

Cat virus indicates cancer is contagious

As if cancer is not a dread enough disease, the prospect that it might be contagious is almost overwhelming. Yet scientific evidence for such a possibility is building.

Ohio investigators have accumulated evidence that Hodgkin's disease, one kind of human cancer, may be an infectious disease with a long incubation period (SN: 2/10/73, p. 85). Chickens have contracted leukemia from other chickens. Some laboratory cats have apparently passed cat leukemia virus to other laboratory cats.

Now, New York City and Boston researchers have found that transmission of cat leukemia virus among household cats is common, and cats infected in this fashion have a good chance of getting leukemia. The research team is headed by W. D. Hardy Jr. of Memorial Sloan-Kettering Cancer Center in New York City. Their work is reported in NATURE.

A leukemia virus was identified in cats in 1964. Methods for easily detect-

ing the virus in cats were developed during the past few years. The virus was then found in 90 percent of cats with leukemia. The virus was also linked with several other cat diseases, including some anemias. So Hardy and his colleagues set about testing more than 2,000 household cats to see whether the cat leukemia virus might be transmitted from one cat to another, and whether the virus would lead to cancer or to other diseases suspected of being caused by the virus.

They have found that of 543 cats living in households with at least one leukemic cat, one-third became infected with the leukemia virus. They followed 148 of the infected cats and found that 23.7 percent of them developed leukemia or a virus-linked anemia. The time elapsing between virus detection and leukemia was 5.3 months. The observed incidence of leukemia in the cats with virus was almost 900 times greater than that expected for the normal cat population during a comparable period.

The researchers suspect that the cats can pass the virus by sharing common kitty litter or by grooming compan-

cats. They found the virus in the salivary glands of 32 of the cats with leukemia. They also found antigen to the virus in the kidneys of 70 percent of the cats with leukemia.

Might cat leukemia virus infect people? "We really don't know and are looking into the possibility with great earnest," Hardy told SCIENCE NEWS. He and his team were not able to find the cat leukemia virus in 130 persons who had come into close contact with the virus-infected cats. Nor has the virus ever been found in a human, with cancer or otherwise. But the virus has grown in human tissue under laboratory conditions. □

Where ancient ocean floor meets young crust

One of the most complex parts of the ocean floor is the area in the western Pacific that includes the Sea of Japan and the Philippine Sea, a twisted morass of fractures, trenches and volcanic upheavals. Scientists aboard the Glomar Challenger deep-drilling research vessel devoted Leg 31 of its journey to unscrambling that geologic tangle, in an effort to better understand its convoluted patterns of creation.

Their major finding: its relative youth.

Immediately to the east of the Philippine Sea, just on the other side of the Mariana Trench, the ocean bottom is more than 100 million years old. Yet core samples drilled from the floor of the Philippine Sea during Leg 31 revealed an age there of no more than 60 million years. This sharp age difference is evidence that the trench is thus the junction of two major ocean crustal plates.

Tiny fossils in the core samples also revealed that the Philippine basin itself formed over a geologically short span of time, between 60 million and perhaps 40 million years ago. Whether the basin was pulled open by the eastward movement of the crustal plate that is now the floor of much of the Pacific Ocean or was simply the "scar tissue" left when the junction between two plates widened is uncertain.

The Sea of Japan also turns out to be younger than some geologists believed. One theory was that it might have been formed by a section of the continental crust that collapsed or failed to rise with the Asian mainland about 100 million years ago. But core samples indicate that the Japan sea basin probably did not open until the mid-Tertiary period, some 30 million to 50 million years ago.

In two of the drilling sites in the Sea of Japan, the scientists found more than just rock, silt and fossils. As has happened before on the Challenger's

Scientists dive to site of sea-floor spreading

Along the crest of the Mid-Atlantic Ridge, a chain of undersea mountains marking the churning edges of two of the earth's major crustal plates, lies a mighty canyon. In this great rift is exposed the never-ending resculpturing that continually reshapes the face of the earth, nearly two miles below the surface of the ocean. This month, for the first time, man has gone there in person to look.

