

Computing the temple

For 17 years the Egyptians worshipped Aten, the sun god, as the prime ruler of earth. That was when Akhenaten was Pharaoh—from 1367 to 1350 B.C. But when a new king came to power, the spurt of monotheism came to an end and its religious symbols were destroyed.

The Egyptians so completely dismantled one of the era's most important temples that computers must now be employed to recreate the building. The temple lies in 30,000 pieces—too many, it is said, for the human brain to assemble without electronic assistance. But by matching photographs of the individual pieces on computers, American and Egyptian archaeologists expect to have the temple reconstructed—at least pictorially in a year or two.

Egyptians who took the temple apart 33 centuries ago apparently wanted to destroy evidence of the switch from pantheism to monotheism. King Akhenaten, who built the temple, is often credited as the founder of monotheism.

His successor, King Tutankhamen, wiped out the reformation, re-establishing the traditional gods.

Egyptians then began using Aten Temple as a quarry, carting away the sandstone blocks to use as filler, inside walls and under columns of nearby buildings. For about 60 years the relief-cut blocks have been turning up in the foundations and walls of these buildings during reconstruction work. Because the task of reassembling the temple seemed impossible, the blocks could only be stacked away in warehouses, although Egyptologists recognized their significance.

The blocks are decorated with scenes and hieroglyph inscriptions which carry historical, religious and architectural



University of Pennsylvania
One of the 30,000 decorated blocks.

significance. Once recreated, the temple is expected to throw light on the obscured reign of King Akhenaten, whose queen was the famous Nefertiti. Aten Temple once formed part of a complex of public buildings at Thebes (now Karnak), ancient capital of the Egyptian empire.

After the temple pieces disappeared into other Theban buildings, the area was shaken by one or more violent earthquakes which weakened the newer structures. Eventually, the condition of

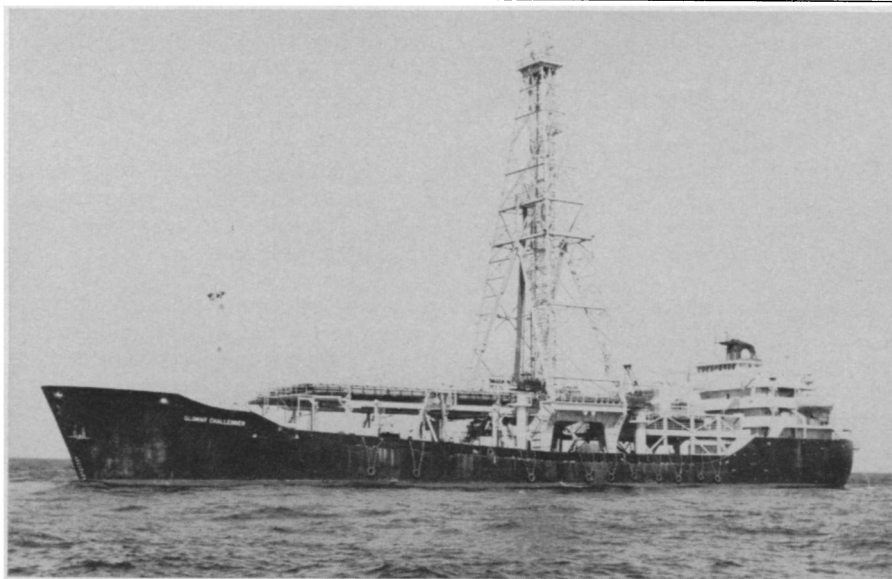
the ground led to the toppling of many columns and during 20th century reconstruction work, archaeologists discovered the temple blocks.

Recreation of the temple has been undertaken by a team from the University of Pennsylvania, the Department of Antiquities of the United Arab Republic, and IBM Corp.

So far 25,000 blocks have been photographed, coded and computer-processed. The tedious process of matching is now underway.

CHALLENGER

Oil, salt and geology



NSF

Challenger: Striking oil, shaking a theory and breaking some teeth.

