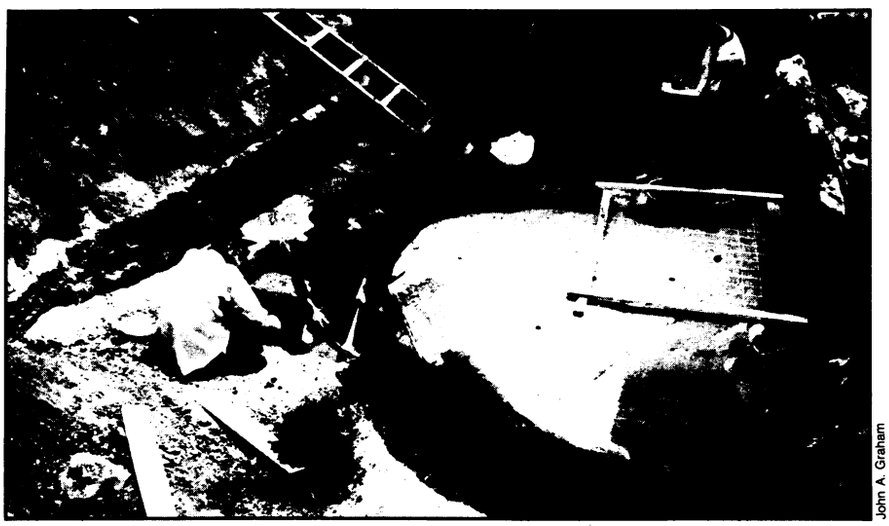
Mayan origins: Predating and reassessing



John A. Graham

Excavation of a sacrificial altar used by the Mayas at Abaj Takalik in Guatemala.

The rise and fall of the Mayan civilization is still a mystery. With their art, architecture, astronomy and highly accurate calendar, the Mayas flourished in the Yucatan Peninsula and the adjacent highlands of the Pacific slope from about A.D. 250 to 900 and then gradually faded away. An accepted explanation for the decline is still needed, but two recent expeditions offer clues to the early origins and later development of Mayan civilization. One indicates occupation of the Yucatan Peninsula 1,700 years earlier than previous evidence had suggested. The other expedition has investigated a Mayan monument that has on it what may be the oldest recorded date yet found in the New World. This may push back the date for the beginning of the Classic Maya period by several hundred years.

The Corozal Project, a joint venture of the British Museum and Cambridge University, has been excavating a number of Maya ceremonial centers since 1973. Last year at a site in Cuello, Belize, a deep stratigraphic sequence was revealed. Midden or refuse deposits were found at various levels down to 4.7 meters below ground level.

A midden at one of the deepest levels contained large quantities of pottery, mollusk shells and animal bones. It was 25 to 30 centimeters thick over the whole area of the excavation and represents, according to the researchers, "the debris from a substantial and undoubtedly sedentary occupation of the site." A sample of burnt wood from this level was radiocarbon dated at 2,600 B.C. This determination, say the researchers in the April 15 NATURE, places "the origins of Maya settlement and civilization in the Yucatan Peninsula back in the third millenium B.C., some 1,700 years earlier than the first occupation known until now."

The Belize find pushes back the date for the Maya Early Formative period, but the Mayas are probably best known for their Classic or advanced period. And since most Classic Maya ruins have been discovered in the Yucatan lowlands, it has been thought that their Classic civilization developed there. Now evidence from another expedition suggests that the advanced Mayan culture may have spread into the Yucatan after it developed in the highlands along the Pacific coast (where the Classic style is very rarely found).

John A. Graham and Robert F. Heizer of the University of California at Berkeley have been working at Abaj Takalik, a site located among coffee plantations near Retalhuleu, Guatemala, near the Pacific Ocean. Their expedition, sponsored by the National Geographic Society, examined a Maya stela (dated stone monument) that predates any found so far. "The badly eroded bar dot date we found on the Abaj stela is no later than the first century B.C. and possibly as much as one to two hundred years earlier," says Graham. The date on the monument, even though incomplete, is thought to be the oldest recorded date yet found in the New World (see cover photo).

Prior to this find, one of the earliest accepted dates for such Mayan works was A.D. 292, from the famous lowland site of Tikal. Graham now expects that date to be pushed back considerably. The Abaj stela is definitely Mayan, he explains, and the art style and hieroglyphic writing are fully developed—indicating that this was not the first such monument, and that older ones are yet to be found.

