Decay-resistant protons in Ohio

Matter as we know it is based on protons. They are—or used to be—the stable core of every atom. In the particle physics of yesteryear protons were absolutely stable. The new Grand Unification Theories (GUTs), which are the next step in unifying physics beyond the Weinberg-Salam-Glashow theory (see p. 84), predict that protons, too, will be subject to radioactive decay. Several experiments are now looking for proton decay, and two of them, one in the Kolar Gold Fields in India and one under Mont Blanc on the French-Swiss border, have reported possible candidates.

The first results of an American experiment, located 2,000 feet under Lake Erie in a salt mine near Cleveland were reported at the recent Orbis Scientiae meeting in Miami by Frederick Reines of the University of California at Irvine. The results of 80 days of running are negative, and that is in conflict with the other two experiments and with theory.

This experiment, called the Irvine-Michigan-Brookhaven collaboration, uses a huge detector, a cube of water about 21 meters on a side outfitted with 2,048 photomultiplier tubes to record Cerenkov light emitted by charged particles moving through the water. The detector is maintained by divers, perhaps the first particle physics detector with such a service.

No events corresponding to the expected decay mode, proton into positron and neutral pion, have been found. "If Kolar and Mont Blanc were [this mode]," says Reines, "IMB would expect many such events." The null result also permits calculation of a lifetime for the proton that is very much greater than that predicted by the simplest GUT theory, the so-called minimal SU(5). If the result stands after further running time (now in progress), it could mean that minimal SU(5) will have to be thrown out in favor of another GUT theory or maybe even no GUT theory at all. —*D.E. Thomsen*

IR satellite is up and looking

The first observatory built to survey the entire sky at infrared wavelengths was successfully transported on Jan. 25 to its intended location — not beneath a mountaintop dome, but in orbit around the earth. The Infrared Astronomy Satellite (IRAS) consists essentially of a single telescope, its sensitive detectors cooled by superfluid helium to only 2°C above absolute zero so that they can spot the faint heat given off by such objects as embryonic stars, whose inner fires may not even have ignited.

The satellite's control center is at the Rutherford Appleton Laboratory in Chilton, England, from which scientists transmit instructions every 12 hours to guide the device in its work. The "eye" of IRAS was opened Jan. 31, when a protective lid over the telescope was jettisoned, and early reports were that it was "seeing" just as planned. An initial test-scan across the plane of earth's Milky Way galaxy readily revealed a large number of IR sources, and the satellite is expected to detect many that are so far unknown.

A major challenge in designing the telescope system was to maintain the supply of helium coolant, whose controlled leakage will determine the satellite's hoped-for seven-month operating life, and the leak rate appeared to be "nominal." The only problem noted in the first week after launch was an out-of-tolerance signal from the on-board attitude-control system, which would sometimes cause IRAS to switch itself to a "safing mode" in which it would stop its surveying and point at one fixed position. Project officials were still attempting to understand the situation early this week, but they had already developed a software modification that seemed to be keeping the "glitch" from affecting the planned observations. The regular observing schedule was expected to begin as early as Feb. 8. —*J. Eberhart*

Microorganism suspect in pregnancy disease

Toxemia of pregnancy — a condition that is estimated to affect 12 million pregnancies worldwide each year — has been linked to a recently reported microorganism, say researchers at Loyola University Medical Center in Chicago. They have identified an organism, which they call *Hydatoxi lualba,* in placental tissue and circulating blood of women with toxemia. In subsequent experiments with pregnant laboratory animals, concentrates of human placenta containing the organism triggered symptoms like those of toxemia.

Silvio Aladjem and Judith Lueck see their recent findings as the first step in finding a cure. "All current medical treatments [for toxemia] attempt only to minimize the symptoms of the disease," Aladjem says. The symptoms can include retarded growth of the fetus and maternal hypertension, swelling and convulsions; the most severe cases end in death.

Aladjem estimates that toxemia causes 5 million deaths — mostly fetal, but some maternal — annually around the world, including 100 women and up to 24,000 fetuses and infants in the United States. "Our ultimate objective is to provide the basis for a worldwide campaign to eradicate the disease, similar to the global campaign to wipe out smallpox many years ago," Aladjem says.

In the Jan. 1 AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY, Lueck, Aladjem and John I. Brewer describe the microorganism they believe causes toxemia. It is a worm-like organism, about 1 millimeter long, that shares some characteristics with such parasites as hookworms and tapeworms.

"We had a clue to its existence from time-lapse photography of placental cells growing in culture," Lueck told SCIENCE NEWS. "We saw small forms moving around." The scientists then modified a staining technique for protozoa, in order to visualize *Hydatoxi* in placental and blood samples. With some further modification, the technique might be practical for diagnostic purposes, Lueck says.

The scientists have detected the organism in blood samples from toxemic patients and their husbands and from the staff working on the project. When concentrates prepared from placentas of patients with toxemia were injected into mice prior to mating or into pregnant beagles, symptoms resembling toxemia resulted. The beagles showed progressive hypertension, protein in the urine, and liver dysfunction, as well as fetal death. Placental concentrates from women without toxemia did not cause these symptoms, and the concentrate with the microorganism did not affect beagles that were not pregnant. The microorganism also was recovered from pups of the beagles with the experimentally induced toxemia.

Aladjem et al./Am. J. of Ob. and Gyn.

Hydatoxi lualba: *Adult and perhaps egg.*

Others studying diseases of pregnancy greeted the report with surprise and skepticism. "My general reaction is that an infectious etiology of toxemia is low on the list or not on the list at all among those studying toxemia," says Donald NcNellis of the National Institute for Child Health and Development. "This is a very revolutionary kind of report and people will be very cautious in accepting it."

"I've not seen organisms like those described in the articles," says Charles Sander of the Michigan Placental Registry at Michigan State University, but he says the staining techniques the Loyola scientists used are quite different. He says, "I think what these authors did needs to be repeated at other centers and in other parts of the country." —*J.A. Miller*