It took just eight days of a planned 18-month mission for the first operational U.S. deep ocean drilling program (SN: 8/10, p. 143) to prove its worth. After finishing her sea trials on Aug. 11, the 400-foot oceanographic research ship Glomar Challenger set forth to cross the world's major oceans, collecting core samples from beneath as much as four miles of water and reaching some 2,500 feet down into the sediments overlying the earth's crust.

On the total itinerary are studies ranging from changes in the planet's magnetic field to the possibility that once there was no Atlantic Ocean, that North and South America, Africa and Eurasia were once a single body of land. More than 60 holes are planned for the project, which is being sponsored by the National Science Foundation.

By the second hole, the scientists were already reaping rewards. On Aug. 19, in the Gulf of Mexico, the Challenger drilling team pulled up a 472-foot-long core from one of the Sigsbee Knolls, a belt of submerged hills stretching more than a thousand miles from the Texas-Louisiana coast south to Mexico's

Yucatan peninsula. The soft, porous sandstone in the core oozed forth a sticky, black liquid: oil.

The findings do not necessarily indicate a vast oil field, but the possibility is strong. "It opens up the whole Gulf and the Caribbean," says Dr. William E. Benson, in charge of earth sciences for the NSF. This means an area of some 1.66 million square miles, six times the size of the entire state of Texas. Texas currently produces more than \$3.3 billion worth of crude oil annually.

Of even greater interest to the scientists than the oil are the geological formations in which it was found. The core samples definitely established that the Sigsbee Knolls are salt domes, common enough in land oil fields, but previously thought by some researchers to be highly unlikely in the deep ocean where large salt deposits would presumably be unable to form.

Either the 170 or more salt domes were formed by geological processes that are so far unknown, says Dr. Benson, or else "the entire Gulf was once a huge down-dropped block of continental crust." If the latter is the case,

as Dr. Benson believes is more likely, the Gulf is the first known example of a large section of earth's crust falling so far. "The bottom really dropped out," he says.

After such momentous findings only one percent of its way into its journey, the Challenger headed east of San Salvador in the Bahamas, where bottom samples delivered a mild blow to the increasingly popular theory of continental drift by sea floor spreading.

According to the theory, heat currents in earth's mantle force material up at the mid-oceanic ridges, from which it moves outward on either side. The oldest sediments thus would be those furthest from the ridges, since they would have had the most time to spread. By figuring backwards, scientists had come to the general conclusion that the spreading began between 100 million and 125 million years ago, before which the continents were joined together.

Sediments brought up by the Challenger, however, reveal that there has been deep ocean around the Bahamas for 150 million years or more. The likelihood is that the complicated estimation of the age of the continental split is inaccurate — "You hope you're within 100 percent on calculations like that," says one NSF scientist—but the ancient sediments could mean that the continental drift idea needs readjusting.

From San Salvador, the next stop was the Bermuda Rise, an area about 600 miles wide and 900 miles long on the route north to the Challenger's first landfall and resupply stop in Hoboken, N.J. The rise was the last major scientific drilling site in the first of the nine legs of the journey, and it was there that the researchers encountered an unsuspected problem that could plague them repeatedly during their 40,000-mile journey—and plague future seabottom drillers as well.

Turbidites, sediments deposited by turbidity currents, were previously thought to be relatively common on ocean floor rises but much less so in the deep ocean. To their surprise, the Challenger scientists found the turbidites to be almost equal in volume with the finer, ordinary sediments, and to include several layers of hardened chert (amorphous silica) and limestone which played havoc with their drill bits. One bit, which had successfully ground through several hundred feet of lava on land, was so badly mangled that it could not even be refitted with new diamond cutting points to salvage it. If the Challenger's indications hold true, such layers, impeding the way to deeper sediments, could be found almost anywhere in the oceans.

Last week the Challenger sailed for Dakar, Senegal, on the second leg of its journey.

