

SOME RECENT ARCHAEOLOGICAL DISCOVERIES IN MEXICO CITY.

BY THOMAS R. BAWLEY, JR.

The unearthing of the remains of an Aztec temple in the city of Mexico last winter promises to shed much additional light upon the ancient capital of the Aztecs. The discovery was made in the heart of the city, only two squares east of the great plaza, or Zocolo, and constitutes one of the most important archaeological discoveries made in years. In addition to the temple, several huge monoliths, stone idols, incense gum, spear heads and other interesting objects were brought to light.

Some years ago the eminent archaeologist Señor Batres, of Mexico, projected a map of the city of Tenochtitlan as it existed in the year 1519, when first seen by the Spaniards. This map represented the city as an island intersected with canals running nearly at right angles, corresponding to the streets of the present city. He located on the map the various temples and public edifices of the Aztecs, all of which, of course, had been destroyed by the conquerors. Back of the great temple, or Teocalli, which occupied the present site of the cathedral and major portion of the plaza, he located a temple called Coateocalli, meaning the house of many gods. He gave as his authority for locating this temple, Padre Duran, who wrote that the temple existed on the site occupied by the property of the Acevedos. Searching the archives, Batres found among the records in reference to an ordinance regarding the supply of water, under date of October 27, 1710, that the property referred to was on the corner of Relox and Cordobanes streets, and consequently gave that as the locality of the temple of many gods, but as the corner was occupied by a fine old building, it was not supposed for a moment that any remains of the ancient temple could possibly be in existence.

Last winter the work of renovating, or practically rebuilding the old palace occupying this corner was undertaken, for the purpose of furnishing suitable

parallel with the steps, a trench was opened the entire length of the patio. At the further end of the trench, scarcely two feet below the surface the men struck what appeared to be a round, polished rock, around which they carefully worked, pulling the dirt



EXCAVATING THE TEMPLE.

out with their hands, till they had disclosed a monolith weighing several tons, representing a tiger recumbent, or ocelotl, ready to spring. A rude derrick was rigged up, the sculptured rock hoisted out of the hole and it was weighed and measured.

Further excavating brought to light another rock sculptured to represent a serpent's head, which corresponds with two others previously discovered, and which were the corner pieces of the great wall inclosing the great Teocalli, within which are said to have dwelt seven thousand Aztec priests. Besides the great pyramid rising in the center, upon which they made their human sacrifices to the war god, there were seventy-eight chapels devoted to the worship of special deities. After the two huge monoliths were removed from the excavation, the digging proceeded, and the dirt carefully removed, every object found was cleaned and put aside for the inspection and study of Señor Batres. The foot of the steps was finally reached at a depth of thirteen feet below the level of the present city of Mexico, where they rested on a solid base, or foundation of masonry, which was without question the level of the old city of Tenochtitlan; consequently the present city of Mexico must be some 13 feet above the level of the original city, which presents an interesting problem to the archaeologist.

At the foot of the steps many of the smaller objects were found, such as idols, remains of idols, incense gum,

spear heads and ornaments, just as they had been thrown down by the Spanish conquerors. The stumps of two trees growing at the foot of the temple were also uncovered. These trees had evidently taken root after the destruction of the temple. They were found at irregular distances from the steps, and had the appearance of having grown spontaneously, just as the trees are growing at the present day out of the ruined walls of Palenque, and other aboriginal cities.

The recumbent tiger or ocelotl, weighs four tons. It measures 2 meters, 30 centimeters long, 1 meter 5 centimeters wide, and 94 centimeters in height. Its mouth is open, showing huge teeth and a part of its tongue, and great round eyes give it a ferocious look. It is well modeled, with the tail properly curved around on one side as the animal is often seen in life. On each side of the head is a mane resembling somewhat the pendant part of the head-dress on the Egyptian Sphinx. On its under side are vestiges of painting showing that it was originally painted with red and yellow to carry out more perfectly the idea, or imitation of the American tiger. Cut in its back is a cylindrical cavity about eighteen inches in diameter and five in depth. The sides and bottom of this cavity are sculptured with representations of Aztec figures, or warriors.

The serpent's head, identical with the other two already discovered, represents the serpent with its mouth open and the upper lip rolled up over its forehead, disclosing the upper jaw with great tusks projecting down over the under lip. It is supposed that there were four of these heads, one in each corner of the great wall, and the design corresponds to similar heads graven on the Aztec Calendar stone. On the under surface of the heads, Batres has deciphered a hieroglyphic which he calls *tres acatl*, the date of the foundation of the Great Teocalli.

