ARCHAEOLOGY—PALEONTOLOGY

World's Jig-Saw Champions

From Thousands of Time-Worn Pieces They Patiently Build Temples, Mosaics, Vases, Skeletons or What Have You

By EMILY C. DAVIS

MEET the world's jig-saw champs—the archaeologists.

Paleontologists run a close second.

The men who wear these double-jointed titles specialize in jig-saw jobs that make the hardest pastime puzzles look like a third grade child's home-work.

You hear puzzle fans these days talking in hushed tones of puzzles made of seventeen-hundred-pieces! Well, one puzzle in turquoise mosaic solved by scientific skill had 3,000 pieces, tiny pieces at that.

You hear dramatic tales of jig-saw fans working for hours, even days on some terror of a puzzle. But there was one scientific puzzle—it was a dinosaur when they got it together—that took the National Museum seven years.

There is nothing novel about a jig-saw puzzle to an archaeologist. Inviting him to help put a picture puzzle together at a party would be about like the classic joke of suggesting to the postman that he might take a walk for diversion on his day off. Still, if you could lure one of these specialists to try a hand at the game, you might find his methods interesting and worth copying.

The archaeologist works sometimes with pinhead pieces. Then again, the puzzle is made of stone blocks bigger than your head.

Down in Yucatan, a Mexican temple buried in the earth is a puzzle on the grand scale. Building blocks have been dislodged by the persistent tugging of tropical plants. Great stones have gone crashing down the steep pyramid on which the temple once perched. Hundreds of the pieces lie broken, scattered in the soil with edges sticking up here and there.

When Earl Morris of the Carnegie Institution of Washington reconstructed the great Warriors' Temple at Chichen Itza, in Yucatan, he had to hunt all over the place for pieces belonging to his building. Vandals, he said, had hurled blocks down the slopes for the sport of watching the descent. Modern Indians with ideas of improving their own buildings had taken pieces away from the ruined temple to fit into walls and walks.

One of the staff who worked on the front wall of the Warriors' Temple spent days poring over the sculptured masks and mosaic panels he was trying to arrange. He had the stones spread out on the terrace, and there he worked in the hot sun, shifting his heavy puzzle pieces. Each piece of sculptured mosaic weighed from 40 to 100 pounds.

The archaeologists found that they could call down to the Indian workmen who were digging out buried stones, and say, "Look out for a piece eleven inches long with a hand carved on it." And presently an Indian would come up with the piece. And sure enough it would fit.

Time and again, they found they could do that.

The same expedition met the puzzle of the 3,000-piece turquoise mosaic. Here was a picture puzzle with a good many pieces lying in place, so that the pattern could be made out. But it lay in a stone jar, discovered under the temple floor. The wood on which the mosaic had originally been mounted was turned to dust.

How to remove the thousands of tiny pieces of blue and green stone from the dusty jar and to set the pattern on a firm backing was a real problem. The archaeologists of the expedition, who had worked so masterfully with their giant stone puzzle blocks, declared that this was no task for them. They wired to New York for a museum expert to come down to solve the puzzle.

Mosaic of this sort is something for puzzle fans to examine. The largest of the turquoise pieces was less than a third of an inch square. The smallest was one-forty-eighth of an inch. And the stones were sliced very thin, besides. There were almost no helpful curves and odd-shaped pieces. The stones were mostly rough squares of different sizes. With these flecks of color, the Indian artist had constructed eight panels, radiating from the center, and in four of the panels he had made profiles of that popular Mexican deity, the Feathered Serpent.

It is a long way, conversationally, from a delicate plaque of turquoise to a club-tailed glyptodon. But they are both puzzles of the mosaic type. An old glyptodon does not look it, when he is neatly fitted together and en-

PUZZLE CHAMPION AT WORK

The piecing together of puzzles is no fad to Neil M. Judd, curator of archaeology at the U. S. National Museum. It is a part of Mr. Judd's work to restore ancient pottery and other articles from hundreds and sometimes thousands of fragments.

shrined in a glass case. Nothing could look more solid than a glyptodon with his low-hung body, spiky club tail and bone blanket. But that same animal represents thousands of bone pieces, painstakingly fixed in their proper places.

When dug up—paleontologists first catch their puzzles and then put them together—a glyptodon's fossil bones have an exasperating way of scattering. So, there is nothing to do except gather up the pieces and ship them back to the laboratory and there assemble the beast. The shell alone is made of thousands of little squarish monotonous pieces. Glyptodons were distant relatives of the modern armadillos. A well-grown glyptodon stood as high as an ox.