SYPHILIS

Epidemic in rural Mississippi

Syphilis rates tend to be high in cities, and constant surveillance is needed to keep the disease under control. Rural epidemics are rare, so when the number of reported cases in a northwest Mississippi county rose from six in 1967 to more than 90 in the first nine months of this year, an alarm went out to the National Communicable Disease Center in Atlanta.

Both whites and Negroes are spreading the disease. One explanation, according to Dr. Durward L. Blakey of the state health department, is that though Coahoma County is largely agricultural, with more mechanization in farming, workers travel back and forth to Memphis and other cities for temporary jobs, thus spreading infection from urban pools.

Another reason for the increase is that more teenagers are becoming infected. The ages of contacts in Coahoma and adjoining counties range from 13 to 86, but 20 percent are teenagers. It is hard to deal with teenage contacts; educational programs in the schools are being set up in hope of preventing initial infections.

Coahoma County, Miss., does not have funds for a full-time health officer. Dr. Blakey of the state health department drives over from Jackson every two weeks to catch up on the accumulation of work referred to him as acting county health officer.

"The lack of funds for personnel is not confined to Mississippi," Dr. Blakey emphasizes. "It is nationwide. People are needed for interviewing suspects and giving blood tests after they are found. Only 35 percent of syphilis patients recognize the symptoms in the early stages. We have received help from NCDC for rounding up contacts and treating infected persons."

Nationwide, says Dr. William J. Brown, chief of the venereal disease branch of NCDC, teenagers and adults under 25 years account for 48 percent of syphilis cases. Those under 20 years of age make up 19 percent.

Despite the epidemic in Coahoma County, national figures show a decline in the past three years. In fiscal 1965 there were 23,250 cases reported; this year the total so far is 20,200.

Penicillin remains effective in the treatment of syphilis, although there is a growing resistance to the antibiotic by the gonorrhea organism. A vaccine for syphilis is being sought but, although the outlook is promising, it will be several years before it is ready for use.

One of the methods for uncovering more syphilis cases is called "cluster

testing." A patient is interviewed to determine his sexual partners and then for persons among his acquaintances who he believes are having the same partners. In one instance, a cluster interview of 285 early infectious syphilis cases brought an additional 153 to treatment.

There is no doubt that venereal disease is seriously under-reported, and that most cases are reported and diagnosed late. Health departments are asking private physicians to report more of their cases. With only 20,200 syphilis cases reported this year, the true number is estimated at about 100,000. One of the problems in reporting is that of homosexuals who fear exposure. Between 12 and 15 percent of reported syphilis cases are among homosexuals.

Gonorrhea is still out of control nationally, with 400,000 cases reported last year, a rise of 25,000 cases over the previous year. Sixty percent of these are under 25 years old and 24 percent are under 20.

"The reason for the greater amount of gonorrhea," Dr. Brown says, "is that we do not have a good test as we do for syphilis. The CDC is at work on a blood test that researchers hope to perfect in the next year.

"Patients are not unwilling to come into a clinic or doctor's office for blood tests, but they will not volunteer for physical examinations, especially women."

PULSARS

Counting the subpulse

The puzzle of the pulsars—what sort of object can account for the extremely regular pulsed radio signals coming from 11 known locations in the sky—may now be even more puzzling. A very short period subpulsation has been discovered superimposed on the main pulsations of two of the objects. A resumption of the search for an optical counterpart is a likely result.

Dr. Frank D. Drake of the Arecibo Ionospheric Observatory of the Cornell-Sydney University Astronomy Center in Puerto Rico reported to a seminar last week at the National Radio Astronomy Observatory in Green Bank, W.Va., that he and Dr. Harold D. Craft Jr., have discovered pulsations of about 10 milliseconds duration superimposed on the one-second fluctuations of two pulsars—AP-2015+28 and CP-1919. (Letters in the designations refer to discovering observatories, A for Arecibo, C for Cambridge; the numbers refer to locations in the heavens.)

The 10-millisecond pulsation is in the range of period that would be expected