

Ocean Mystery Solved

► THOUSANDS of luminous fish and strings of transparent sea creatures are responsible for the mysterious moving layers in the ocean first noticed during World War II.

During the war, sonic equipment recorded stratified zones in the ocean that mysteriously moved up at night and down during the day.

Now, 20 years later, the factors responsible for these moving layers have been identified, reported Dr. Eric G. Barham, of the Marine Environment Division, U.S. Navy Electronics Laboratory at San Diego.

The sonic echoing layers are swarms of lantern fish, which are deep sea fish with luminous growths on head and body, and siphonophores, which are delicate transparent individuals of the Hydra order, arranged along a contractile stem, Dr. Barham reported in *Science*, 151:1399, 1966.

The sea creatures are merely following their life cycle in relation to light, temperature and food, in a constant rhythmic pattern of rise and fall.

The diminutive lantern fish have gas-filled swim bladders of such a size that they resound the pulses of the echo sounder. Colonies of the siphonophores, even though their bodies consist of a gelatinous material which sounds like water to a sonar beam, include buoyant individuals that generate

and retain carbon monoxide bubbles of approximately the right resonant size for echo sounder frequencies.

At dawn, these swarming layers of creatures were observed swimming vertically downward at a dramatic rate of about 1,000 feet in 90 minutes, Dr. Barham said. The lantern fish swim head down at a 45-degree angle. The siphonophores swim with their tentacles contracted.

When the downward migration was about two-thirds completed, an upper layer split from the main layer which settled down to a depth of about 1,000 feet, while a lower layer dropped to below 1,400 feet, out of observation range. There the layers of sea creatures rested through the day until mid-afternoon, when they began a gradual ascent, increasing their speed just at sunset.

Observation of these creatures was made from a small two-man vehicle, the Cousteau Soucoupe Sous Marine, known in English as a diving saucer. The craft is extremely maneuverable and can go to depth of 1,000 feet. More than 14 hours of a 36-hour period were spent in underwater observations. The bathyscaphe Trieste had also been working on this sea project, before its removal to the East Coast in 1963 to search for the submarine Thresher.

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U. S. Geological Survey

FRESH WATER FROM OCEAN—G. Warren Leve, a hydrologist with the U.S. Geological Survey's Jacksonville, Fla., office, collects a sample of fresh water gushing from a hole that was drilled into rocks 500 and 900 feet beneath the ocean floor about 25 miles east of Jacksonville. The project is part of the Joint Oceanographic Institution Deep Earth Sampling program, sponsored by the National Science Foundation.

Glacier Ice Flooded Ancient Antarctica

► A RAGING RIVER of melted glacier ice flooded a valley in Antarctica several centuries ago, cutting deep, winding channels in bedrock.

For years scientists have puzzled over this strange eroded terrain that covers about seven square miles at the head of Wright Valley, west of Ross Island. Some thought the rock was carved by ordinary melted glacier water that had been dammed by a tongue of glacier ice to form a lake and then suddenly poured down the valley when the ice dam gave way.

What really must have happened, Dr. Charles R. Warren of the U.S. Geological Survey reported, was that a volcano under the thick glacier ice erupted, creating a great flood that may have carried more water than any river ever seen by man.

The actual volcano has not been probed, but it is deep under the ice where other volcanoes are also located.

Evidence of the volcanic flood is the low content of heavy water, in Lake Vanda located in the deepest part of Wright Valley. This permanently frozen lake, more than five miles long and one a half miles wide, has less deuterium in the salty water at the bottom than most glaciers and meltwater.

Dr. Warren calculated that this could happen only if that part of the water entered the lake from the west, from the volcanic eruption. The only water entering the lake today comes from the east.

The mixture of teeming volcanoes and ice has also occurred in other parts of the world, Dr. Warren said.

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Fresh Water Gushes From Ocean Floor

► FRESHWATER lakes or pools trapped under the salty ocean floor, may provide precious drinking water to coastal communities in the future.

This refreshing thought occurred when a fountain of fresh water gushed 30 feet high above sea level from a hole drilled into the ocean floor off the coast of Florida.

The fresh water was discovered when hydrologists with the U.S. Geological Survey drilled a hole into rocks at depths of 500 and 900 feet beneath the sea floor about 25 miles east of the northern Florida coast. The water gushed up as a result of artesian pressure, or pressure generated by underground water.

The drilling project is part of the JOIDES (Joint Oceanographic Institution Deep Earth Sampling) program, sponsored by the National Science Foundation.

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