

# Cook Strait as a Field for Ecological Study

Chairman : Mr. A. C. Kaberry

## Marine Geology of Cook Strait

*J. W. Brodie*

Various aspects of the marine geology of Cook Strait of concern to the biologist may be considered under the following heads:

*Morphology*: The division of the central and southern areas of the Straits into regions is possible:

a. Even, gently-sloping bottom in from 0 to 50 fathoms, e.g., Cloudy Bay, Palliser Bay.

b. Near-flat but irregular topography, 50-70 fathoms. This is the outer edge of the shelf, and is diversified by minor basins

c. Basin area, D'Urville Island to mid-strait off Tongue Point, maximum depth 200 fathoms.

d. Cook Strait canyon, steep sides, high relief, 70-1000 fathoms.

e. Northern area, depth 50-100 fathoms, small relief.

f. The southern entrance to the Strait is fringed by the continental slope to the Kermadec Trench.

*Sediments*: A chart was presented showing the distribution of sediments in the three categories, sand, silt, and pebbles. Sand is ubiquitous, except for an area in the southern narrows floored with pebbles and situated at the southern extremity of the basin region, and for an area 30 miles off-shore from the Manawatu River where silt alone is recorded. The sediments are in places badly sorted with silts and pebbles overlapping. The conventional decrease in grade with increasing distance from shore is entirely absent in the southern half of the Strait though occurring in the north. Pebbles are found at a number of stations near

the 50 fathom mark. The sedimentation pattern is then not primarily a function of the present environments. Where it is related to present conditions these conditions are anomalous with respect to the usual shelf conditions. The pebble areas are in part a function of previous hydrological environments (those in shallow, open water), and these are being progressively reduced by a cover of Recent finer-grade sediments. In part the pebble areas remain due to the erosion of finer-grained material, or at least to the prevention of deposition in the present regime, (the pebble areas on the flanks of the narrows basin).

*Former Outlines of Cook Strait*: Evidence from the Wanganui and Wellington areas suggests that the general outline of the Strait has remained more or less the same since the time of the higher marine bench preserved at Tongue Point. Evidence for both higher and lower sea levels than at present exists in both areas. There is some doubt as to whether these fluctuations of sea level (correlated with glacial phases) are to be matched with phases of the last glaciation, or with successive glaciations and interglacials. The last major eustatic change of sea level was a rise of approximately 50 fathoms during the Flandrian Transgression. The extent of tectonic movements during the post-glacial ten thousand years is unknown, but it has been shown that considerable uplift has taken place specifically in areas away from the coast line. A chart was presented showing the extent of land laid bare by a simple fifty fathom fall of sea level.