Wensday: November 24, 1971

Topolobampo, Sinaloa, Mexico; outer point of bay entrance at end of dirt road; under rocks set in groovelly mud; tide approx. -1½ foot below high water (5 p.m.). Many Pachygrapsis transversus & porcelain crabs (P. gracilis ?). a few Eurytium? or Panopeus?. Some rocks thick with Balanus tintinnabulum on the upper surface, others thick with amphipods on lower surface. No Ligia seen this time (although always present here before). (Borrodaile saw one Ligia on Nov. 25, 1971 here).

Thursday: November 25, 1971

Rhizophora mangle
Avicennia germinans

Topolobampo, Sinaloa, Mexico; Mangrove swamp just before paved road (from los Mochis) into town of Topolobampo. small & medium sized rocks scattered in mud. Mud high in organic content, probably decomposed Mangrove leaves & roots. Many, many burrows, mostly crabs, some from clams. Uca sp.; Grapsus grapsus; Eurytium sp.?

No Uca maxobfera or ~~Grapsus~~ Goniopsis pulchra as I expected.

Saturday, Nov. 27, 1971

La Paz, Baja California Sur, Mexico.
La Paz Sample #1: approx. 5 miles south (down the beach) from town of La Paz where paved road passes near Mangrove swamp on left. Sandy cove with rocks imbedded in sandy-mud (Leptodius, Eurytium, Eriphia), sandy beach (Ocypode), and mangroves in sandy-mud (Goniopsis). Soil substrate around Mangrove roots not dark mud as usual but a light sandy mud or muddy sand - not high in organic detritus and w/o strong H_2S smell (although weak H_2S present) [in places]. Upper reaches of bay with Uca (crenulata?). Shallow sandy flats with Callinectes bellicosus. Very clear water, about 73°F. The ♀ in La Paz (mexicans) seem much more friendly than other mexican cities. Prices on Japanese import items aren't ~~isn't~~ as cheap as one would expect in a duty-free port. [because its all trucked down from far Diego!] The Goniopsis were never seen clinging to the roots of the Mangrove as they do in Bahia Lobos - rather they were always in horizontal burrows at the waters edge into the mud at the base of the mangroves.

Caulerpa racemosa

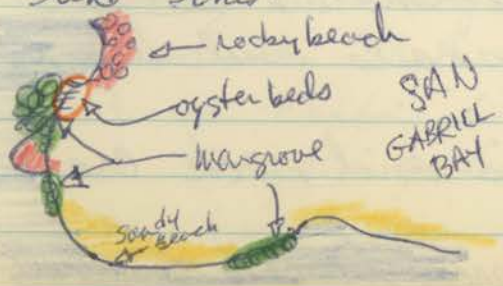
Sunday, Nov. 28, 1971

SAN GABRIEL BAY, Espíritu Santo Island, off La Paz, Baja California Sur, Mexico; 12 noon; 24°26'N 110°21'W

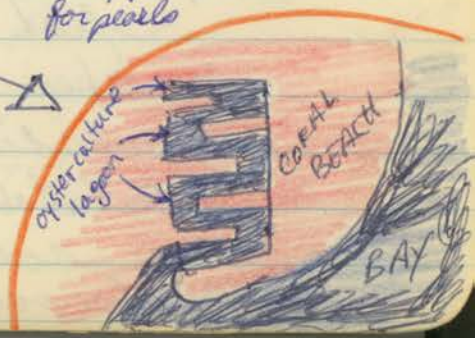
Caulerpa racemosa (Forskal)

#2 Ophiothrix speculata, Ophioderma panamense, Ophiocoma aethiops, Ophiocoma alexandri, (sponge: purple on outside, white on inside; encrusting; about 2-3 inches thick) in mid & low intertidal. Hygia (exotica?) very thick. Small isopod (2-5 mm long) under rock in high intertidal. Low intertidal & subtidal with many, many Eucidaris thouarsii and quite a few Pharia pyramidata (blue, violet & orange). Lots of Porites in shallow water. Only algae on beach was belt of pale brown (Cladophora?) in subtidal from about -2 ft to -6 ft. (a belt about 30 feet wide). In oyster beds Caulerpa sp. (the feather-like species) was abundant. The oysters beds are man made channels that used to be used to raise oysters commercially & look like this:

Caulerpa sertularioides (Gmelin)



for pearls



Sunday, Nov. 28, 1971 2-4 P.M.

