Huge meteorite crater under polar ice?

Sixteen years ago, scientists on an American expedition across Wilkes Land, Antarctica, discovered evidence of a huge valley underneath the mile-thick polar ice. The suggestion was made shortly thereafter that the area might be the site of a huge meteorite crater, but funds could never be raised to go back and check. Now, a reassessment of the data, in light of what has been learned since then about craters on the moon and Mars, has renewed speculation and has led to national headlines proclaiming the site as the possible location of the biggest meteorite crater on earth.

The region in question—some 250 miles inland on the side of Antarctica closest to Australia (140°E, 71°S)—had originally attracted attention because of a broad depression in the polar ice, which is particularly broken up in the area. Geophysicists John G. Weihaupt and Franz VanderHoeven measured gravity changes as they moved over the depression, to determine the amount of mass underneath the ice. These measurements, together with graphs of seismic waves set up by exploding dynamite, established a contour of the underlying terrain—a broad valley some 150 miles wide and half a mile deep.

When a colleague of Weihaupt's at the University of Wisconsin's Geophysical and Polar Research Center, Richard A. Schmidt, saw the data, he recalled that a meteorite crater had been postulated for the area by yet another scientist, Virgil E. Barnes, in order to account for mysterious pieces of fused rock scattered across southern Australia. Called tektites, these glass-like spherules the size of a walnut were, in one hypothesis, thought to have been splattered onto the earth from the impact of a large meteorite on the moon. But Barnes said that an impact on the near edge of Antarctica would account for the Australian tektites just as well. In 1962, Schmidt published his idea that the newly found valley might be the expected crater (SCIENCE 138:443, 1962), but when no money could be raised for a return expedition the suggestion fell into obscurity.

Weihaupt, now the associate dean of science at Purdue University's Indianapolis campus, has brought up the subject again, encouraged partly by two discoveries made during the intervening years through the Apollo space program. First, the contours of undisturbed meteorite craters on the moon have been studied and shown to differ substantially from those of eroded craters on earth. Second, the composition of material from the moon has proven unlike that of tektites, thus favoring the terrestrial hypothesis.

In a paper delivered Aug. 22 at the 25th International Geological Congress in Australia, Weihaupt presented his analysis of the rim structure and dimensions of the valley discovered in Antarctica, compared to those of extraterrestrial craters, and found a fairly close match. (The crater would have suffered little erosion under the ice.) This and other data led him to conclude that Schmidt had been correct in hypothesizing a meterorite crater at this location. If the impact indeed threw up the material that became the Australian tektites, their age—600,000 to 700,000 years—would date the event.

Unfortunately, the press release issued by Purdue with Weihaupt's approval failed to credit Schmidt and Barnes with having originated the crater idea, and SCIENCE NEWS has learned that the JOURNAL OF GEOPHYSICAL RESEARCH has held up publication of Weihaupt's paper for the same reason. Also, Weihaupt released a good deal of additional information that has not yet been subjected to the scrutiny of scientific publication, including a detailed characterization of the meteorite as being 2.5 to 3.75 miles across, weighing 13 billion tons and hitting the earth at 44,000 miles per hour. Such a meteorite would be by far the largest known to have struck the earth, and would have caused considerable disturbance. Weihaupt suggests, for example, that a global cooling trend might have resulted from the dust kicked up.

Weihaupt told SCIENCE NEWS that Schmidt and Barnes will be fully credited for originating the idea of an Antarctic meteorite crater when his present paper is finally published, and that a future paper will present the calculations of the meteorite's size. □

Leg 50 goal: Deepest ocean hole

The research ship Glomar Challenger has drilled a lot of deep holes in the ocean floor during the eight years of the Deep Sea Drilling Project. But none match the depth of penetration to be attempted during the upcoming Leg 50 of the project. Scientists on board the vessel hope to penetrate some 3,000 meters (10,000 feet) of seafloor off the northwest coast of Africa. This would be well over half again as deep as the deepest hole previously drilled into an oceanic basin, the 1,740 meters (5,709 feet) accomplished by Leg 47 of the DSDP earlier this year off Portugal (SN: 6/5 & 12/76, p. 357). Leg 50 starts Sept. 12, when the ship departs the Canary Islands for the drill site off the coast of Morocco.

The scientific goal is to obtain the oldest sediments from the very earliest beginnings of the fledgling Atlantic Ocean, when it was still a newly opening narrow trough like the Red Sea is today. The sediments would date back to the time when the young basin was receiving its first hesitant incursions of seawater. Indirect evidence indicates the presence in the basin of evaporites, a sign that the shallow seawater had evaporated one or more times before the new ocean fully began to fill.

The nearly two-mile depth of the anticipated hole is necessary to penetrate the thickness of sediments that have accumulated over the roughly 180 million-years that the Atlantic has been spreading.

The oldest sediments previously recovered from deep oceanic basins were found in the deepest parts of the North Atlantic on both the American and the African sides during previous cruises of the Glomar Challenger. These sediments were dated at about 155 million years. Geophysical studies since then have determined that older sediments underlie the basins near the continental margins. It is these that Leg 50 is seeking. □

Chemical toxins in mothers' milk

Preliminary findings by the Environmental Protection Agency indicate undesirably high levels of polychlorinated biphenyls (PCBs), a group of industrial compounds, in mothers' milk. From what will ultimately be a nationwide study, the EPA has discovered this chemical contamination in samples obtained from 10 states along the eastern seaboard. Since 1966, PCBs, used as plasticizers, electrical insulators and a wide variety of other uses, have been discovered in foodstuffs, rivers, wildfowl, and the human body.

A special meeting was held recently at the Department of Health, Education and Welfare to discuss what the meeting's chairman calls "this potentially serious problem." Among the states so far studied, the highest average levels of contamination are found in North Carolina, Maryland and New Jersey with 2.6, 2.5 and 2.3 parts per million of PCBs, respectively. Studies with rhesus monkeys found high mortality and disease including that of the brain and nervous system in offspring nursed by their mothers with milk that often contained 3 ppm PCBs.

Although the sole manufacturer of PCBs, the Monsanto Co., sharply curtailed its sales in 1971, millions of pounds of imported PCBs enter the United States each year. A bill on toxic substances that could halt any such future imports is pending before Congress.

The viciousness of PCB contamination derives from its chemical stability. From the environment, the body's fat tissue absorbs and accumulates the PCBs, which will remain there for years. The Food and Drug Administration has tentatively proscribed that the PCB contamination of whole milk not exceed 2.5 ppm. Officials are awaiting the confirmation and extension of current results before considering any other remedial action. □