Among the other relics unearthed was a curious little idol cut out of a dark porous stone, about 10

inches in height. The workmanship is rather crude, but decidedly interesting, representing a head with scarcely any body, perhaps in a sitting posture with arms folded. The incense gum upon being removed from the earth which had surrounded it for centuries resembled pieces of bone, but when, by the simple application of a lighted match, it burned and gave off the proper perfume, it was proved to be incense.

A number of stones were fashioned in the shape of skulls, or death heads, with projections at the back as though they had been inserted into a wall. Some of them were painted white, which gave them a more horrible aspect. A very interesting relic was a piece of baked clay, a part of a foot of a colossal statue. The toes were perfectly modeled, showing the edge of the leather sandal beneath, and the knots of the thongs holding it over the instep as worn at the present day by the native Indians. Other smaller pieces of this same statue were found, and in handling them one could imagine the great war chief in full regalia guarding the portals of the temple when set upon by the Spaniards and hurled down the steps to the bottom.

All the objects found are to be preserved in the National Museum, and it is proposed by Captain Diaz to leave the patio with the excavation open, showing the remains of the temple. The very interesting question now arises, how is it that the present city is 13 feet above the old one, as shown by the excavation.

We know that when Cortez first saw the Aztec city, he compared it to Venice on account of its being composed of islands, and having canals for its streets. With the destruction of the city, the temples and public edifices were toppled over, filling up the canals. It would seem that the Spaniards would have taken this material to build their new city, but it is evident that they did not. In building the new city they



THE TIGER, OR OCELOTL.

quarters for the Department of Justice. Captain Diaz, the son of President Diaz, was given charge of the work, and it is due chiefly to him that the discoveries were made. While the workmen were leveling off the patio, or central courtyard of the edifice, previous to putting down a new pavement, they came in contact with a hard solid foundation which proved to be a flight of stone steps going down into the earth. They would probably have covered them up again, and leveled off the projecting one at the desired height, had not young Diaz happened along just in time.

Diaz ordered the men to keep on digging, cautioning them to use their tools carefully, and following a line



HEAD OF OCELOTL.



SMALL STONE IDOL.

brought building material from elsewhere and built on top of the old.

Another fact demonstrated by the discovery of the temple is that the reconstruction of the city began in a very feeble manner, for the stumps of trees growing at the base of the steps show that the ruins of the temple must have remained just as the Spaniards destroyed it a long time, thus giving the two trees ample time to sprout between the crevices and grow before they were eventually buried by the debris, upon which the palace of the Acevedos was built, more than a century, or a century and a half later.

The great cathedral was not commenced till a century after the destruction of the city by Cortez, and like the palace of the Acevedos, it must have been built upon the ruins of the Great Teocalli. We can therefore conceive Tenochtitlan a ruined city for upward of a century, with its demoralized remnants of a once proud race wandering about the ruins till finally the site was accepted for the Capital and the

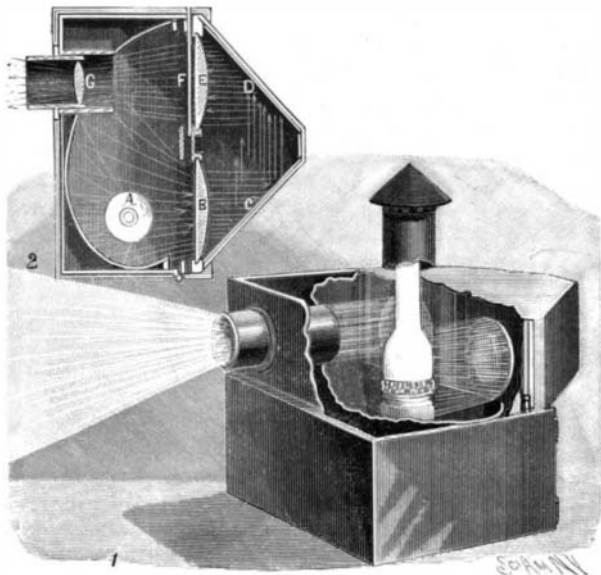


STONE SKULLS WITH SMALL IDOL ON THE TOP.

reconstruction commenced in earnest. The value and quantity of relics which are buried beneath these structures can only be conjectured.

IMPROVED PICTURE PROJECTING APPARATUS.

Heretofore magic lanterns have been devised either for projecting transparent pictures only, or for projecting opaque pictures only. Some transparency projectors, however, have been provided with an attach-



IMPROVED PICTURE PROJECTING APPARATUS.

ment whereby the same may be converted into a projector for opaque pictures. While this is suitable for certain classes of exhibition it nevertheless falls short of the requirements when it is desired to exhibit transparent and opaque pictures interchangeably; for considerable time is consumed, and trouble involved, in making proper adjustments necessary to effect the change from one class of picture to the other. Moreover, certain specially interesting pictures or objects—viz., those partly transparent and partly opaque—cannot be projected by such lanterns. With these conditions in mind Mr. George W. Smith, of Evanston, Ill., has recently produced and patented an apparatus which will project any class of picture or object without requiring any special adjustment. The invention is applicable to any kind of magic lantern, but more particularly to the form commonly known as the megascope.