Bahía Ballena, Espíritu Santo Island, off La Paz, Baja California Sur, Mexico.
AIR 80°F WATER 80°F

Sample #3 Pretty poor beach-bay fauna-wise. The bay bottom and beach were composed of a very fine sand made of what appeared to be ground-up coral. There was a gradient from the bay itself (subtidal), where the substrate was so fine as to resemble talcum powder, to the shoreline, where it became more coarse resembling regular sand but much lighter & more porus, to the upper reaches of the beach (high tide line) where large chunks of coral were strewn (several inches to several feet across). In this light, ~~porus~~ porus sand there were imbedded igneous rocks & boulders (probably a basalt).

open bay: many many miniature fish and miniature Callianeetes; a few moon snails and compound ascidians

intertidal: Lygia and rock crabs under rocks.

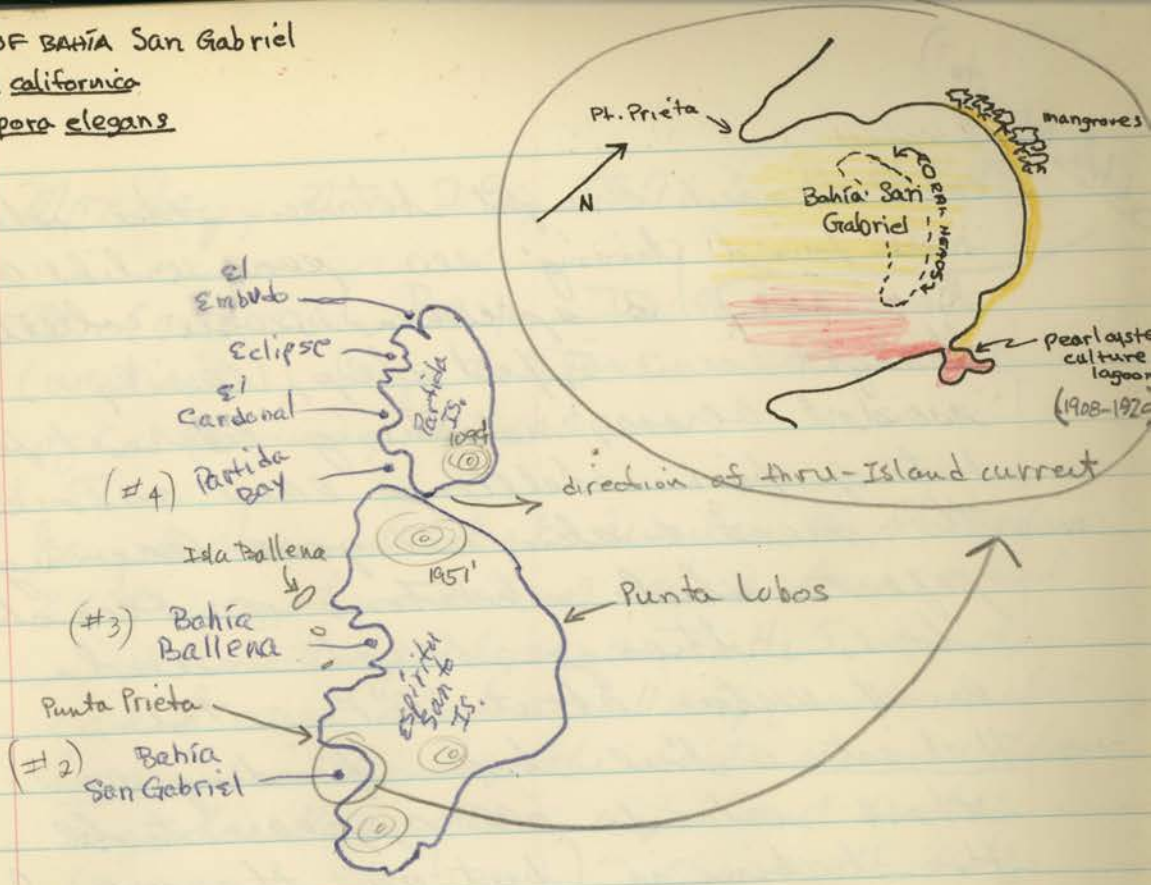
No observable Mangrove life although small stands exist along beach

