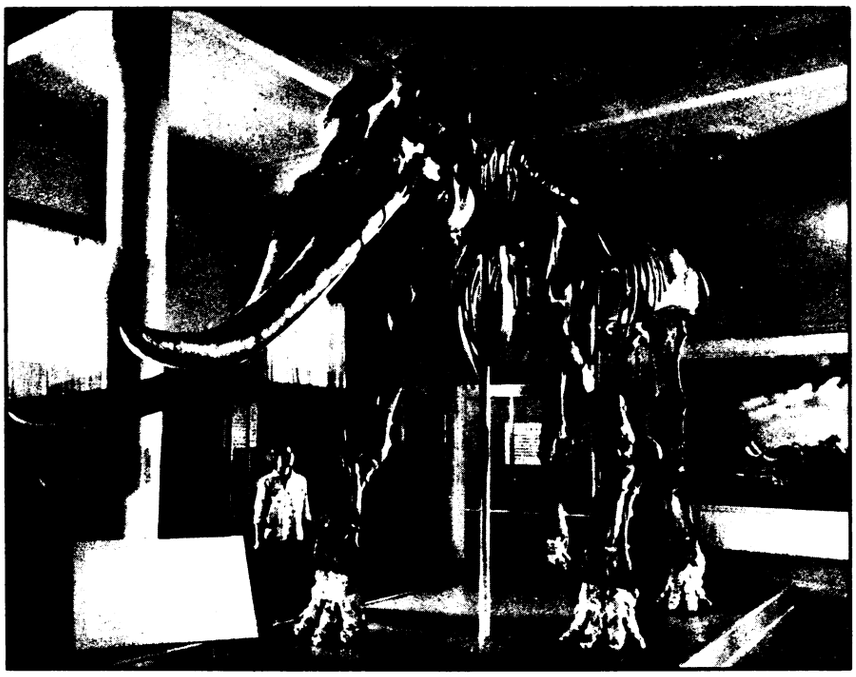
Chinese reveal the perfect stegodon



The People's Republic of China is taking full advantage of the Western world's hunger for knowledge of the Orient. The Chinese archaeological exhibition (SN: 12/28/74, p. 395) drew more than 700,000 spectators at the National Gallery of Art in Washington. This was the largest crowd in the last 25 years to see any special exhibit there—including the Mona Lisa. And the Chinese apparently intend to keep up this interest by keeping the information (or some of it) flowing. China Features, a Peking news service, recently released a story on "the most perfect known stegodon skeleton found anywhere thus far."

The stegodon is an extinct elephant that lived about two million years ago. Stegodon fossil remains have been discovered in regions north of the equator in northeast Africa and Asia. The first such find came in the 1850's, but it and other finds have been limited to cranial bones, teeth or fragments of limb bones.

The Chinese find, made in 1973 along the Yellow River in the Kansu province, consists of an entire skeleton. Members of a commune discovered the "dragon's bones" while collecting sand. Scientists from the Institute of Vertebrate Paleontology and Paleonanthropology of the Chinese Academy of Sciences investigated. Their excavation uncovered a four meter tall, eight meter long skeleton complete in every part and connected in all its limbs. The Yellow River stegodon appears to have died by sinking into a quagmire while drinking from a river or lake. Reinforced with iron, it now stands in the Peking Museum of Natural History. □

Search for laser signals from elsewhere

As radio messages from extraterrestrial civilizations go, 1,420 megahertz is a natural. It is the natural resonant frequency of hydrogen, most abundant element in the universe, and outward-looking researchers feel that it would thus be a natural choice on which to send messages, since each party—sender and receiver—might reasonably expect it to occur to the other. Several listening attempts in recent years have concentrated on 1,420 MHz (a wavelength of roughly 21 centimeters).

Yet the same factor that makes it a good choice, the prevalence of hydrogen, also makes it a poor one. It's noisy. Hydrogen-laden stars everywhere are burbling out their own natural 1,420-MHz static (among other varieties), and interstellar hydrogen, the very stuff of space, absorbs and emits radiation at the same frequency.

Herbert Wischnia, a consulting engineer and president of Sonitrol/Worcester Corp., Worcester, Mass., is trying a different approach. Instead of listening for radio beeps, he is looking for flashes of ultraviolet laser light. "Ultraviolet laser beacons," he says, "offer the potential of high power combined with high efficiency," making them "an efficient and logical electromagnetic radiation source, which could be used by an extraterrestrial community to announce their presence to us."

