LOWER TERTIARY BIOSTRATIGRAPHY
OF SOUTHWESTERN SANTA CRUZ ISLAND

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STRUCTURAL SETTING

Lower Tertiary marine sediments totaling more than 3,400 feet are exposed south of the Santa Cruz Island Fault on the southwestern part of Santa Cruz Island (see geologic map). The dominant structure of the area is a northwest-southeast trending, doubly plunging fold, the Christi Anticline (Rand, 1933), that is broken by the Christi Fault, the trace of which parallels and in part truncates the axis of the anticline.

Southwest of the Christi Fault (Rand, 1933), the stratal sequence is relatively continuous and tectonically little disturbed, whereas on the northeast flank the sequence is highly faulted and discontinuous, with several stratagaps in the sedimentary record.

STRATIGRAPHY

Subsurface.—The oldest lower Tertiary strata cropping out in the southwestern part of Santa Cruz Island are, at the base, in fault contact with younger strata, but their subsurface equivalents occur above beds of Cretaceous age.

Near the axis of the Christi Anticline and within the broad apron of lower Tertiary rocks centered on that anticline, Richfield well No. 2 penetrated 2,260 feet of marine sediments in 1955. Of these, the lower 1,860 feet of sandstones and conglomerates have been interpreted as of Late Cretaceous age, on the basis of the presence of the fossil foraminifer Globotruncana arca. They are thought to be of equivalent age, and are similar in general lithology to the Late Cretaceous strata outcropping on San Miguel Island. These subsurface beds on Santa Cruz Island are thought to be overlain unconformably by 400 feet of siltstones and sandstones which contain fragments of Turritella pachecoensis Stanton, indicating a Paleocene age. A reported unconformity between the Cretaceous conglomerates and the Paleocene siltstones and sandstones, presumably interpreted on the basis of abrupt change in dip of strata found in the well, actually may be the plane of the Christi Fault exposed nearby in Well Canyon and if so would indicate a westward dip for the fault.

Pozo Formation.—Rocks similar in lithology to and inferred to be lateral equivalents of the upper half of approximately 400 feet of strata bearing Turritella pachecoensis as encountered in the well on Christi Anticline are the oldest sedimentary rocks exposed on Santa Cruz Island. In Well Canyon, a small tributary north of Cañada Pozo (see geologic map), they outcrop as buff, fine-grained, thin-bedded, well sorted, calcareous cemented, arkosic sandstones and siltstones, containing 10-30% rounded quartz grains and common biotite flakes. Beds are as much as four feet thick and often contain hard, spherical, calcareous concretions up to six inches in diameter. Occasional thin beds of grey shale are intercalated. This sequence is referred to as the Pozo Formation following the unpublished usage of Kennett (1947; table 1), the name is derived from nearby Cañada Pozo. The only exposure of this unit occurs in upper Well Canyon, where it is found at the edge of the western upthrown block along the Christi Fault. The unit crops out for a distance of approximately 1,000 feet down the canyon and has a measured thickness of 225 feet. A one to two foot thick bed, rich in molluscan fossils occurs near the base of the exposed section and if so would indicate a westward dip for the fault.

Cañada Formation.—Disconformably overlying the Pozo Formation is a 1,400 foot thick sequence of grey or bluish-grey shales and thin-bedded siltstones with scattered, grey, fine-grained limestone or sandy limestone beds two to six inches thick. The lower part of this unit is composed of about 50 feet of bluff, fine-grained, thin-bedded, arkosic sandstones and siltstones containing occasional calcareous concretions up to six inches in diameter and large, flattened concretions up to four or five feet in length. Immediately below this sandy interval is a one to three foot thick basalt conglomerate of vari-colored, well-rounded, fine-grained volcanic cobbles which occupy channels in the underlying beds of the Pozo sandstone (see fig. 3).