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A TILTED-UP, BEVELED-OFF ATOLL

WHAT WOULD A TILTED-UP, BEVELED-OFF ATOLL LOOK LIKE?

IF an atoll were tilted up by deformational forces and then beveled off to low relief by degradational processes, its understructure would be laid bare. If the atoll reef had been formed on the margin of a shallow platform cut across a stationary, worn-down, deeply weathered volcanic island by the waves of the lowered and chilled ocean in the Glacial epochs of the Glacial period, according to Daly's Glacial-control theory, the revealed understructure would consist chiefly of volcanic rocks under a small thickness of lagoon deposits. If the atoll reef had been formed on the margin of a submarine bank that had been built up to small depth by pelagic calcareous deposits over a deep, non-subsiding volcanic foundation, according to the Rein-Murray theory, the tilted and beveled understructure should give evidence of such an origin by showing chiefly deep-water calcareous deposits on a volcanic mass of submarine eruption. If the atoll reef and its enclosed lagoon deposits had been built up to great thickness on a slowly subsiding volcanic island of subaerial eruption and erosion, according to Darwin's theory, the beveled understructure would declare this origin by showing chiefly shallow-water calcareous deposits above a volcanic base.

To make the latter case specific, let it be assumed that the original foundation of the atoll was a mountainous volcanic island of oval outline, about 50 miles long. If such an island sank slowly, while a barrier reef grew up around it and calcareous lagoon deposits were laid down in the "moat" enclosed by the barrier, until the island was wholly submerged, the barrier reef would become an atoll reef, as in Fig. 1. If such an atoll were tilted up at its southwestern end, and if the uptilted area were degraded to moderate or low relief, as in Fig. 2, the understructure would be well revealed. The upper beds would consist of lagoon limestones with occasional lagoon reefs, originally encircled by the marginal atoll reef; and the volcanic foundation would be laid bare beneath the limestones, if the uplift and the following degradation were of great enough measure. If a central area of the foundation were shown, the calcareous beds would there overlie the summits of the dissected volcanic range unconformably; but if only a marginal part of the foundation were shown, calcareous beds might there alternate in approximate conformity with tuffs and agglomerates, either because these volcanic