In addition, there is far less static. "Stars with a temperature near that of our sun," Wischnia says, "radiate very little energy in the vacuum ultraviolet, so that the telescope receivers are not 'blinded' by natural stellar radiation."

There is one considerable obstacle: Ultraviolet radiation is absorbed by earth's atmosphere, so that very little of it reaches the surface. Wischnia's solution is to conduct his search from orbit, using the Princeton University ultraviolet telescope aboard Copernicus, the Orbiting Astronomical Observatory satellite.

His targets are three stars, each about 11 light-years from earth. Two of them—Epsilon Eridani and Tau Ceti—were also the objects of the first official search for radio signals from extraterrestrial civilizations, Project Ozma in 1960. The third star is Epsilon Indi.

Last Novermber, the telescope was trained on Epsilon Eridani during 14 of the satellite's orbits around the earth, while the spectrometer attached to the telescope scanned the ultraviolet spectrum. The data are now being carefully analyzed for pulses, or peaks, spaced at what could be intelligently controlled intervals. The other two stars will be scanned this summer and fall.

The probabilities of success are small, or at least the uncertainties are so great as to make the probabilities unguessable, but then so is the sample. "While it is possible to speculate on the success of detecting extraterrestrial laser signals on the very first attempt," Wischnia says, "it is more realistic to plan for a systematic laser and radio search for the next 100 years." □

Taking a look at X-ray sources

An observatory believed to be the first ever dedicated solely to studies of X-ray sources has just joined the complex of facilities at Kitt Peak, Ariz., despite the fact that stellar X-rays cannot be seen from the ground. Operated by a consortium consisting of the Massachusetts Institute of Technology, Dartmouth College and the University of Michigan, the McGraw-Hill Observatory will receive data from facilities that *can* see stellar X-rays—earth-orbiting satellites—and use it to guide a search for associated, optically-visible effects at the same locations.

The observatory, which took its first look at the sky on May 2, was rushed to completion in order to be ready for the latest of the satellites that will feed it: SAS-3, the third Small Astronomy Satellite, launched May 7. It was the first SAS which began the systematic study of the X-ray sky in 1970, promptly raising the number of known X-ray sources from 36 to about 200, including the discovery of X-ray pulsars as well as X-ray emissions from Seyfert galaxies and quasars. It re-

vealed previously unknown binary star systems identifiable only by X-radiation, and took the first measurements suggesting that "black holes" may be real.

SAS-3 was successfully launched into a near-circular equatorial orbit, about 513 kilometers above the earth, although National Aeronautics and Space Administration controllers at Goddard Space Flight Center in Maryland had to struggle for days after launch to cancel out a two-degree wobble caused by a stuck motion-damper in the spacecraft. Even without SAS-3, however, astronomers at McGraw-Hill Observatory will have guidance from a variety of other X-ray watchers, including the Dutch ANS satellite, Britain's Ariel V and even the still-active SAS-1, better known as Uhuru.

Heart of the observatory is a 1.3-meter telescope, which was transported to Arizona from the University of Michigan at Ann Arbor. X-ray observations from the satellites will be sent to MIT in Cambridge, Mass., where the data will be converted into positional coordinates and passed on to the observatory. There consortium scientists will use the coordinates to aim the telescope. Because the Kitt Peak location will put the instrument some 6,300 feet above sea level, consortium director W. Albert Hiltner, chairman of the University of Michigan astronomy department, says that the telescope should be 10 times more efficient than it was at Ann Arbor.

High-speed delivery of data from SAS-3 (from the satellite by radio to Goddard, by data link from there to MIT and thence by phone lines to Kitt Peak) is particularly important, the researchers feel, because it will enable them to use the observatory to study transient phenomena spotted by the satellite.

The satellite's observations are divided into four experimental areas. A galactic monitor experiment directed by Hale V. D. Bradt of MIT (he is also the MIT representative in the observatory consortium) is designed to locate X-ray sources in our Milky Way galaxy to within 15 arc-seconds—equivalent, says NASA, to spotting a basketball from four kilometers away. George Clark, also of MIT, plans to measure the absorption of X-ray background radiation due to interstellar matter. A third experiment, conducted by MIT's Walter H. G. Lewin, will focus exclusively on Scorpio X-1, the first celestial X-ray source ever discovered other than the sun. The most distant sources of all will be sought by Herbert W. Schnopper of the Smithsonian Astrophysical Observatory, who will be hunting X-ray emitters outside our galaxy. His observation plan calls for four months of looking in the Virgo Cluster of galaxies, three months in the Andromeda galaxy and three months in the Large Magellanic Cloud.