As shown in our illustration, the invention comprises a lantern box, at the rear of which is hinged a reflection chamber having vertical walls arranged obliquely with respect to the front wall of the box. A light, A, for example a Welsbach light, is located at one side of the lantern box at one focus of an ellipsoidal reflector, the picture or object to be projected being inserted at the other focus. On the opposite side an opening is formed in the reflector for the admission of the objective tube. Rays from light, A, pass through a condensing lens, B, to one of the oblique walls of the reflector chamber. Reflectors, C and D, are provided on these walls and they act to reflect the rays back through a condensing lens, E. A transparent lantern slide, F, when placed before the lens, E, intercepts the rays and permits the proper gradations of light and shadow to be projected by lens, G, onto the screen. Such is the effect when a transparent slide is used. When an opaque slide is to be projected, the direct rays from lamp, A, and also the indirect rays concentrated by the ellipsoidal reflector, illuminate the front of the slide, and the proper image is thus re-

flected through lens, G, to the screen. If the slide be partly opaque and partly transparent or translucent, the lantern will operate simultaneously as a megascope and scioptric combined, thus, without any change, producing unique effects in a very simple, inexpensive and yet satisfactory manner.

The lantern should be very useful for scientific purposes for the reason that the same object may be projected by reflected light alone or by transmitted light alone, or by both simultaneously without removing the slide or changing the adjustment of the projector.

MOVING LARGE TREES.

An Iowa inventor has devised a very effective machine for lifting and moving heavy and cumbersome objects. The machine, which we illustrate herewith, though primarily designed for lifting rocks and boulders, has nevertheless been found equally useful for raising and transplanting large trees. A description of this tree-lifter should prove of great interest to landscape gardeners, for it provides them with an easy and comparatively inexpensive means for transplanting and setting out large trees without injuring them. Our engraving shows the machine handling a tree 1 foot in diameter and 30 feet long. This, however, does not illustrate the full capacity of the lifter, for it has easily transplanted trees as large as 20 inches in diameter. The frame of the machine is V-shaped, the rear wheels of which support the outer ends of the frame while the apex rests on the front truck. Thus it is possible to back the machine up to the tree which it is desired to move so that the two arms of the frame will straddle the trunk. When the machine has been backed sufficiently to bring the hoisting drum into contact with the trunk, the front truck is swung around at right angles to the rear wheels so as to give a firm anchorage for the machine when the hoisting mechanism is operated. The horses are now detached from the machine and are hitched to the hoisting gear. A connecting rod is fastened across the rear extremities of the V-shaped frame, and serves the double purpose of increasing the rigidity of the machine and of supporting the trunk when the tree is drawn out of the ground. A padded roller on this connection serves to prevent injury to the trunk. A bar-chain is now placed around the roots of the tree, which have been previously cut loose from the surrounding earth. This chain is attached to the lifting-drum and the tree is slowly drawn up until the roots clear the ground. At the same time the trunk gradually sinks back until it is supported by the padded roller. The power for thus raising the tree is supplied by the team, which, as stated above, is hitched to the hoisting mechanism. The tree is locked in this position by a ratchet wheel and is now ready for transportation.

