The scandal broke on March 27. James Martin, an assistant in Summerlin's lab, discovered that some of the black patches on white mice looked as if they had been painted on instead of being bona fide skin grafts from black mice. The grafted skin, of course, was supposed to have been cultured beforehand according to Summerlin's technique and hence to have taken in the white mice with no rejection problem. The assistant found that the patches would wash off with alcohol and reported his finding to other scientists in the lab. They told Good, who relieved Summerlin temporarily of his duties and had a committee at Sloan-Kettering look into the charge.

The Committee now reports that Summerlin falsified not only those results, but some others as well—that he successfully transplanted corneas from one species to another after culturing them. Summerlin admits that he did color the skin of two mice with a pen to convince Good it was possible to transplant tissue to genetically unrelated animals without rejection. But he says that he did the coloring in a state of accute depression resulting from an overwhelming work load, the belief that Good had lost faith in his research and the impersonal, cloistered atmosphere of Sloan-Kettering. However, he denies that he misrepresented the cornea results. He says he honestly believed that the transplants had been successful.

In its May 24 report, the committee also chastises Good, who brought Summerlin with him to Sloan-Kettering 18 months ago from the University of Minnesota. Good is also coauthor on a number of Summerlin's scientific reports. The committee feels "that Dr. Good shares some of the responsibility for what many see as undue publicity surrounding Dr. Summerlin's claims, unsupported as they were by adequate authenticating data. Dr. Good was slow to respond to a suggestion of dishonesty against Dr. Summerlin at a time when several investigators were experiencing great difficulties in repeating Dr. Summerlin's experiments."

To which Good replies, "I trusted him. He came as a respected scientist."

Although the committee recommended that Summerlin be fired because some of his actions "over a considerable period of time were not those of a responsible scientist," Summerlin has been placed on medical leave from Sloan-Kettering for treatment of "an emotional disturbance." His $40,000 salary will continue. Summerlin said this week he feels much better now that he is under the care of a psychiatrist and hopes to return to medicine and science. He said he still has faith that first culturing tissue or organs may be the answer to graft and transplant rejections. □

Quest to the birthplace of earth's crust

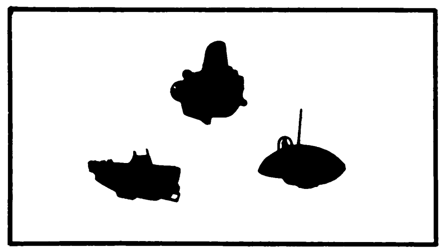
Only the conning tower shows as Alvin approaches its mother ship after a dive.

Of all the trailblazers who have hewn new paths to the remote reaches of the globe, few if any have been to so isolated a spot as that visited by the members of Project FAMOUS, who last summer became the first human beings to descend to the Mid-Atlantic Ridge, one of the sites of the world's continual rebirth. This summer they are going back.

Two miles below the surface of the Atlantic lies a great fracture, a huge rift running north and south almost from pole to pole and bounded on either side by towering undersea mountains. It is there, along the rift, and others like it, that the earth constantly reasserts its life force, pushing apart the vast plates of the ocean floor to make room for new material being thrust upward from beneath the crust. In a continuing cycle of birth and death, aged crustal material is continually sliding away to submerge beneath the outer edges of the plates, driven by the youthful onslaught welling up along fissures like the Mid-Atlantic Rift.

Last summer, after two years of preparation and mapping, the French bathyscaphe Archimède carried French and American scientists on the first seven dives to the rift (SN: 9/22/73, p. 181), only one more than the number of man's visits to the moon. From a location about 220 miles southwest of the Azores, Archimède dove down some 9,000 feet, taking photos, gathering samples and learning the ropes for the heavy assault to come.

This is the year of the assault. Besides Archimède, an unwieldy but deep-diving craft, two more submersibles will join the foray. Jacques Cousteau's SP 3000, now known as Cyana, will



Alvin (top), Archimède (left), Cyana.

use its greater maneuverability to explore and sample one of many transverse faults that run crossways to the rift valley. The hot rod of the trio is Alvin, from the Woods Hole Oceanographic Institution. Alvin has been fitted with a new titanium hull that doubled its working depth to 12,000 feet. The heavily instrumented research submarine will explore both areas as well as the steep walls bordering the main rift valley. Rock, mineral and water samples will be collected using a variety of hammers, drills, claws and

Photos: NOAA

First dives to the rift saw "pillow lava."

other tools developed especially for FAMOUS—the French-American Mid-Ocean Undersea Study.

Other rift areas have been photographed remotely from shipboard, but none so exhaustively as the dive site. Some 30,000 photos have been accumulated, many of them from last year's dives, both to show the divers where they are and to locate interesting targets.

The photos reveal that the hard rock floor of the valley seems to be somewhat different from lava flows on land, possibly because the new material that is being added from below is slowly forced through the rift like clothes through a ringer. James R. Heirtzler of Woods Hole, chief U.S. scientist on the project, says, for example, that the site shows strange flows resembling "toothpaste squeezed from a tube."

"We don't fully understand the processes and distribution of materials," Heirtzler says, but the limited observations so far do confirm that the sea floor does seem to be moving outward in both directions from the rift. In the one to three miles of the valley's width, rock samples have been found to range in age from too young to date, near the center, to as much as 100,000 years near the valley walls.