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Contaminants: Coliforms in cauliflower?

Food bacteria are like everybody else—put them in an unpleasant environment and they experience stress. This understandable reaction creates some problems for food processors and handlers. When a food is chilled, heated, salted, irradiated or otherwise processed, bacteria, often the bulk of those in the food, become stressed and will not show up during routine testing. Only the nonstressed bacteria will grow on the agar test plates. It is, therefore, difficult to get a true picture of total contamination.

Two microbiologists from North Carolina State University, M. L. Speck and Bibek Ray, have developed a culture technique that rejuvenates the stressed bacteria so they can stand up and be counted. They reported it at the meeting of the American Society for Microbiology. The technique measures coliform bacteria such as *Escherichia coli* and *Aerobacter aerogenes*. These microorganisms occur in many foods and don't cause much of a health problem at low levels. But high levels can indicate abusive or unsanitary conditions, such as dirty equipment, improper food storage and fecal or other contamination.

By using what they call their repair-recovery method, the team plates and incubates food samples a bit differently, the stressed bacteria are able to recover and grow, and the team detects much higher total coliform levels. Testing various kinds of frozen dairy, nondairy and refrigerated foods such as ice cream and seafood, Speck and Ray found total coliform counts between three and 100 times higher with the repair-recovery method than with their conventional tests.

This kind of finding tends to cast suspicion on the food industry, but it's not really warranted, says FDA's Director of Microbiology, J. C. Olson Jr. Industry is well aware of the stressed bacteria problem and coliform contamination in general. Also, the FDA has not established standards for maximum coliform counts in any foods except milk. (There are such standards for pathogenic bacteria.)

The FDA is, however, moving toward the establishment of specific microbial limits for processed foods above which a product would be rejected. Culture methods, such as repair-recovery, will have to be developed for many types of bacteria. The Speck-Ray method could not be used as is because it does not reveal significant differences between stressed and nonstressed coliforms in some foods. "When we are convinced that a particular method will recover most if not all of the stressed organisms and is not so elaborate that it is impractical, we will use it," Olson says. □

Let's drink to a longer life

Alcohol kills: Drunk drivers are responsible for thousands of deaths each year; a large number of suicides and homicides are committed under the influence of alcohol; liver diseases and other physiological problems are related to alcoholism. It would seem natural to conclude that a nondrinker outlives a heavy drinker. Statistically, that is the case; surprisingly, however, moderate drinkers tend to outlive both heavy drinkers and teetotalers (about 30 percent of the national population). This is the finding of Robin Room and Nancy Day of the School of Public Health at the University of California at Berkeley.

The researchers surveyed the drinking habits and mortality rates of more than 6,000 people during periods ranging from 4 to 11 years. The results of the study will be presented in June as part of the Department of Health, Education and Welfare's second special report to Congress on alcohol and health.

During the time of the study, twice as many abstainers as moderate drinkers died. Three times as many heavy drinkers died. Frequent heavy drinkers were defined as people who drink more than five drinks at least four times a week. They represented about seven percent of the sample, says Room, but only about three or four percent of the population as a whole. Moderate drinkers consumed alcohol once a day or less. These findings apply mainly to men between the ages of 21 and 60. Women apparently follow the same pattern, but not enough women were represented in the various drinking groups to make valid conclusions.

Data from this study do not sufficiently explain the apparent link between drinking patterns and mortality. Such factors as lifestyle, social class and even cigarette smoking (heavy drinkers tend to be heavy smokers) may all have important effects on death rates of various types of drinkers.

The overall conclusion that can be drawn at present, however, is that there may be a threshold for drinking below which mortality is little affected. The classical "Anstie's limit," the researchers suggest, seems to reflect a safe amount of drinking that does not increase the risk of early death. Named for the British physician who prescribed it for his patients who wanted to drink and stay healthy, Anstie's limit calls for the equivalent of one and one half ounces of absolute alcohol per day; i.e., three ounces of whiskey, half a bottle of wine or four glasses of beer. The alcohol is to be taken only with meals and whiskey is to be well diluted. □