and conviction for almost 2,500 years. Aristotle (384-322 B.C.) dismissed the Atlantis legend as pure fantasy. He believed that Plato made up the story because he found it useful in expounding his ideas on ideal government, and that—having created it—he made it disappear in a cataclysm so as not to have to account for its whereabouts. But there is no need to suppose that just because the tale served Plato's philosophical purposes it had been fabricated out of whole cloth. Indeed, it has been taken seriously by at least as many people as have rejected it.

The first strong hint that the tale might not be mere fabrication came with the spectacular exploits of Heinrich Schliemann (1822-1890), a German businessman who became one of the founders of modern, scientific field archeology. At an early age he became fascinated with the epics of Homer, which described a civilization of Greeks prior to that of Plato. At the time he read them, the *Iliad* and the *Odyssey* were mostly regarded as works of pure fiction. Schliemann became convinced that they really related historical events, and he resolved to prove it. In 1872 he found—or thought he did—ancient Troy, whose siege is the subject of the *Iliad*. In fact, in his impatience he had cut through Homer's city to a much earlier Troy.

In 1876 Schliemann began excavating at Mycenae in Greece and was immediately successful. The so-called shaft graves he found there yielded an enormous wealth of spectacular finds. He thought he had found the city and palace of Agamemnon, the "king of men" who was the leader of the Greek host that sailed against Troy. But again Schliemann had erred amid success. The graves were 300 to 400 years older than Agamemnon's could have been. Schliemann was followed by other archeologists, whose work revealed a highly advanced ancient civilization,



This schematic of what the Ancient Metropolis of the Atlantean empire may have looked like is based on a map conceived by J. V. Luce, a Greek classicist, after many years of close study of the sources of the Atlantis legend.

Why Atlantis?

Nicholas Tschoegl, professor of chemical engineering, has—in addition to writing “Atlantis: Cradle of Western Civilization?”—spoken several times over the past year to students, alumni, and the general public about Atlantis. His talk at Beckman Auditorium last month drew more people than any other lecture ever given there, packed Ramo Auditorium for a piped-in version without the slides and graphics, and left hundreds of people outside.

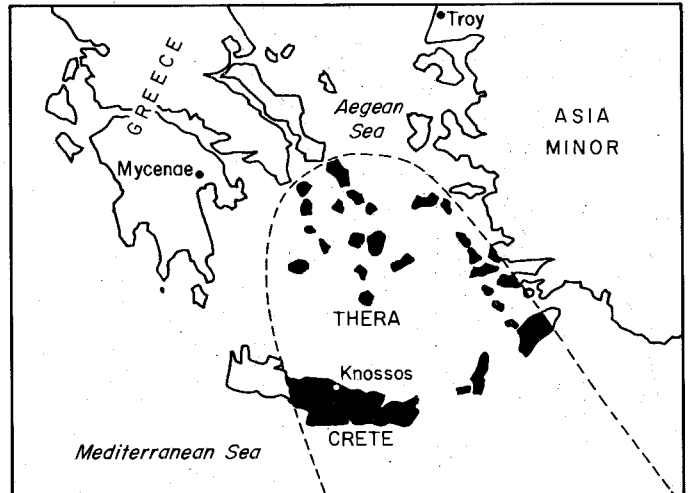
This phenomenon gives rise to a number of questions: Why is the subject of Atlantis so interesting to so many people? In fact, why is Tschoegl interested, and why did he decide to give the lectures? How, as a chemical engineer and scientist, does he feel qualified to lecture and write about something so far removed from his particular specialty—the study of synthetic materials, in particular synthetic rubber?

Tschoegl believes that the lure of Atlantis is partly a general fascination with the mysterious and partly a desire on the part of some people to find simple answers to the complex problems facing us.

