



University of Southern California

SAND ON SAND—Dr. James W. Vernon, geologist from San Diego, is pouring grains of sand dyed red and green onto the ocean floor along the southern California coast in a study to discover how beaches are being swept into giant undersea canyons.

OCEANOGRAPHY

Sands Trace Erosion

► TINY GRAINS of sand dyed bright red and green were used to trace thousands of tons of sand washing away each year from California beaches.

The two-year study of sand movement, more extensive than any previous research, was conducted by Dr. James W. Vernon, director of General Oceanographics Inc., San Diego. The Coastal Engineering Research Center of the U.S. Army Corps of Engineering financed the project.

With underwater cameras, sand samples and hundreds of scuba dives, Dr. Vernon established definite patterns of sand movements that will prove valuable in controlling erosion of the California beaches, particularly the San Diego and Laguna Beach areas.

Natural forces tear sand loose from beaches sweeping it down the coast into great undersea canyons which exist near the coastline, Dr. Vernon found. From these canyons the sand is funneled out to sea and perhaps ultimately lost in a vast oceanic graveyard.

By constant observation along the southern California coast, Dr. Vernon traced a definite pattern of sand movement. He found that as waves enter shallow coastal water, sand is picked up from the floor and

carried toward shore. It is then moved down the coast by the churning waves until interrupted by a rip current, a rocky headland or a submarine canyon.

As the sand is swept around rocks jutting into the sea, much is lost to deep waters, he reported. Submarine canyons near shore, also move the sand seaward.

One method of saving the beaches would be to pump sand back onto land from the large deposits accumulated in shallow waters.

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TECHNOLOGY

Deep Seas Next Region For Nuclear Power Use

► THE "INNER SPACE" of deep seas and ocean bottoms is the next vast but still largely unexplored region where the harnessed power of the atom could be put to good use.

Nuclear power systems already developed are proving useful on the earth's land, in outer space and on the ocean's surface. The deep-sea applications for such systems were outlined in the U.S. Atomic Energy Commission's Annual Report to Congress.

The AEC said there is little doubt that

nuclear power has many uses for future ocean exploration.

Some of the nuclear systems use the heat of disintegrating radioactive atoms as their source of energy, while others use the heat produced by fissioning nuclei in a small nuclear reactor. Both sources are called SNAP, an acronym for Systems for Nuclear Auxiliary Power.

SNAP systems could be used in the deep oceans not only for exploration and survey, the AEC reported, but also for research into the physical and biological life cycles of the seas; discovery, identification and recovery of underwater objects; exploitation of underwater oil and mineral resources; navigation and detection system.

As an example of the potential of nuclear power systems for oceanographic work, the AEC noted that the first isotopic SNAP generator was put into commercial use on an oil rig in the Gulf of Mexico during 1965.

In space, the AEC said, an isotopic power system called SNAP-27 is under development for use in the Apollo program to land a man on the moon.

Also in space, two more satellites instrumented by AEC for detecting nuclear tests were placed into orbit last July, bringing the total to six such satellites.

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GEOLOGY

Gold in Mountains? Large Survey Underway

See Front Cover

► THE PRESENCE of gold, copper, iron and other minerals is being investigated in an immense survey of five and a half million acres by the Geological Survey and the Bureau of Mines, both of the Department of the Interior.

Earth scientists, engineers and surveyors have already made mineral appraisals in six of the 34 National Forest Primitive areas in 11 western states. Findings of these surveys will be presented to the President of the United States for transmittal to Congress by September 1974. Congress is considering this land for inclusion in the National Wilderness Preservation System.

Seen on this week's cover is a two-man team of geologists from the U.S. Geological Survey who use a helicopter to make observations in the rugged Northern Cascades Primitive area, Washington.

The use of helicopters to reach inaccessible areas quickly and the extensive use in the field of newly developed procedures for chemical and spectrographic analyses in mobile laboratories have been of great assistance to the Geological Survey scientists. During the past summer, analyses of 30 elements in 3,000 samples, or a total of 90,000 spectrographic determinations, were made in the field and reliable, rapid and inexpensive chemical analyses were performed.

Mobile laboratories help in making this huge appraisal of the magnitude of measured mineral reserves, the location of mining claims and the minability of all known deposits in each area.

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