Seven French and six U.S. scientists, two at a time, will take part in the exhaustive schedule of as many as 60 dives, which are planned to run from June 20 to Sept. 2. Besides gathering samples, they will be looking for signs of geologic activity in the region, several of which have already been detected. The water close to the bottom is unusually warm over the rift, for example, a possible sign that heat from the interior of the planet is being brought up with the new material. The rift rocks are also more magnetic, again an indication of recent origin. Tiny earthquakes, as many as a dozen per hour in some parts of the site, signal the nearness of the living earth, although they are far too weak to imperil the submersibles.

Scarcely 20 miles from the project's four surface support ships, another remarkable vessel will be making its own contribution to riftlore. The Glomar Challenger, which has been drilling core samples from the floors of the world's oceans, will be working about 20 miles west of the dive sites. In their first attempt, Challenger scientists will try to drill their core tubes through 550 meters of bottom sediment and on into the hard rock beneath. If this works, they will use a cone-shaped guide developed by Challenger teams to reenter the hole a second time to bore even deeper. The goal is to penetrate up to 800 meters into the oceanic basement rock, far exceeding the 80-meter depth achieved so far. □

Uniting two forces: Ferment in physics

For some time particle physicists, and we, have been celebrating the discovery of the phenomenon called neutral weak currents and its meaning for the unity of particle physics (SN: 5/4/74, p. 284; 5/25/74, p. 340). Now there is further evidence in favor of the same trend, toward the unification of two kinds of natural force.

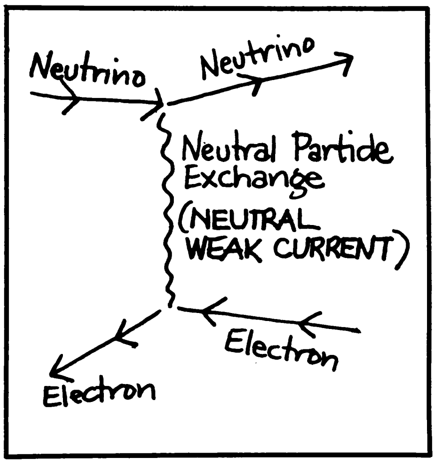
To give a brief recapitulation, there are now three experiments that have seen effects of neutral weak currents. They are at three of the foremost centers of modern physics, the CERN laboratory in Geneva, the Fermi National Accelerator Laboratory at Batavia, Ill., and the Argonne National Laboratory at Argonne, Ill.

In a recent publication the NAL people were a bit hedgy, pointing out that the particular phenomenon they had found might be attributed to other causes. But in a new report attributed to all of them and authored by David Cline, they seem to have dropped the hedge and are laying their result on the neutral weak current. It is gratifying to have such triple support for the phenomenon come so quickly. There have been some important steps in physics that have come in a much more frustrating manner.

The discovery, according to Cline (and we are indebted to him for the general ideas expressed here), is an incident in a phenomenological trend that is tending to show basic siimlarities between electromagnetism and the weak interaction and to which NAL now adds another piece of information. This is a similar trend to the series of experiments in the early 19th century that showed similarities between electricity and magnetism and led to James Clerk Maxwell's theory showing them to be reciprocal aspects of a single phenomenon, electromagnetism.

Of course a similarity and basic union between electromagnetism and the weak interaction are assumed in the theory of Steven Weinberg and others that the present excitement seems to support. But any comprehensive theory needs support at many points, not just one. There is a sense in which one could say that Newton's theory of universal gravitation was not fully proved until the first artificial satellite went into orbit.

The weak force was actually discovered as long ago as 1896 when Henri Becquerel came upon nuclear beta decay—or better, the phenomenon of beta rays because that's how he saw it. Becquerel was not aware that he was seeing the operation of a previously unknown force. At the time physicists believed in two kinds of



force, gravity and electromagnetism. For decades physicists attributed atomic and subatomic happenings to electromagnetism. It was not until the 1930's with the discovery of the neutron and the postulation of the neutrino that it became clear that two new varieties of force were at work. They have been denominated quantitatively if not very distinctively the strong and the weak. The strong holds atomic nuclei together. The weak is at work in various varieties of radioactive decay.

The currents were the first similarity between electromagnetism and the weak interaction. They were a similarity that at first looked rather dissimilar and have now become very similar thanks to the latest experiments. The currents are analogous to electric currents in a wire, but are not the same thing.

Much of particle physics is based on what happens when two particles collide. There are several ways of viewing such a collision including the simple kind of picture one sees with balls on a billiard table. One of the views is that as the two particles approach each other they exchange an intermediary particle, in the case of electromagnetism a photon, in the case of the weak interaction a particle that has never yet been experimentally manifest, and this exchange somehow creates a force between the particles. The other most common view is the currents. The particles in the interaction are moving and can therefore be regarded as constituting currents. One current exerts a force on the other just as a current in a wire exerts a (magnetic) force on another current-carrying wire. The particle interaction can thus be seen as an interaction between currents.

The current picture proved fruitful in dealing with interactions under the control of electromagnetism. It became clear that in electromagnetism the proceeding was what is called a neutral