Ballanus tintinnabulum & oysters on mangrove roots. Ophioderma teres under rocks (few).

CORALS OF BAHÍA San Gabriel

Porites californica

Porcillopora elegans



Monday, Nov. 29, 1971; 9:30 - 11:30 A.M.

Partida Bay (narrows between Espíritu Santo and Partida Islands), N La Paz, Baja California Sur, Mexico.

SAMPLE #4

Substrate similar to station #3; fine coral sand grading from powder-like in bay to gravel with regular sand mixed in on shore. Not too many animals - 2-3 sp. crabs; lots of Lygia as usual; some Eurythoë; lots of oysters and other mollusks; no living coral observed.

Stylatula (elongata?)

on S-shaped straight between the islands were found living sea pens unlike any I've seen. 3 specimens were collected. Straight is 2-5 feet deep, easily waded across, no strong current felt. Lots of fish skeletons cast ashore (or left by fishermen) the meat & skin all gone leaving perfect whole skeletons of bleached bone. Strange beach indeed. Air & water about 80°F. The Heliasters I've been finding on these islands all appear to be H. kubiniji but on the mainland side this species is replaced by H. microbrachius between Kino and Guaymas & only rarely found at Guaymas. were already below the latitude of Guaymas. I've also been finding Uca crenulata and Callinectes bellicosus which I thought were more warm temperate forms. I've not yet seen evidence of an insular fauna here.

Monday, Nov. 29, 1971 : 2-4 P.M.

El Cardonal Bay, Isla Partida (west side); Baja California Sur (Gulf of California), Mexico.

STATION 5

Bay & shore substrate similar to stations 3 & 4 except most of shore-line covered with rotting algae and H_2S mud, caked over rocks. Very few animals: Ligia (millions of the bastards, more than anywhere I've seen); a few mud crabs (Panopeus? Eurytium?); on south side of bay in mangroves Grapsus Grapsus, Eriphia sp., and a large Uca (probably Uca princeps or Uca monolitera). The bay is really shallow (1-3 feet) but drops off fast in outer part to about 20 feet. Bottom in 20 feet depth same powdery coral sand (white, very light and powdery) with scattered clumps of algae. Some 2 predominant algae types Caulerpa sertularioides and a red that resembles Cladophora as in other bays on these islands. Also many young Callinectes bellicosus as at all other bays on these islands. Some ♂ ~~Peli~~ brown pelicans are coming into breeding plumage.

Tuesday Nov. 30, 1971

Isla San Francisco (just below Isla San Jose), approx. 24° 40', Gulf of California, Mexico. (west side)

STATION 6

Collections made along rocky shore and sandy beach of bay on west side of island. The sand here isn't the fine powdery stuff of Isla Partida & Isla Espiritu Santo, but is a volcanic gravel (red) mixed with bits of shells. It is loose and fine but not light & powdery so the bottom doesn't get all murky when disturbed and the beaches are much nicer. I think I collected Grapsus grapsus & Geograpsus lividus as well as Ocypode occidentalis (2 generations) and a couple land hermit crabs. Not too much shore life; island much greener than previous two with a good deal of brush or scrub grass and a succulent reminiscent of ice-plants. There were land hermit crabs all over the fucking beach and way inland but my efforts at tracking them led to only one specimen.

STATION 7

On the bottom at the same cove at Isla San Francisco, 3-6 feet water, patchs

Of the same algae as other places (Caulerpa and the fuzzy brown) imbedded in sand. Got amphipods for Jerry and what appears to be majid crabs as well as a couple weird shrimp. Water 78°, air 80°. Tons of puffers in water. Tried both dredges but neither produced anything but sand.

