

But they indicate that oral contraceptives, along with sexual relationships early in life, sexual promiscuity and pregnancy, may heighten the risks of uterine cancer. The NIH is now launching a study of 30,000 women in 10 regions to sort out these risks.

Even more muddling is mounting evidence that oral contraceptives may prevent breast and uterine cancer. At a meeting last week in Washington of the International Confederation of Midwives, R. T. Ravenholt of the Agency for International Development described some of this evidence. In the United States, where oral contraceptives were first introduced and used in large measures, mortality rates for cancer of the uterus have decreased rapidly and progressively during the first decade of pill use, especially among younger women. Several clinical-epidemiological studies show women with breast tumors, both benign and malignant, to have had less prior experience with oral contraceptives than matched control patients without such disease. One of the largest and most recent of these studies is reported by Martin P. Vessey and Richard Doll of Oxford University, England, in the Sept. 23 *BRITISH MEDICAL JOURNAL*.

Obviously even a "miracle drug" like the birth control pill would be hard put to both cause *and* prevent breast and cervical cancer in women. Douglas Janss of the National Cancer Institute says the situation is not as hopeless as it seems. One problem, he says, is that investigators have used different animal models with different sensitivities to cancer, which may or may not approximate human sensitivity to cancer. Another is that they have used closely related hormones, like the estrogen class, with subtle, yet divergent biochemical specificities in target tissue. And the studies have used diverse, not-always-comparable approaches. The only way to obtain a conclusive answer to the question of whether the pill can cause or prevent cancer in humans, he declares, is to design better programs for testing compounds in animals and patients. The NCI is presently working up such programs. □

MMPI questions

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Stonehenge: A calendar or just a crematorium?

Between 2000 and 1500 B.C. an impressive ceremonial temple—Stonehenge—was erected in Great Britain. Archaeological reconstruction of the site shows that the monument consisted of a circle of immense, finely tooled stone archways surrounded by a ring of 56 equally spaced Aubrey holes (named for their modern discoverer). Looking out from the center of Stonehenge, the Heel Stone can be seen. It marks on the horizon the point of sunrise at the summer solstice. This fact, and the precisely proportioned placement of the stones and holes, has led archaeologists to presume that the monument had some great astrological significance to its Neolithic architects.

In 1963 Gerald S. Hawkins of Boston University and the Harvard-Smithsonian Observatory suggested that the Aubrey holes provided a system for counting the years of a 56-year cycle of eclipses. "Perhaps," he said, "cremations were performed in a particular hole during the course of the year, or perhaps the hole was marked by a movable stone."

Now Robert R. Newton and Robert E. Jenkins of the Applied Physics Laboratory of Johns Hopkins University in Silver Spring, Md., say the Aubrey holes were probably used to count months, not years, if they were used as counters at all.

The physicists arrived at this conclusion as an off-shoot of a project in which they were attempting to predict the orbits of manmade satellites. One method of verifying such data is to apply it to the moon and then predict backward and check the results against ancient observations of lunar and solar eclipses. Doing so, the researchers found a 111- or 112-month cycle coinciding with the position of the setting of the summer new moon. They explain in the Oct. 27 *NATURE* that the Stonehengers "could easily have made these

predictions with the use of a counting circle of 111 holes. If they preferred not to build a circle with this many holes, they could have used a circle of 56 holes just as easily." Two times around the circle would predict the summer new moon.

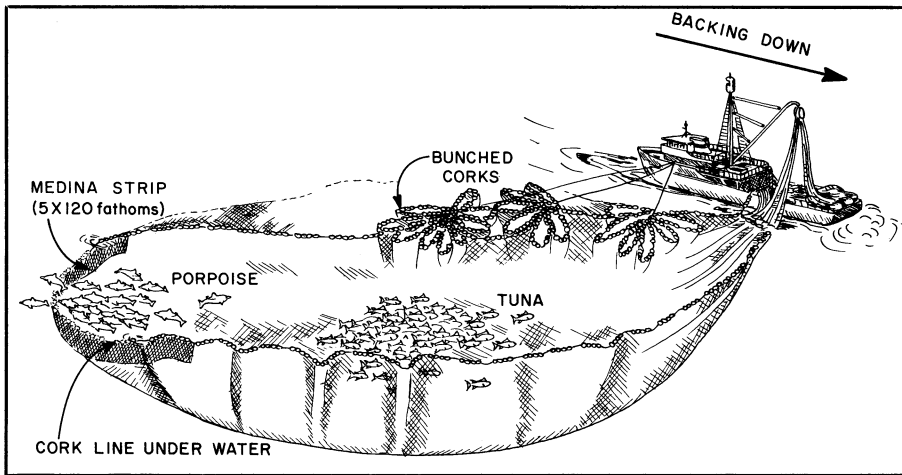
Jenkins says the lunar calendar is more likely than the eclipse predictor, but admits that it is just as speculative a hypothesis. "In fact," he says, "we are starting to conclude that you could find support for or against almost any theory." The Heel Stone may have been used to mark the summer solstice but the Aubrey holes may have no astrological significance at all. As an alternate explanation, the researchers say perhaps there were 56 families, clans or social units who built Stonehenge and who were entitled to dig one of the Aubrey holes and use it to inter cremated remains. □

Glomar's Leg 26 finds old Indian Ocean sediments

Scientists on Leg 26 of the Deep Sea Drilling Project have returned to port with the oldest sediments yet recovered from the Indian Ocean, evidence about the identity of a suspected continental fragment and an outline of the history of two ridges.