“For some, Atlantis is in the same category as UFO’s [unidentified flying objects],” he says. “Both go back to the same common root—the feeling that perhaps at some earlier age we had the secret of living together peacefully, and somehow that secret got lost. By rediscovering Atlan-



Nicholas Tschoegl



The disappearance of the richly cultured Minoan civilization on Crete and of its outposts on many of the islands in the Aegean Sea is believed to have been the result of a tremendous volcanic explosion at Thera in about 1450 B.C. The area within the dotted line, plotted from deep-sea core samples of volcanic ash fallout, indicates the area of worst devastation.

dubbed Mycenaean from its chief archeological site. Just before the outbreak of World War II, numerous clay tablets written in the “Linear B” script were found at the excavation of the palace of King Nestor, near Messenia in Greece. The deciphering of the script in 1953 showed that the Mycenaeans were Greek. The civilization that this archeological work uncovered is in all essential details identical with that of Homer’s Greece.

Thus, at least the Greek part of the Atlantis legend has been vindicated: Long before the Greek classical period, there was indeed another practically forgotten period of high civilization in Greek history.

What about the location of Atlantis? Plato unmistakably put it in the Atlantic Ocean. But what we now know about the topography of the Atlantic makes it virtually impossible to believe that an island empire could have existed in this ocean in anything like historic times. In addition, because of the unbelievable logistics of conducting a war over such vast distances, it would make much more sense to seek Atlantis rather closer to the Greek homeland.

One possibility is Crete. Its relation to the Greek mainland and the nearby island of Thera is illustrated above. At the beginning of this century, archeologists—foremost among them Arthur Evans (1851-1941), excavator of the palace of Minos at Knossos—unearthed on Crete what appeared to be another highly advanced civilization, somewhat older and artistically more refined and more original than the Mycenaean. An example of some of the delicately executed art of this civilization is illustrated to the right.

Evans called this civilization, which was destroyed around 1450 B.C., Minoan. Evidences of Minoan outposts have since been discovered on many Aegean islands and



In contrast to much of the art of the time—Egyptian, for example—Minoan art of 1500 B.C. emphasized the natural rather than the ritualistic. This portion of the "Harvester Vase" shows smiling workers returning home from the fields. The vase was found at the palace of Phaistos, near Hagia Triada in Crete.

as far away as Sicily and perhaps Spain.

But the notion that Atlantis just had to have been in the Atlantic Ocean was so firmly rooted in the minds of so many people that the establishment of a connection between Atlantis and the Minoan culture was surprisingly slow in coming. Another reason for the lag was that for a long time remains of the Minoan civilization were found essentially only on Crete—and Crete was still there. It certainly had not disappeared into the sea.

In 1913, the British archeologist K. T. Frost published a paper identifying the Minoan civilization and Crete with Atlantis. But although he argued convincingly and compellingly, his thesis was ignored by archeologists. Still unexplained remained the causes for the sudden decline of Minoan civilization, which had been noted by Evans, and its replacement by the Mycenaean.

In 1939, while excavating Amnissos, the ancient harbor of Knossos, the Greek archeologist Spyridon Marinatos became convinced that he had found the clue to the sudden catastrophe that befell the Minoan civilization. He believed it was a consequence of a gigantic eruption of the volcano on the island of Thera, about 70 miles north-east of Crete. At that time archeologists generally believed that the Minoan civilization was destroyed by conquest from the mainland.

Marinatos published his revolutionary ideas in the respected British journal *Antiquity*, but the outbreak of World War II and the subsequent civil strife in Greece prevented any further work. When archeological and scientific work was resumed in about 1955, startling results were obtained in quick succession. In particular, the Greek seismologist A. G. Galanopoulos connected the Minoan civilization with Atlantis, and Marinatos had also come to the same conclusion.

Why Atlantis . . . continued

tis, many people believe, we will find the secret again. In the same way, some believe a race of beings in some far galaxy has the secret and will deliver it to us someday."

But for Tschoegl the fascination has a much more rational and factual basis. "The theories and evidence that seem to connect the mythical Atlantis with the historical Minoan civilization are appealing to me because they order my personal universe a little more. Something that was hitherto incomprehensible now finds its proper niche in the scheme of things."

One reason he decided to give the Beckman lecture was his desire to clear away some of the mysticism about Atlantis. "Another reason," he says, "has to do with the purpose of the Beckman lectures, which has always been to present Caltech and its faculty to the general public—not only through discussions of their work, but through the personalities of the scientists as human beings."