The Guatemala find has other interesting implications. The dated stela was found among 50 to 60 large Maya monuments and several major Olmec monuments. The Olmecs suddenly appeared in Middle America around 1,200 B.C., and are thought to have had some influence on the Mayan civilization that came into its own more than one thousand years later. The Abaj site may shed some light on the relationship between the two cultures. "This is the first time Olmec and Maya carvings have been found side by side," says Graham. "We're speculating that the Olmecs settled the place before the Maya arrived, but hopefully that will be determined in later excavations." More to come when the team goes back to Guatemala early next year. □

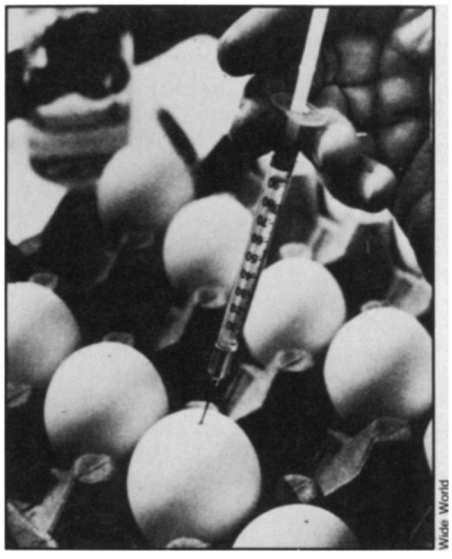
Swine flu: Advice, dissent and politics

Two and a half months after the death of a Ft. Dix, N.J., Army recruit from swine influenza complications, the federal government and four drug companies are gearing up for an all-out attack on the disease. President Ford requested and Congress last week appropriated $135 million to finance production of about 200 million doses of swine influenza vaccine—enough to immunize most U.S. residents. This, the first mass influenza inoculation in history, has drawn both praise and sharp criticism from scientists, and generated the inevitable cry of partisan election-year politics—a charge that is, this time, probably unfair.

One death, 11 active cases and signs of swine viral exposure in 500 other Ft. Dix recruits signaled a potential pandemic to flu experts. Most flu cases last winter were caused by Victoria/A strain (first isolated in Victoria, Australia). The sudden appearance of a radically different strain such as the Ft. Dix swine virus might, therefore, indicate the early stages of a worldwide epidemic.

Pandemics, says Mt. Sinai medical school microbiologist Edwin D. Kilbourne, have always been preceded by major viral mutations and tend to appear in 10-year intervals. One is expected during the late 1970s, he says. A strain of swine flu virus caused the 1918 pandemic that killed 20 million persons, mostly from related pneumonias. (Although antibiotics are now available, the Hong Kong flu still killed 20,000 in the United States in 1968.) The virus, it is thought, has been harbored in swine ever since, giving infected animals a mild, flu-like illness. The virus isolated at Ft. Dix is basically similar to the version found in swine, but has mutated enough antigenically to cause concern. Those persons born before about 1925 probably have antibodies (generated during the 1918 outbreak and aftermath) to protect them now, says Walter Dowdle, head of virology at the Center for Disease Control in Atlanta. But those under 50 would be highly susceptible.

No other cases have been found outside the base thus far, but, says Kilbourne, 1) flu is essentially a winter disease and the virus may be "seeded" to over-summer



Swine virus for vaccine is grown in eggs.

in individuals across the country and 2) the Asian and Hong Kong epidemics smouldered before they took off. "No one is saying there *will definitely* be a major outbreak," he says, "but this lead time gives us a chance to protect the public in case there is one—and many of us think it is likely."

Dozens of highly respected scientists, Kilbourne included, from federal health agencies, universities, research institutes and drug companies advised President Ford to request $135 million to produce the virus. $100 million of the newly appropriated funds will go to four major drug companies, $26 million will go to state and local health organizations to cover some administrative costs and $4 million will go for vaccine quality control by the Food and Drug Administration and research by the National Institute of Allergy and Infectious Diseases.

The program is really a public/private venture; the $135 million will cover only part of the costs. Although some vaccine will be administered at no cost by local public health clinics, many—perhaps most—persons will have to pay private physician fees for vaccination during regular office visits.

Not all 217 million Americans will be inoculated, however. Some small children, persons allergic to eggs (virus for the vaccine is grown in chick embryo allantois fluid) and those allergic to vaccines in general aren't included in the figures. Neither are the many individuals expected to decline participation. The drug companies are aiming to make at least 150 to 175 million doses by December, a spokesman says. High-risk individuals (very young, very old and the infirm) will be inoculated beginning in June, it is hoped, and lower-risk individuals by November or December.

