of other islands between Monserrate Island and the Tres Marias Islands (Emerson and Hertlein, 1964; Durham, 1950). Northwest of Loreto several tuffs are interbedded with about 1,200 m of marine and nonmarine clastic deposits shown on the reconnaissance map of McLean (1988). The "mid-Pliocene spreading event assemblage" of mollusks is here confined to the lower and middle parts of the section. Tuffs dated at 3.3 - 2.1 Ma (McLean, 1988) also occur in this same part of the section.

Tertiary marine record in the Cabo Trough

It is significant that none of the "mid-Pliocene spreading event assemblage" megafossils is found in the Trinidad Formation or the overlying unnamed sandstone ("Salada" of authors) in the Cabo Trough between the present-day Sierra la Victoria and Sierra la Trinidad, B.C.S. Molluscan data there suggest that the basal Trinidad Formation of Pantoja and Carrillo (1966) may be as old as late middle to early late Miocene, an age not yet verified by microfossil determinations.

Megafossils from the basal Trinidad Formation, Member A of McCloy (1984), are Tertiary Caribbean species that are also found in Panama and the Dominican Republic. Representative index fossils include *Anadara patricia* (Sowerby, 1850), the main component of the *Larkinia* beds in the Cercado Formation, Dominican Republic (Saunders and others, 1986), *Cerithium avus* (Pilsbry and Brown, 1917), and other Tertiary Caribbean taxa illustrated in Plate 2. The basal part of the Trinidad Formation, Member A represents an "estero" or near-mangrove environment with abundant infaunal clams (*Tagelus* sp), cerithiid gastropods, and the tiny multicolored neritinid snail *Theodoxus luteofasciatus*. Miller, 1879. The upper part of the Trinidad Formation, Member A, is neritic and contains *Turritella abrupta fredeai* Hodson, 1926 and other Tertiary Caribbean taxa. Shark teeth measuring 12-15 cm high from *Carcharadon megalodon* Agassiz, 1843 are also present.

Megafossils are rare in the overlying members B - D of the Trinidad Formation, member C being a deep water diatomite. Mollusks from the overlying clastic deposits near Rancho el Refugio have affinities with late middle to early late Miocene taxa from Santa Rosalía to the Salton Trough. A thesis by Rodriguez (1988), mapping by McCloy (in preparation) and microfossil studies in progress (McCloy, Carreño) will contribute new data on the age and relations of these highly fossiliferous units. Several important fossils from the basal Trinidad Formation and correlative deposits from northeast of Santa Anita (83JS10 = USGS locality M9113) and Rancho Algodones (Espinosa A., 1979) have recently been recognized: the basal Imperial Formation index species *Conus spurius* Gmelin, *Codakia* sp. cf. *C. orbicularis* Linnaeus, and *Strombus obliteratus* Hanna, among others.

Tertiary records in the southwestern Salton Trough, California

Tertiary sediments in the southern Salton Trough vary from 0 - 5 km thick and represent a variety of facies from bathyal to neritic to evaporite to nonmarine clastic rocks. In the southern Coyote Mountains the part of the Imperial Formation described by Hanna (1926) and refined by Woodring (1932) represents the lower part of the section, the Latrania Sand Member. It is distinguished from younger facies in the Fish Creek/Vallecitos Mountains that have been subdivided by lithology and especially by the presence or absence of Colorado River sediments by Winker (1987). Megafossils whose ages have been interpolated from their occurrence elsewhere with associated radiometrically dated volcanic rocks support the age constraints suggested by lithofacies.

The basal Imperial Formation, Latrania Sand Member overlies the Alverson Andesite of authors, which was dated as 16.1 ± 1.0 Ma by Eberley and Stanley (1978). Latrania Member fossils include many index species with strong Caribbean affinities also found on Tiburon Island in a 1.5 km thick conglomerate sequence. The Tiburon Island section contains an interbedded volcanic breccia dated at 12.9 ± 0.4 Ma (Smith and others, 1985; Smith, 1989) and is overlain unconformably by an ash flow cap of 11.2 ± 1.3 Ma (Gastil and Krummenacher, 1977). None of these index mollusks is known from younger Miocene deposits in Baja California. The earliest Colorado River sediments in the Salton Trough are younger than 5.4 ± 0.2 Ma, the age of the basal Bouse Formation (Damon and others, 1978); Colorado River sediments are found in the Fish Creek/Vallecitos area by 4.3 Ma (Winker and Kidwell, 1986). Magnetostratigraphy indicates the age of the youngest deltaic members of the Imperial Formation, the Jackson Fork and Camels Head Members of Winker and Kidwell (1986), as 4 Ma. Taken together these figures imply an age span of ca. 14 - 4 Ma for rocks mapped as the Imperial Formation. Different facies deposited over basement varying from metamorphic to volcanic rocks to old alluvium (Kidwell, 1988) complicate correlation throughout this sequence of rocks, and more accurate age determinations are needed to unravel the complex history of the area.

Plate 2 Late middle or early late Miocene mollusks from the Cabo Trough, B.C.S., Trinidad Formation, Arroyo la Trinidad, unless noted.

Figure 1 *Tagelus* sp. LV, ht. 1.5 cm, lth. 3.7 cm. Smith loc. 83JS12 = USGS loc M9041.

Figure 2 *Theodoxus luteofasciatus* Miller, 1879. Ht 3 mm. Smith field loc. 83JS12 = USGS loc M9041.

Figures 3, 4 *Turritella abrupta fredeai* Hodson, 1926. Fig. 3, CAS loc. 58337, ht. 7 cm. Well preserved comparative specimen, Gatun Formation, Panama, collected by William and Lois Pitt. Fig. 4, USNM hypotype 418199, ht 7.7 cm, USGS loc. M9042 = Smith field loc. 83JS13. Miocene, typical preservation for Trinidad Formation, upper basal Member A.

Figure 5 *Turritella* sp. cf. *T. planigyrata* Guppy, 1867. Ht. 5 cm. Smith field loc. 83JS12 = USGS loc. M9041.

Figures 6, 7 *Anadara patricia* (Sowerby, 1850). LV, hypotype USNM 418201, ht 9 cm, lth 9.5 cm. USGS loc. M9112 = Smith loc. 83JS11.

Figures 8, 9 *Turbo crenulatoides* Maury, 1917. Fig. 8, ht. 1.8 cm. Fig. 9, ht. 1.3 cm, Smith loc. 83JS12 = USGS loc. M9041.

Figures 10, 11 *Turbo antiguensis* Cooke 1919. Basal, abapertural views, ht. 1.4 cm, diameter 1.2 cm, loc. 83JS12 = USGS loc. M9041.

Figure 12 *Strombus obliteratus* Hanna, 1926. Side view, ht. 4.3 cm. Smith loc. 83JS13= USGS loc M9042.

Figure 13 *Melongena melongena consors* (Sowerby, 1850). Apertural view, ht. 6.4 cm. Smith loc. 83JS12 = USGS loc. M9041.

Figure 14 *Cancellaria (Pyruclia) diadela* Woodring, 1970. Apertural view, ht 3 cm. Smith loc. 83JS15 = USGS loc M9042.

PLATE 2