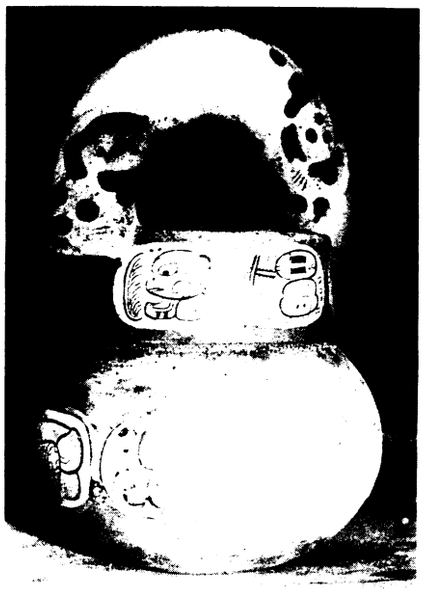

*This pot, with its "childproof" top, may be the most significant find.*

the ruling family of Tikal." Tikal is the site of the largest Maya ruins in the Peten region.

"With some study," Adams says, "we should be able to get a better understanding of the whole Early Classic Maya world. There seem to have been a lot of wars at this time [and] competition among Maya states. And this family [Tikal] seems to have been involved in those wars."

The occupant of the tomb, Adams speculates, was probably an administrator in the ruling family. The three large wall paintings are punctuated with Maya symbols of authority, and the hieroglyphics on some of the ceramics refer to "Great Son," a royal title.

The most valuable find in the tomb, according to Adams and National Geographic archaeologist George E. Stuart, is a ceramic pot with a stirrup handle on its removable top and a highly sophisticated flange arrangement to fasten the top — similar to today's "childproof" medicine bottles. It may be the first evidence of such a top, say the scientists.

The Maya are believed to have been one of the most advanced peoples in history. The civilization is thought to have existed in Middle America between 1500 B.C. and A.D. 1500. It was the Classic period, from about A.D. 300 to 900, that brought the greatest advances in the arts and sciences, which included the use of mathematics, the calendar and astronomy. Their architecture, art and farming techniques were among the most advanced of pre-Columbian peoples.

All of the items found in the Rio Azul tomb were transported to the Institute of Anthropology and History in Guatemala City for more detailed study. The move also removes the artifacts from the danger of looters — who have removed countless relics from ancient ruins throughout Guatemala. *—J. Greenberg*

# Ancient technology: Pouring a pyramid

The Christian Science Monitor

From "Cleopatra" to "The Ten Commandments," Hollywood is well known for altering ancient history. But this time, even Egyptologists may eventually have to revise their thinking about how the great pyramids of Egypt were built.

For generations, people have believed that building the pyramids was a massive construction project that involved tens of thousands of workers who quarried the limestone, hauled the huge slabs to building sites, pulled the blocks up long ramps and set them into place. Polymer chemist Joseph Davidovits, however, suggests that the Egyptians actually used man-made stone that was cast at the pyramid site, where it was needed. The process, he says, involved pouring a slurry of crushed limestone and a special mineral binder into wooden molds. Within a few hours, the mixture would harden into a material almost indistinguishable from rock. Such a construction method would have taken less time and required far fewer workers.

Davidovits, originally from France and now associated with Barry University in Miami Shores, Fla., first presented his controversial idea in 1979. Since then, he has been collecting evidence to support his hypothesis. Last week at the 1984 Archaeometry Symposium at the Smithsonian Institution in Washington, D.C., Davidovits reported the results of his analysis of rock samples from three of the pyramids and two limestone quarries (at Turah and Mokhatam) traditionally associated with pyramid building.

Davidovits looked specifically at the limestone "casing stones" that formed a smooth shell over a pyramid's stone core. He found that the pyramid samples contained traces of minerals that were not found in the quarry. Instead, they contained as much as 13 percent of what Davidovits calls a "geopolymeric" binder. In addition, microscopic examination of the samples showed that the quarried limestone consisted almost entirely of tightly packed calcite crystals that gave it a uniform density. In contrast, the casing stone was less dense and contained numerous air bubbles.

"Consequently, if the casing stones were natural limestone, quarries different from those traditionally associated with pyramid sites must be found. But where?" asks Davidovits. "That's why we suspect that these were man-made limestone blocks."

Not everyone agrees with this analysis. Michael S. Tite of the British Museum Research Laboratory in London reported that his laboratory's recent mineralogical analysis of a pyramid casing sample did not show the same features found by Davidovits. "All of the features that they saw can be explained on the basis of natural origin," he told the symposium, "and there is really no need to introduce this hypothesis of reconstituted stone."

Davidovits argues that because the man-made stones contain chunks of natural rock, sampling must be done very carefully and the analysts have to know what to look for. "What we see from time to time is pure limestone but embedded in a very loose matrix," he says. "Our problem is to be able to sample different locations within the material."

There are other clues that point toward the manufacture of stone, says Davidovits. The ingredients needed for the mineral binder — sodium carbonate, various phosphates (obtained from bones or guano), quartz and Nile silt — were readily available to the Egyptians. In addition, the casing stones have a millimeter-thick surface coating that appears to consist entirely of this binder. Davidovits suggests that during setting some of the binder came to the surface to form a "skin." It was the presence of this obviously man-made coating that originally prompted Davidovits to look for traces of this material within the rock itself. Davidovits's theory also helps explain why the casing blocks fit together so well that a postcard can't be inserted between the blocks. The sides of two previously molded blocks could be used as the walls for making the stone in between them.

While pursuing further clues in support of his theory and while experts debate the evidence, Davidovits is investigating whether this long-lost, ancient technology can be used for building modern structures. *—I. Peterson*