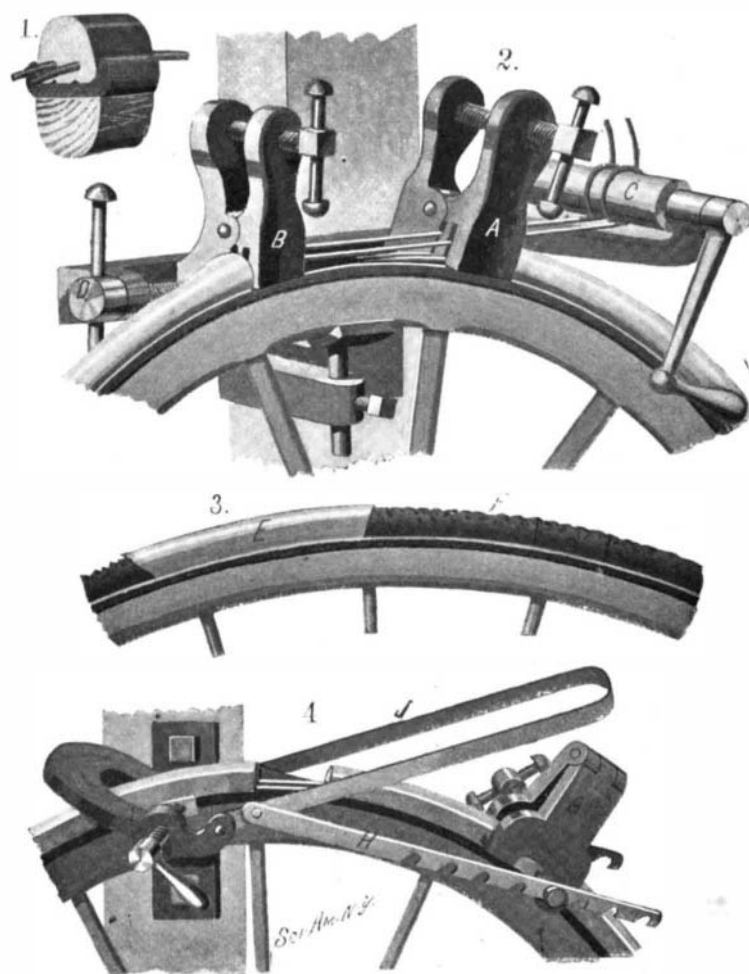
It is evident, of course, that a large hole has been left in the place which the roots of the tree occupied, a hole probably larger than can be safely straddled by the rear wheels. It is interesting, therefore, to note the novel method by which the machine is moved away from this cavity without its wheels sinking therein. Instead of being pulled directly forward the front wheels of the machine are first circled around the hole on the outer rear wheel as a center, until the machine occupies a position approximately at right angles to its original position, when, the hole having been cleared, the tree can be transported to any desirable locality. It is evident that by this method any hole can safely be avoided whose diameter does not exceed the distance between either of the rear wheels and the inner wheel of the front truck when turned at right angles. With the machine shown a hole of 14 feet diameter may thus be circled. When replanting a tree the same method must be pursued to avoid the cavity into which the roots are to be planted. When the hole has been sufficiently circled to bring the

roots directly over the center, the tree is slowly lowered under control of a friction brake. In our illustration the operator of the machine may be seen grasping the lever of this friction brake. As soon as the roots have been lowered into the cavity, the machine is drawn forward, thus gradually raising the tree into an upright position. Guy ropes are then fastened to secure the tree in place, after which the rear connection is swung open and the machine is drawn off.

The frame of this tree-lifter is very strongly constructed of Washington fir, white oak and hickory with very heavy iron bracing. It has a direct lifting capacity of over 50,000 pounds, and it will, therefore, readily be seen that the machine would prove serviceable for moving heavy objects of all descriptions.

SOLID RUBBER TIRE SETTING MACHINE.

Solid rubber tires are ordinarily secured to carriage wheels by a steel tape or a pair of wires which run longitudinally through the tire, near its under surface. At present the wires seem to meet with more favor than the steel tape, and the reason for this lies probably in the fact that the tape first used was not heavy enough for the purpose, and soon broke or rusted away. Heavier tape is now used with better results; but a prejudice once formed is hard to overcome and wired tires still hold the lead. Aside from



SOLID RUBBER TIRE SETTING MACHINE.

this prejudice there may be some good reasons for the preference of wire over steel tape. To admit the tape, the tire must have an opening which is much longer, in cross-section, than the sum of the diameters of the two wire openings. The tire is thus greatly weakened, and the more so when we consider the fact that the tape offers more of a cutting edge, even though its edges be rounded, because the diameter of the wires is greater than the thickness of the tape.

In Fig. 1 we show a section of a wheel rim with a wire-strung tire in place. The channel rim, which is secured to the felloes of the wheel, has a flange along each side, between which the tire is set and held by the two wires. The manner of stretching these wires and splicing their ends together, so as to form endless rings, is very interesting. A number of different machines have been designed for this purpose, among the simplest of which is the mechanism here illustrated. In Fig. 2 we have the machine for setting and splicing the wires together, after which the rubber must be straightened out and set by the device shown in Fig. 4. Both mechanisms are very compact and take up almost no room, because they can be fastened to the side of the wall, or against a post or column of the repair shop.

The wire-setting device consists of two clamps, one clamp, A, being stationary. The other clamp, B, is movable, being mounted on the tightening screw, D, by which it can be made to travel along the tracks on the main frame. A bracket projects out from the frame a short distance below the two clamps, and on this the wheel is hung, the felloe resting in an adjustable support which is raised sufficiently to bring



POWERFUL MACHINE FOR MOVING LARGE TREES.