He believes the image that needs to be projected is the real one of men with interests and social concerns that go beyond their narrow specialties rather than the distorted—but all too prevalent—one of a bunch of mad scientists huddled in their laboratories plotting how either to save or to destroy mankind.

Tschoegl is a good example of the scientist who is both a specialist and a generalist. He knows a good deal about chemical engineering because "that is the way I earn my living." But science and engineering are only two of his many activities and interests. Archeology, linguistics, and the art and history of foreign cultures are others. This variety is perhaps a result of his classical European education. In the high school he attended in Hungary, science was no more important than any other subject. And much emphasis was given to languages, history, and literature.

"I was about 14 years old when I came across a book that showed a color plate of the palace of Minos at Knossos on the island of Crete. The palace was going up in flames. I wanted to understand the fate of that strange and exciting culture that created so many beautiful things. I wanted to know why such beauty was destroyed; knowing the reason, I thought, would put things right for me somehow. So when I saw an exhibit on the Thera excavations in Athens last summer, I realized I might have found an answer."

Although he admits to no qualifications on this subject other than an extensive amount of reading, Tschoegl resolved then and there to present a Beckman lecture on the archeological work being done on Crete and Thera.

One result of his lectures is interest on the part of some Caltech chemists and geologists in contributing their skills to the determining of whether the Atlantis-Crete-Thera theory is true. Meanwhile, Tschoegl is thinking about presenting another lecture at some future date—this time on a topic that combines his interest in cultural anthropology and his specialty in chemical engineering. The proposed title is "A Cultural History of Rubber."



The key to the obliterated Atlantean and Minoan civilizations is the volcanic island of Thera, about 75 miles north of Crete.

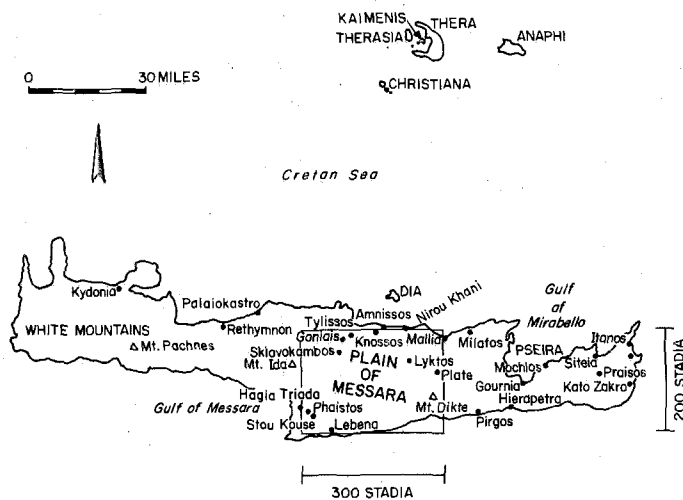
Since Thera appears to be an important clue to the whole mystery, let us have a closer look at it. Thera, illustrated above, is a small volcanic island group about five miles in diameter—one of the Cyclades islands in the southern part of the Aegean Sea. The volcano on Thera is active, a minor eruption having occurred as recently as 1956. The work of volcanologists—Reck in Germany, and Heezen and Nincovich of Columbia University's Lamont Geological Observatory in this country—has shown that the island volcano underwent major eruptions in about 25,000 B.C. and again about 1450 B.C., when Minoan civilization was at its height. Volcanic ash thrown up during the later eruption was as much as 1,000 feet deep on Thera, and in lesser amounts was scattered over a wide geographic area of the Aegean. The eruption of 1450 B.C. is estimated to have been four to five times as powerful as the well-documented eruption of Krakatoa in the Indian Ocean in 1883. The sound of Krakatoa's explosion was heard as far away as 3,000 miles; ash fall was recorded over distances of 2,000 miles; and particulate

matter from the eruption circled the earth for many years.

The map on page 18 indicates the approximate area over which the Thera blast was felt. This truly gigantic explosion, several times more powerful than that of the largest nuclear bomb ever exploded, surely affected the entire Aegean world. The accompanying earthquakes and tidal waves, and the ensuing conflagrations, destroyed Minoan palaces and cities all over the island. Many of the inhabitants, and the animals on which their livelihood depended, were killed. Crete must have been covered with ash, smothering vegetation, rendering wells useless, and blocking irrigation canals. For many years Crete must have been a shambles—the Minoan civilization destroyed at its base.