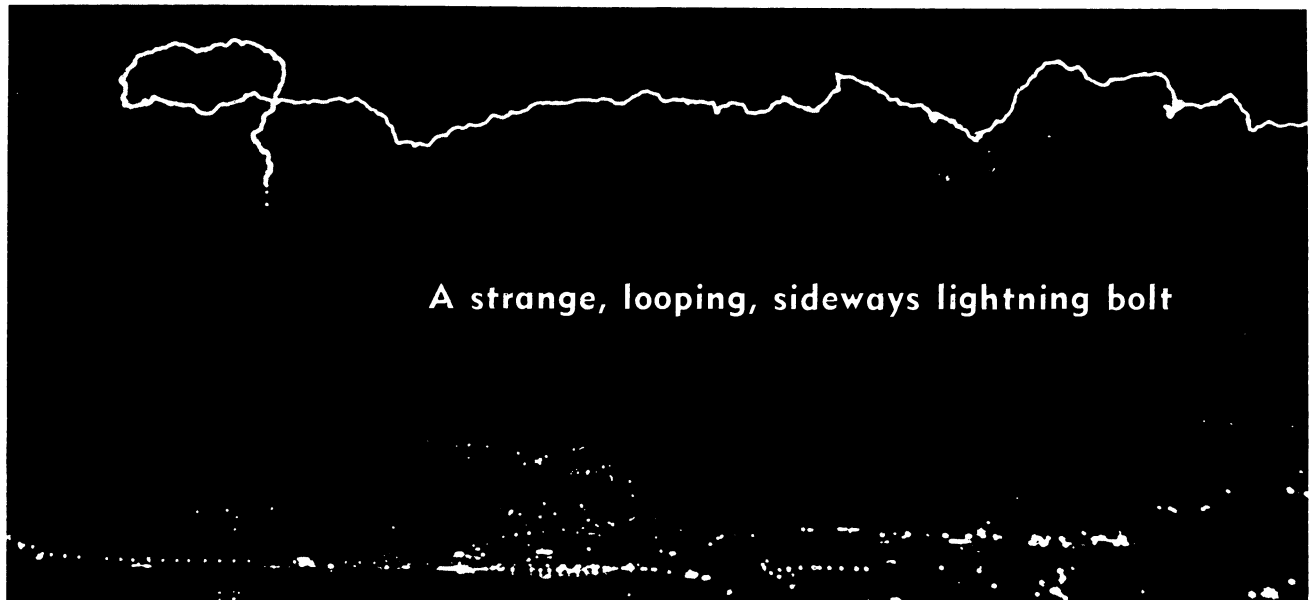
In the French bathyscaphe Archimède, three-man teams have made three dives, all of which successfully reached the floor of the rift about 9,000 feet down. They made notes, took about 300 photographs and even collected a sample of the rocky bottom.

As one of the loci of the earth's constant evolution, the rift is a geologically active area, and the submariners found ready evidence. Numerous fresh lava flows marked recent volcanic activity—so recent that sediment had not even had a chance to settle on the newly exposed bottom.

On two of the dives, the French pilot and copilot were accompanied by French scientists, one of them Xavier LePichon, a key figure in developing the theory of sea-floor spreading that accounts for such geologic features as the Mid-Atlantic Ridge. LePichon represents the French National Oceanographic Research Center in Brittany which is running the diving project known as FAMOUS, for French-American Mid-Ocean Undersea Study. The third scientist was an American, Robert Ballard from the Woods Hole Oceanographic Institution in Massachusetts.

Sea-floor spreading, though it is supported by earthquake reports, photos and other data, is far from being completely understood. The Archimède divers reported, for example, that parts of the walls of the rift are vertical, a puzzlement since either the colliding or separating of the crustal plates that form the rift seemingly ought to cause some sloping.

The dives, on Aug. 2, 5 and 8, lasted from four to eight hours, and a second series was being planned this week with a third hoped for before next autumn and its accompanying rough weather. Two more research submersibles are scheduled to join Archimède: the Alvin from Woods Hole and the French SP 3000. A good omen for the yet remaining dives is that the first series proved Archimède able to refit at sea between dives, adding ballast, refilling her enclosing buoyancy envelope and recharging her batteries. With 220 miles between the diving site and port in the Azores, such independence is vital for extended operations.