The Glomar Challenger docked at Fremantle, Australia, Oct. 30 after a two-month, 5,580-mile excursion through the Indian Ocean. The ship left Durban, South Africa, Sept. 6 and its scientists drilled at nine of the ten sites planned.

The Leg 26 researchers, led by Bruce Luyendyk of Woods Hole Oceanographic Institution and Thomas A. Davies of Scripps Institution of Oceanography, drilled at two sites in the Wharton basin, west of Australia. One produced sediments 101 million years old. The other site, farther south, contained even older sediments—105 million years. On the Naturaliste Plateau southwest of Australia they found sedi-



Dept. of Commerce

Backing down with a Medina net: One way to free porpoises but keep tuna.

ments more than 105 million years old. Luyendyk and Davies believe these sediments "could be among the earliest laid down in the juvenile ocean."

The Indian Ocean also contains several features believed to be fragments of continental crust broken off from the main continents and then submerged. Several attempts have been made to drill into these features. The Leg 26 scientists did drill into one suspected microcontinent: Broken Ridge, which borders the Wharton basin. But the cores suggested that instead of being a piece of continent that had submerged, the ridge is probably a piece of ocean floor that has been uplifted. Limestones from the top of the ridge had been uplifted, tilted and exposed above sea level, and then eroded before subsiding again. The researchers believe the movements of the ridge were related to the separation of Antarctica from Australia.

The Naturaliste Plateau had a similarly upsetting history. The plateau was once in deeper water than it is today. It was uplifted about 90 million years ago, and then uplifted more, possibly above sea level, between 80 million and 5 million years ago. It has since subsided.

Drilling on the Ninetyeast Ridge shows it to be composed of piles of volcanic rocks laid down in shallow water and then gradually submerged. The sediments are older and more deeply submerged at the northern end of the ridge than at the southern end. "Thus we can visualize the ridge as having once been a chain of islands, . . . with active volcanoes at the southern end and a chain of low, submerged, older, extinct volcanoes extending northward away from the volcanic center."

Leg 26 was the Glomar Challenger's fifth cruise in the Indian Ocean, and it won't be the last. Leg 27, in the southeastern Indian Ocean, is already under way. □

Some modest proposals to save the porpoises

The Marine Mammals Protection Act forbids U.S. fishermen to kill porpoises, but this has been small comfort to the porpoise. The act does not apply to accidental killing of marine mammals, and it is by accident that U.S. fishermen do the greatest harm to porpoise populations.

In a new report endorsed by Secretary of Commerce Peter G. Peterson, a committee of National Oceanic and Atmospheric Administration scientists estimates that upwards of 200,000 porpoises were accidentally killed by U.S. tuna fishermen in 1971. Porpoises and tuna tend to travel together, and tuna fishermen often spot tuna schools by looking for porpoises. The problem arose in the early 1960's when the tuna fleet began to convert from pole-and-line fishing to use of large purse seines. In netting the tuna, the fishermen also capture large numbers of porpoises, which become entangled in the net and drown.

The committee notes that because so little is known about the size and composition of the porpoise population, it could not judge whether these accidental deaths threaten the existence of the species. But, said Peterson, "When one porpoise dies in a tuna net, that is one death too many."

One possible solution would be to abandon use of nets and return to live bait fishing. The panel notes this would be unacceptable to the industry; most U.S. fishermen would probably simply change their national base of operation. Other nations are involved in tuna fishing, and the committee believes any solution must be acceptable to all fishing nations.

Some studies have been done on ways of separating tuna from porpoises. They range from attempts to design gates in the nets that would al-

low porpoises, but not tuna, to escape, to using underwater broadcasting of killer whale sounds to scare porpoises away. But these efforts have had limited success. To date, the most promising solution has been the Medina panel. Devised by a tuna-boat captain, Harold Medina, in 1970, the Medina panel is simply a strip of finer mesh netting that, when incorporated in tuna seines, makes it more difficult for porpoises to become entangled. The committee recommends that all tuna seiners be encouraged to use a Medina panel. Some 50 boats are already using them, and all new nets incorporate a Medina panel.

Another recommended step is more efficient use of "backing-down" techniques. Tuna and porpoise swim at different depths. Backing up the tuna boat to sink part of the net's floatline below water level gives porpoises an escape route. The problem is getting the porpoises to use it. Also, the backing-down technique requires some tricky maneuvering. Though the porpoise committee recommends programs to teach fishermen to use the backing-down technique more effectively, it also urges that research be begun on alternative methods of freeing porpoises, with an ultimate goal of bringing porpoise losses down to zero.

The committee estimates that programs to study porpoises and devise new fishing techniques would cost about \$1,307,400 for fiscal 1974. □

Traversing the asteroid belt without incident

Pioneer 10 is now half-way through the asteroid belt on its way to Jupiter (SN: 6/17/72, p. 391). If all systems continue to operate, the spacecraft will pass closest to Jupiter on Dec. 3, 1973.

Two instruments on board, the gas-cell experiment and the asteroid-meteoroid telescopes, have been measuring interplanetary particles since the craft left earth. One surprise has been that the rate of smaller particles one-tenth to one-hundredth millimeter in diameter has not increased since the craft entered the asteroid belt. This indicates, says William Kinard of NASA's Langley Research Center, that earth and Mars are not sweeping out particles in their vicinity of space as had been expected. As of this week, 91 penetrations of the 234 cells had been recorded.

But the number of larger-sized particles is greater than expected. The telescopes have seen between one hundred and two hundred particles ranging in diameter from one-tenth millimeter to one millimeter. One increase in incident rate occurred as the craft passed through one of two areas in the belt of maximum particle density. □