

plosion. A black hole of that mass would have a radius of only a few angstroms, no more than the size of a few atoms of ordinary matter. Coming down through the atmosphere it would have caused a shock wave and a fiery blue column (such a column was seen by witnesses of the event). The shock wave and heat would have caused the damage. In spite of the damage it does in the atmosphere, such a black hole would pass through the rock of the earth without any interaction because the forces that bind the rock together are much stronger than the gravitational interaction between the rock and the passing black hole.

The black hole would have come out of the earth in the North Atlantic in the region between 40 and 50 degrees north and 30 and 40 degrees west. As it emerged it would have caused a shock wave in the water and raised a column of water at the surface. The next thing that Jackson and Ryan want to do is check meteorological and other records to see if any such disturbance was recorded in the Atlantic at that time. □

Money and ethics in biomedical research

Biomedical research has recently been faced with several controversial issues that may soon be resolved. The questions, not surprisingly, have to do with money and ethics. In May the House, and last week the Senate, passed a bill (H.R. 7724) that would provide money for the training of young researchers and set up a commission to investigate and answer ethical questions.

The House version of the bill, which goes to conference next month, states that "National Research Service Awards [previously cut back by the Administration] should be the key element in the training programs of the National Institutes of Health and the National Institute of Mental Health." For this purpose, the bill would authorize more than \$200 million per year (SN: 7/7/73, p. 386).

Both versions of the bill call for an end to research on live, aborted human fetuses (SN: 4/21/73, p. 253). There is less concurrence, however, on another issue, the use of psychosurgery (SN: 5/12/73, p. 310). If this problem is not settled in conference, the bill provides an alternate solution. It calls for the establishment within the Department of Health, Education and Welfare of a National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. The 11-member commission would set ethical standards for all federally funded research. □

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A 9,000-foot dive to watch the earth evolve

The Mid-Atlantic Ridge runs almost from pole to pole along the ocean floor, a double row of towering mountains with a vast canyon between them. The ridge and others like it are the markers of the living earth, for there the great plates of the planet's crust are being continually thrust apart to make room for new material thrust upward by the seething cauldron beneath the earth's outer layer. The ridge is a window to the bowels of the globe, and now, for the first time, man has been there.

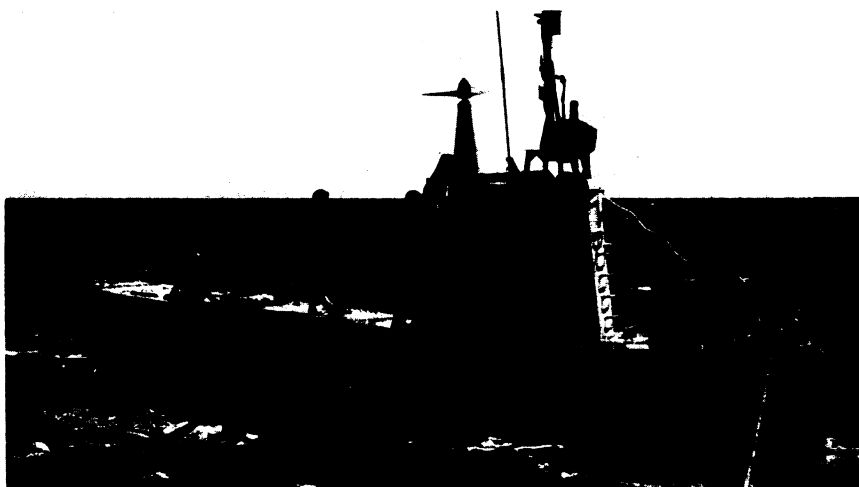
For two years, Project FAMOUS—the French-American Mid-Ocean Undersea Study—has been in preparation. Ship-borne and towed instruments gathered magnetic, seismic and refraction data, made sonar maps of the bottom, took pictures and dredged up samples. Finally, on Aug. 2 of this year, the French bathyscaphe *Archimède* made its first descent, directly over the central valley of the ridge some 220 miles from the Azores (SN: 8/18/73, p. 104).

Before heavy seas drove the explorers away on Sept. 7, seven dives had been made to the floor of the rift some 9,000 feet below the surface. A prize of the final dive was a sample, weighing less than 10 pounds, of fine-grained basaltic rock still bearing the black, glassy traces of a geologically recent volcanic origin.

Due to the constant reshaping of the ridge area by the forces of the evolving earth, the terrain was a turmoil of crags and obstacles, making a tricky task for the pilot of the lumbering bathyscaphe. To be sure of where the data were coming from, *Archimède* was equipped with a precise navigation system that automatically kept a record of its path. This record, along with hundreds of photographs and television images—and the precious few samples—will be the subject of a week-

Archimède prepares for 9,000-foot descent to the Mid-Atlantic Ridge.

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Seafloor lava is earth's renewal.

long meeting in France in October among the six scientists who rotated during the mission. After that the detailed study will begin.

Archimède, like the first manned spacecraft, was hardly an ideal vehicle for research—but it worked. "It's a large boat," says Robert Ballard of the Woods Hole Oceanographic Institution, who spent eight hours in the rift zone on the second dive. "It's 53 feet long—it can't be taken out of the water on the scene, it's got to be towed, it's a logistical nightmare and it's difficult to fix." These are expected problems with bathyscaphes, ungainly spheroids burdened by tumorous ballast tanks filled with gasoline. "But," Ballard says, "they were the first ones to come along that could go deep."

Next summer, however, FAMOUS will swing into high gear. Along with the bathyscaphe are to be two more maneuverable, better instrumented submersibles, both now in the final testing stages. Jacques Cousteau's brainchild, the SP 3000, will be operated by France's National Center for Ocean Exploration, and Woods Hole will operate the U.S. Navy's *Alvin* (which found the notorious missing hydrogen bomb off Spain in 1966), just fitted with a new titanium hull to double its operating depth to 12,000 feet. The only other craft capable of reaching the depths of the rift valley, says Ballard, is Trieste, another French bathyscaphe.

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