Nova Expedition answers questions

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Questions about the origin of island and land masses and possible continental drift in the vast central and southwest Pacific Ocean are expected to be answered by the Nova Expedition of the University of California, San Diego's Scripps Institution of Oceanography that began here today (April 17).

The Argo, one of two Scripps oceanographic research vessels that will take part in the eight-month expedition, sailed from Nimitz Marine Facility to join her sister ship, Horizon, which departed April 8 from Kwajalein Island for Brisbane, Australia, on her six-month assignment with Nova. Earlier in the month Horizon had completed her work with Scripps' Carmarsel Expedition to the Caroline and Marshall Islands. She will return to San Diego in mid-October, Argo about December 18.

Dr. Henry W. Menard, professor of geology, is coordinating Nova's extensive geological, geophysical, and geochemical study of a 5,000,000-square-mile region bounded on the west by Australia and on the east by the nearly seven-mile deep Tonga- Kermadec Trench and the New Zealand structural line. Melanesian investigations will range northwest into the Gulf of Papua; northeast into the Samoa and Tonga area, centering in the Fiji-New Caledonia region; and southeast to New Zealand. They will be concentrated on peculiar, large, shallow regions between the islands.

He said studies will be made in the trench, in the equatorial region to the north on the initial and final expedition legs, and on the land masses (Australia and New Zealand) adjoining the region.

Scientists from Australia, New Zealand, New Caledonia, and Japan, and from several universities in the United States will participate in Nova, which is supported by the U.S. Office of Naval Research and by various grants from the National Science Foundation.

Dr. Menard said expedition plans have been coordinated with related expeditions by the U.S. Coast and Geodetic Survey, Lamont Geological Observatory of Columbia University, the Hawaii Institute of Geophysics, and several organizations in the southwest Pacific.

Capt. Laurence Davis of Del Mar will pilot Argo until August 1, when he will be relieved by her regular master, Capt. Alan S. Phinney, of La Jolla, currently recovering from an operation.

Nova's geological and geophysical studies will include reconnaissance and detailed bathymetric surveys with precision depth recording, seismic profiles, sub-bottom sonic profiling; heat flow, magnetic, and gravity measurements; coring and dredging, and geological mapping and radiometric age determinations on continental and island areas within and around the region.

Oceanographic and geochemical studies will be made on water masses, on their isotopic composition and dissolved gas concentrations, and on gases, water vapor, and dust transport in the marine atmosphere. Sediment cores will be dated and subjected to mineralogical and chemical analysis.

In addition to Dr. Menard, UCSD and Scripps scientific leaders in the various segments of Nova include Dr. Harmon Craig, professor of geochemistry and chairman of UCSD's Department of Earth Sciences; Dr. Edward

D. Goldberg, professor of chemistry; Dr. George G. Shor, Jr., research geophysicist and chairman of Scripps' Division of Oceanic Research; Dr. E. L. Winterer, associate professor of oceanography; Dr. William G. Van Dorn, research oceanographer; Dr. Robert L. Fisher, associate research geologist; Dr. A. E. Engel, professor of geology; Victor Vacquier, professor of geophysics; T. E. Chase and Stuart M. Smith, assistant specialists in submarine geology; and Daniel Karig, research assistant.

Dr. Menard described the southwest Pacific as a "jumble" of small continental and oceanic continental block islands between Australia and the Pacific basin.

"It is structurally very active, with numerous earthquakes and volcanoes, perhaps because it lies at the intersection of an ocean basin margin and highly faulted oceanic rises.

"The presence of trenches, island arcs, transverse fracture zones, and block- faulted rifts of intermediate depths indicate that the present folding and faulting activity has existed for some time."

He said this region is little known, but that its history and the origin of its structure appear to have a crucial bearing on many of the major hypotheses of geology.

"For example," he said, "we hope to arrive at answers to these questions:

"Is this region the site of continental drift, and if so, are the drifting blocks bounded by fracture zones? Is there continental generation or regeneration, or is there continental growth by reason of a gradual marginal build-up of land over a long period of time solely by the act of natural forces?

"Are the large areas of intermediate depth produced by expansion of the earth's mantle, by sedimentation on an oceanic crust, or by a build-up of volcanic rocks, limestone, or a layer of granite?

"The geological literature abounds in speculation on these and similar questions, but information is woefully lacking. Answers to questions about this region are important in themselves, but they are doubly important because they will provide tests of numerous hypotheses of global structural development."

Dr. Menard said the scientists will be able to outline the geological history of this great region as a result of their findings.

"It may be argued," he said, "that the application of techniques such as exploration seismology, heat flow and magnetic studies, bathymetric and sub-bottom profiling, dredging, coring and gravity studies, to continents and ocean basins during the past few decades has not reduced the number of major ideas about the history of the earth. It has, however, proved most older ideas were wrong and replaced them with new ones capable of explaining some aspects of the new data.

"The importance of studying the southwest Pacific is that the region is intermediate in character between continents and the main ocean basin and thus the data acquired should be critically different in many ways and thereby hopefully provide a test of the ideas."

Dr. Menard explained that because the southwest Pacific crust is in many respects intermediate between oceanic and continental crust, it may represent some transition between the two and, as such, may contain information on the origin of the continents.

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