A strange, looping, sideways lightning bolt

Orville and Berger/*Journal of Geophysical Research*

The entry in the laboratory's logbook begins: "22:30—bright cloud flashes—clouds still below the summit of San Salvatore—cloud above mountain a little—can see tower lights. . . ." Five minutes later, the skies over Lugano, Switzerland, were split by a strange lightning bolt that is one of the most unusual ever recorded.

Lightning strikes downward, as everybody knows, and sometimes up. But there is now at least one authenticated record of a bolt that struck sideways.

Nor was this the only peculiar aspect of the freak flash. It took off upward, from a 92-meter-high television tower atop Mt. San Salvatore just south of Lugano, inscribed a complete loop in the sky and finally shot off to the west for about two kilometers. It also lasted an unusually long time—more than a tenth of a second, compared with most bolts which are measured in millionths of a second.

Fortunately, the flash could not have occurred at a better place. The tower from which it sprang is also instrumented as part of the Mt. San Salvatore Observatory, one of the handful of full-time lightning research facilities in the world. The Lugano area, says Richard E. Orville of the State University of New York at Albany, has the greatest concentration of lightning in a vast area stretching from Moscow to England and from Norway southward to Africa.

Thanks to the presence of the laboratory and its staff, the rare bolt was photographed from three locations, and its current, which never exceeded a relatively weak 1,600 amperes, was recorded.

The flash occurred on the night of July 7, 1969. Orville and the laboratory's founder, Karl Berger, who set up the facility some 30 years ago, have just published their data, but the intervening four years, during which they discussed the event at scientific meetings and elsewhere, have turned up no other known horizontal bolts. "I'm not aware that there are any," says Orville (who ironically missed the sight by a mere three days, having just returned to the United States), although he was sent a photo of a flash over Germany with a loop in it.

"We believe," Orville and Berger report in the July 20 *JOURNAL OF GEOPHYSICAL RESEARCH*, "that this unusual flash was probably caused by a primary flash outside the field of view of the camera, but do not wish to exclude the possibility of an upward discharge that was triggered by a high ambient electrostatic field." The reason for the horizontal path of the bolt is uncertain, but the likeliest clue seems to be the logbook's reference to low-hanging clouds, which could have provided the impending potential flash with an available target at almost the same height as its discharge point.

expeditions, bubble-like pockets were discovered in the core sampling tubes, meaning that the drill had, in fact, struck gas. The gas may have been formed by bacteria acting on the hundreds of meters of bottom sediments, the same process that creates marsh gas, but a preliminary analysis of the gas in the tubes indicated a relatively high ethane content, suggesting a natural gas deposit formed by heat, pressure and catalytic action. To evaluate such gas deposits, however, would require more time and funding than is usually available to a research expedition. Such deposits, says Oscar Weser of the Scripps Institution of Oceanography, which manages the Deep Sea Drilling Project, are "relatively common" in sites near land, due to their

richness in land-based organic sediments.

Samples were also taken in and around the Nankai Trough south of Japan, which revealed that sediments from Japan stopped being deposited southeast of the trough about four million years ago. This probably means that the trough was formed about that time, thus trapping sediments from the land and representing the descent of the advancing edge of a piece of crust moving northwestward from the Philippine basin. The Challenger geologists believe that this area has been getting deeper since that time, until now it may be to blame for the large earthquakes which periodically rock southwestern Japan.

Leg 32 of the *Glomar Challenger's*

journey began with departure from Japan Aug. 15 in the direction of Honolulu, where the vessel should arrive by about Oct. 10. A major goal of this part of the trip is to compare the ages of the seamounts (undersea mountains) to see if they are in sequence. This could add weight to the theory that there are relatively fixed "hotspots" in the earth's mantle, pushing up strings of seamounts in the overlying crustal plates as the plates slowly move. Another part of the mission is to see if there are any geological traces of localized changes in earth's magnetic field that are older than about 80 million years, the point before which most such traces have been worn away from most of earth's upper crust. □