Scientific puzzlers have been known to put together a table full of bones and to get the wrong picture.

It was particularly easy to make mistakes with the old dinosaurs that lived so many million years before men inherited the earth. Nobody ever saw a dinosaur. Before the dinosaurian bones began to be unearthed, about a hundred years ago, no human being ever dreamed that such creatures had existed. Naturally enough, some of the early attempts at solving the dinosaurs were funny, even funnier than the dinosaurs themselves really look.

There was the Iguanadon, for example. When the first set of Iguanadon bones was dug up, quite a few parts were missing and others were scattered.

Dr. Frederic A. Lucas of the American Museum of Natural History once described with a chuckle the laboratory adventures of that Iguanadon.

"Among the first of the remains found," he wrote, "were some sharp pointed bones not unlike small horns; so one was not unnaturally placed like the horn of a rhinoceros on the nose of the animal. Later it was found that this spine was really a thumb, and it was pointed out that to put his thumb to his nose was really an undignified gesture for so ancient an animal."

One of the longest animals ever assembled is the Diplodocus, a dinosaur 75 feet long. The pieces of this puzzle weighed almost two tons. They were shipped to the U. S. National Museum from the original home of the giant creature in Utah. The Diplodocus, with the appropriate, plodding name, lived about 150 million years ago.

To obtain the two tons of fossilized bones, the Museum had to carry off almost 50 tons of rock in which the bones were firmly embedded. Back in the Museum laboratories began the task of chipping the rock off the bones.

To keep the long body of the puzzle beast from falling apart when set upright, a steel support had to be devised. That was a problem in itself. Altogether, the laboratory worked on that gigantic jig-saw dinosaur for seven years. It was finished and wheeled up to its place of honor in the hall of the dinosaurs in 1931.

The most jig-saw-like of all scientific puzzles are the broken dishes that have to be put together again. Some of these are found in a Humpty-Dumpty state of wreckage that would seem to defy human ingenuity. But where all the king's horses and all the king's men might fail, archaeologists have been known to work just a little longer and more ingeniously and to produce almost magic results. They can't always do it. But some of their successes are amazing.

Big water jars found in the ruins of Indian pueblos in the Southwest are often shattered in several hundred pieces when found. So are the big pottery bottles that the Incas of Peru used for carrying water. And so are vases from Greece and Egypt.

One yellow vase from Crete offered an interesting puzzle picture. There were 86 pieces to be assembled. When the piecework was done, there was a scene of the realistic writhings of two octopods on the curved surface.

Some of the most famous objects in museums are masterpieces of jig-saw art. Take the Portland Vase, sometimes referred to as the most famous vase in the world. This fragile glass vase was found in the sixteenth century. It was removed from a Roman tomb where it had lain sealed up since the third century A.D.

The graceful beauty of the vase, rescued from its dark resting place, was acclaimed. It was made, in cameo technique, of two layers of glass. The outer layer was opaque white. The layer beneath that was a deep soft blue. The artist had cut out the white layer, leaving a scene in white against the blue background.

In 1786, the Duke of Portland paid $5,000 for the vase. In 1845, it was reposing in state in the British Museum when an insane man took it into his head to smash it into a hundred pieces. Today it is as beautiful as ever.

NEUROLOGY

Scientists Study Goats That Become Rigid When Excited

GOATS so nervous that a shout causes them to become rigid and motionless were described to the members of the American Association of Anatomists.

Drs. Sam L. Clark, Frank H. Luten and Jessie T. Cutler of Vanderbilt University, Nashville, Tenn., rendered a scientific report on the nervous goats whose peculiar condition is evidently due to an inherited abnormality of the central nervous system.

The goats are so nervously constituted that excitement of any kind makes them perfectly rigid and they cannot move for a few moments. If they try to run, they fall down and for several minutes cannot bend their legs under themselves in order to get up. The condition is inherited. The rigidity may be brought on by a shout or other noise, by the goat's losing its balance in trying to climb, or by any kind of excitement.

The strain of goats is found in Tennessee and northern Alabama. Similar goats were reported by a traveller in Palestine, Dr. Clark said.

According to local history, a man travelled through Tennessee late in the last century with four of these goats and a sacred cow of India. He needed money, so sold the goats, but took the cow with him. All the nervous goats of that part of the country are said to have descended from those four.

Dr. Clark and associates find that the condition is not due to any muscular ailment, nor could they find anything in the blood of these goats different from other goats. Giving them adrenalin excites them, but does not cause the rigidity.