The first experimental inoculations will be given next week to thousands of volunteering federal employees at health agencies and military bases. Three dosage strengths will be tested for maximum protection with minimum side effects.

Critics like Nader-raider physician Sidney M. Wolfe contend that the risks of side effects inherent in mass inoculation are clear-cut while the benefits are uncertain. He cites a projection that "15 percent of those immunized will suffer a 'disabling' illness—meaning in most cases missing work or school." That, says FDA virologist Francis Ennis, is a pessimistic prediction, the usual reaction rate being a few percent with sore arms and "nondisabling low-grade fevers." Wolfe also contends the decision was made politically and dissent was discouraged.

Wolfe and others advocate stockpiling the vaccines and beginning inoculation only after there is evidence of a major outbreak. But this, says Kilbourne, is "highly unrealistic, and ignores both the speed with which flu can move through a population and the massive distribution problems we will face."

Kilbourne, as one of Ford's advisers, says he resents the implication that the decision was a political one. "This decision had its origin in the scientific community and a number of us can take responsibility for it, good or bad. I find the claim of politics somewhat ironic in fact, because it is indeed a large gamble with no guarantees except the inevitable criticism of 'wasted money' if the pandemic doesn't occur. We could all wind up with egg on our faces, but then," he says, "we can't ignore the chance to save thousands of lives."

That chance was ignored during the 1957 and 1968 flu epidemics, he says. "To put the whole thing in perspective, the real question is why the hell didn't we do something like this *before* when we had early indicators? Society and government did too little, too late during those epidemics," he says, "and although this is a bold kind of action, we are following the best evidence we have." □

The great tap water energy machine flap

Most inventors of perpetual energy machines never make it to an editor's desk anymore, or past the polite officials corporations hire to handle such cases. But a Southern California inventor named Sam Leach has apparently found a successful new approach, a machine that demonstrably produces hydrogen from tap water in what he claims to be a self-sustaining reaction. Such demonstrations quickly gained him two corporate sponsors and nationwide press coverage. The problem is that to be truly self-sustaining, the unspecified chemical reactions going on inside the machine would have to violate the first law of thermodynamics: Thou canst not create energy from nothing.

Inside the mysterious machine, which is about the size of a trunk, are reportedly two steel tanks, each containing granules of an unidentified metal that supposedly reacts with steam, binding oxygen and releasing hydrogen. After a while, the reactant must be recycled by heating to remove the oxygen and restore the metal to its original condition. To be self-sustaining the heat given off in the hydrogen-generating reaction in one container would have to be sufficient to power the recycling reaction in the other. Therein lies the rub—the laws of physics insist that such energy transfer could *never* keep the reaction going indefinitely, because some heat would always be lost in the process and therefore the reactant could not be fully restored without adding energy from an external source.

Unfortunately, press reports have tended to treat this difficulty as if it were just another case of experts disagreeing over whether something could or could not theoretically be done. The New York Times of March 29 quoted Leach as saying, "The reaction is self-sustaining. . . . Thermodynamicists follow certain things blindly, like tunnel vision." Some physicists and chemists who had never seen the machine were asked by the Times to respond, and not surprisingly they all said the device could not operate as the inventor contended. Compounding the confusion were incomplete reports on tests run on the machine by two independent laboratories. NEWSWEEK of April 19 simply quoted press releases as saying the labs found that the machine worked.

Even before widespread press coverage could catch up, however, rumors about the process circulated on Wall Street and created a spree of speculation. Leach has reportedly sold application rights to his invention to two companies: The Presley Companies, homebuilders based in Newport Beach, Calif., will control residential applications; MJM Hydrotech of Los Angeles, a family owned company headed by Morris J. Mirkin (founder of Budget Rent-A-Car), will control other rights. The value of Presley stock quintupled in just three months, leading the Securities and Exchange Commission to halt trading, pending an investigation.

Both the press and eager investors have apparently overlooked the fact that the basic claim for the machine is still untested. The independent laboratories were asked only to certify that water was indeed being separated into hydrogen and oxygen, and that after an initial warm up period no external energy was added for the duration of the short test. No hydrogen production rate measurements or extended runs were made to see how long it might take before the reactant would have to be replaced or more energy added. Aaron Cohen of Approved Engineering Test Laboratories told SCIENCE NEWS this week that the tests his organization con-