

The Pyramids at Giza have become the universally recognized symbols of Ancient Egypt and have for centuries been a focal point of archaeology. They have been so argued about, studied, probed, and even bombarded by x-rays and ultrasound that one would think there would be little left to uncover. Recently, however, an international team of scientists and archaeologists has come together in order to obtain from the pyramid site something that would be truly unique: a sample of air some 4600 years old.

The story goes back over thirty years, to 1954, when an underground chamber was discovered about 8 metres from the southern face of the Great Pyramid of Cheops (Khufu), the largest and most massive of all three monuments. Inside was discovered a remarkably well preserved "solar boat" built around 2600 B.C. to carry the dead pharaoh to the next world. (The term "solar boat" is used by modern archaeologists in reference to an Egyptian belief that the body of the pharaoh had to be carried through the sky like the sun.) The vessel had been taken apart by the Egyptians in order to fit into the chamber, but it has now been reconstructed; made of wood, it was 40 metres long, had twelve large oars, and came complete with coiled ropes and mats on which to sit.

Such a discovery in itself set the archaeological world astir, but there was more: a second underground chamber was also found, only 4 metres away. The archaeologists in charge decided to leave this second chamber untouched, even though they were convinced another solar boat lay within. Time has proven this to have been a wise decision, since the excavated boat is rapidly deteriorating; it is hoped that new archaeological techniques will be

developed to prevent such a fate befalling the still-buried second vessel.

But there is something else in the second chamber that concerns the archaeologists and scientists now at work on the site: the ancient air trapped inside when the chamber was sealed. It is now known that the limestone ceiling slabs of the chamber were hermetically sealed with gypsum plaster, trapping air which, to this day, has not been disturbed or contaminated in any way. If

a sample of this air could be obtained, it would provide scientists with priceless information about the environment of 2600 B.C. For example, levels of carbon dioxide and carbon monoxide could be analysed, and such data might

in fact shed some new light on current theories about the earth presently experiencing a "greenhouse effect".

The task, however, is difficult: how can a sample of the air be extracted without any contamination? This is where "space-age technology" comes to the rescue, for techniques and tools developed in recent years by such agencies as NASA can achieve the desired results. First of all, the limestone of the chamber must be analysed in order to determine its porosity and permeability. Next, special drilling bits must be selected which would penetrate the chamber without affecting the air inside and without introducing air from the outside; these drills would work in such a way that any residue from the actual drilling would be continuously sucked out with a vacuum device. Finally, specially designed bottles would be employed to gather the air samples for careful analysis in the laboratory. Only after this irreplaceable air was safely obtained would the chamber itself be further examined in order to determine its contents.

High technology would also be involved in this second phase of the project: the scientists intend to use radar and sonar to "map out" the contents of the chamber. If the results are encouraging, "borescopes" (special tubes fitted with optical lenses) would then be lowered into the chamber to take photographs. Only then would a final decision be made on whether to excavate the chamber or not, and if a second solar boat is awaiting us there, techniques of preservation must be perfected in order to ensure its survival in our world. Archaeologists have indeed learned a hard lesson from the unhappy fate of the boat discovered and excavated in 1954, and now disintegrating.

This project, estimated to cost about one million dollars (US), will be funded by many scientific and archaeological institutions, including the National Geographic Society. Those participating are convinced that the results, in the form of new information for both science and Egyptology, will more than atone for the cost.

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