

NSF officials said. One reason is that the estimated depth to the mantle is less here than at other sites, and another is the weather conditions and ease of operating procedures. Sites near San Juan, Puerto Rico, and the Caribbean island of Antigua were finally discarded because of potential danger from hurricanes and because the sea bottom is badly faulted at one site.

Russian scientists are approaching the study of earth's structure in another method—by studying shock waves from man-made blasts and earthquakes on the land and by drilling a series of five holes in the earth ranging across their land from the Caspian Sea eastward toward the Kurile Islands above Japan.

Seismic waves, as shock waves within the earth are called, have long been studied by geologists and seismologists as a method of analyzing the earth's structure. Set off by man-made explosions, earthquakes, volcanoes or other huge shifts in the earth, these waves travel outward from the point of strain, somewhat like circular ripples that radiate outward when a stone is tossed into a pond.

By comparing the length of time and structure of these different shock waves as they reach the surface of the earth, geologists have learned much about the earth's interior.

• Science News Letter, 88:26 July 10, 1965

GEOLOGY

Explosions to Increase Natural Gas Yield

► **UNDERGROUND** nuclear explosions in the Rocky Mountain region could increase total natural gas production about seven times above today's levels, a study reported in Washington, D.C., has shown.

The study, called "Gasbuggy," is part of the Plowshare program to develop industrial and scientific uses for nuclear explosives. "Gasbuggy" was conducted by staff personnel from El Paso Natural Gas Company, the U.S. Atomic Energy Commission and the U.S. Bureau of Mines.

The scientific team investigated using nuclear explosives to break up gas-bearing formations in order to increase yield rates from natural gas fields. The study showed that nuclear explosives would do the job.

The team recommended setting off an underground blast from which no radioactive material would reach the surface in the San Juan basin of New Mexico. The El Paso Natural Gas Company plans to obtain authorization for conducting the test jointly with the AEC.

If approved, the experiment would be the first Government-industry use of a nuclear explosive for industrial purposes in the world.

Large quantities of natural gas cannot now be recovered because the rocks in which the gas is contained are too porous. The nuclear blast would create a large reservoir into which the gas could flow freely, forming a "well" that could be tapped.

Preliminary cost estimates indicate the experiment would cost about \$3 million, in addition to the charge for the nuclear explosive. The AEC would make extensive studies to assure containment of radioactive material.

• Science News Letter, 88:27 July 10, 1965

Nature Note

Termites

► **TINY WHITE INSECTS**, the termites, have the largest and most complex societies known in the animal kingdom. Their colonies, sometimes housing millions of termites, function under a form of communism in which labor—and there is little play—is divided essentially into three basic, highly specialized castes: soldiers for defense, workers for nutrition and kings and queens for reproduction.

The soldiers, which include both sexes with sterile reproductive organs, have strong biting jaws. Certain termite species have evolved a nozzle-like projection of the head to shoot a sticky secretion or volatile poisonous gas at enemies. The workers, also sterile, care for and feed the queen and king and constantly lick and tend the eggs to protect them from mold and dampness.

The one egg producer of the colony is the queen, a huge immobilized female with an abdomen 100 times as large as normal. She has one function: simply to lay eggs—and some tropical queens lay as many as 7,000 eggs each day. Kings and queens sometimes reign over their colonies for 10 or more years before their offspring are allowed to develop into sexual individuals which sprout wings, swarm and feebly fly away to start a new colony.

These creatures are not ants, but are of the Isoptera order, related to the roaches. Wood is their main food, and they cause enormous damage to houses and structures in all warm climates. Since wood is composed largely of lignin and cellulose that are hard to digest, the creatures have a special arrangement—millions of microscopic protozoans and bacteria inhabit their intestines and help change cellulose into easily absorbed sugar.

• Science News Letter, 88:27 July 10, 1965

ENGINEERING

Bottomless Tank at Sea Is Safe and Spills No Oil

► **A BOTTOMLESS** oil tank floating at sea like a huge inverted bucket, is both safer and less likely to contaminate its contents than conventional storage containers.

The tank, made of fiber glass reinforced plastic, works simply because oil is lighter than water. Oil is pumped in from the top of the tank as it floats, forcing seawater out of the bottom. In the reverse process, the water level rises as oil is taken out.

Since the tank is completely full of liquid at all times, no air pockets can form, and the danger of fire or explosion is greatly reduced. Also, any heavy impurities in the oil just settle out the bottom and down to the ocean floor, instead of forming a sludge that would contaminate new supplies of oil.

The tank is leakproof, but in case of an accident, an "oil fence" is floated outside the tank to prevent any loose oil from spreading.

The Swedish-built tank, developed by Sea-Tank Metod AB, Stockholm, was reported in *New Scientist*, 25:708, 1965.

• Science News Letter, 88:27 July 10, 1965

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