Life soon reasserted itself, however; Mycenaean Greeks moved into the power vacuum. Linear B tablets, written in Mycenaean Greek, have been found in Knossos. The Homeric epics, dealing with events about 200 years after the eruption—about 1200 B.C.—describe Crete as again rich and powerful. The Mycenaean ruler of Crete, Idameneos, is listed by Homer as one of the most powerful among the Greek kings who fought at Troy. About 100 years after the Trojan War (1000 B.C.), a Dark-Ages period that lasted several hundred years descended upon the Aegean world. The reasons for this decline are not clear; it may have been due to a long-lasting climatic change. But classical Greek civilization began to emerge about 700 B.C.

Since nothing was known to either Solon's or Plato's Greek contemporaries about either Mycenaean or Minoan culture, they could not imagine that the events the Egyptian priest described could have happened so close to home. Plato reports the priest as saying that Atlantis was destroyed 9,000 years before Solon's time—about 12,000 years ago. This is plainly impossible, for no trace has ever been found of any advanced civilization that flourished that long ago. Galanopoulos, the Greek seismologist who has made a special study of the Atlantean problem in relation to volcanic activity in the Aegean, has pointed out that whenever Plato mentions figures involving the number 1,000 they do not make any sense. They appear too large by a factor of 10. The conjecture is that somewhere in the transmission of the record to Plato the numeral for 1,000 became confused with that for 100. Thus, the Atlantean host is given as numbering 1,200,000. One-tenth of this—120,000—is still large, but it seems a more reasonable number when we consider that the entire population of the Mediterranean region at that time was scarcely more than that of New York City now.



A possible site of the "Royal State" of Atlantis, a flat region bordered by mountains, is the Plain of Messara on Crete.

If the destruction of Atlantis is, accordingly, taken to have occurred 900—and not 9,000—years before Solon, the date of the catastrophe becomes 1500 B.C. It is difficult to be exact about when the Thera eruption took place, but that it was about 1450 B.C. is currently accepted.

The correction immediately makes sense with respect to the size of the Royal State. If this is reduced from 2,000 by 3,000 stadia—roughly the size of California—to 200 by 300, the dimensions almost perfectly fit that part of Crete, the Plain of Messara, where Minoan sites have been excavated. This is illustrated above.

What about the Royal City, or Ancient Metropolis? Galanopoulos has advanced the bold idea that the Ancient Metropolis has to be sought not in Crete but in Thera. According to this idea, the island group including Thera was the real center of the Minoan—or Atlantean—empire. The Ancient Metropolis thus becomes completely destroyed in the eruption.

The theory has gained even more credence as a result of the recent excavation by Marinatos and others of a Minoan town on Thera with a level of sophistication similar to that of the civilization on Crete. An intact city of two- and three-story houses is still standing under the volcanic ash. Thus, another Pompeii, some 1,500 years older than its Italian counterpart, is emerging on this Aegean island. To make their buildings elastic and earthquake resistant, the Therans—or Atlanteans—set wooden pins in the corner points of the stones. They cultivated the olive and produced pottery similar to that found in

Knossos. But by far the most amazing creations of the ancient islanders were their frescoes, such as the one below. Beyond any doubt they surpass all contemporary art found so far in the Mediterranean region. The frescoes at Knossos, for example, are less delicate, free-flowing, and rhythmical than these. These show Bronze Age civilization at its peak. Such exquisite art could have been executed only by professional artists, who could only have been sustained by a rather high level of civilization.

These discoveries are exciting because of what they tell us about the possible origin of western civilization. Our North American culture has its roots in European culture. The civilization of Europe is founded on the classical Greek culture of Plato, Socrates, and Aristotle, which in turn has its roots in the preceding Mycenaean culture. And the Mycenaean are intertwined with the Minoan culture.

If it is proven that the Minoan and Atlantean civilizations are one and the same, then Thera—the site of the Royal City of Atlantis—may have been the true birthplace of our own civilization.



Fresco of "Two Antelopes" found on Thera makes similar finds at Minoan excavations on Crete seem provincial by comparison.