Wensday ~~Thurs~~ December 1, 1971

Isla San Francisco, Gulf of California
(~~east~~ west side)

STATION 7

Walked across the island to sample rocky shore on other side. Collected large crabs (Grapsus, Geograpsus ??) This island appears to be an extinct volcano, a caldera so-to-speak.

It appears as if water seeps under the sand dike at the east side to spread underground across the salt flats. Numerous sinks are present there & the substrate is always wet. The vegetation is

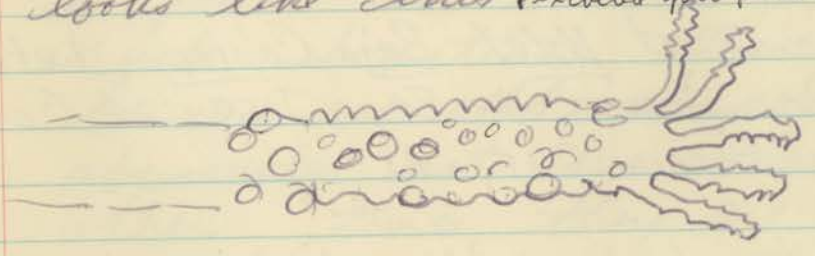
salt-
marsh grass & several types of pickle-
weed (Salacornia ?). This island is
greener & more full of life than
Espiritu Santo or Partida was.

STATION 8

↓ Bahía San Everisto, east coast of Baja
California Sur, across from Isla San Jose,
approx. 24° 50' N. MEXICO. Dec. 1, 1971

This little bay houses a small village
of fishermen and salt produces. The
bay has a muddy bottom, rocky
shore (rocks in mud), sandy
beaches and good vegetation on
the surrounding mountains.
The area is fantastically rich
in all animal forms except large
crabs: Ophioderma panamensis, Ophiocoma
alexandri, Ophiocoma aethiops, Ophiothrix
spiculata; Lygia sp.; Porites californica;
Cypraea sp, Trivia pustulata;
lots of Nemertines, including Baseo-
discus mexicanus; Callianassa &
Upogebia, Selenkothuria lubrica
(here as well as everywhere else
I've collected). The big surprise
was AXIUS VIVESI, they were all
over but I only managed to

capture two specimens, small ones.
It seems the smaller ones cannot burrow as deep or can't escape because if a large rock is overturned you can often capture them before the relocate their hole. The big ones dig so deep & such extensive burrows they simply cannot be dug up short of dynamiting the area. I tried pouring formalin down some holes but they simply retreat to new chambers. Here I also collected a really weird cucumber (I think) that is about 2½ feet long when extended & looks like this (exibited good peristaltic waves)



Apoda: (Leptosynapta ?)
Euapta godeffroyi

December 2, 1971 STATION #9

Isla Cayo, between Isla San Jose and Baja California, MEXICO.
This is a little outcropping of red volcanic rock about 400 feet long and 20 feet wide sticking up out of the water. It

is covered with pelicans & bird shit & appears to be a pelican rookery. On the rocks were large crabs (Grapsus grapsus or Geograpsus lividus, or both ?) and in 10-20 feet of water Oreaster occidentalis. The Oreaster are lavender or chocolate brown with brilliant red-orange tipped spines. The dorsal surface is very porous. The tube feet are the same red-orange as the dorsal spines and are strongly lobed on the ends, the lobes being flattened distally into [illegible] suction discs.

DECEMBER 3, 1971 STATION #10

Rocky point at ~~Hotel~~ Bajo Colorado, between Cabo San Lucas & San Jose del Cabo, Baja California Sur, Mexico.

A rocky (granite) outcropping on a mostly sandy shoreline. The animals here are, without doubt, largely different from the rest of the Gulf. On this first days collecting I would guess approx 40% of the intertidal invertebrates here are not found intertidally in the Gulf. Lots of

weird crabs & many many new & strange cucumbers. Sally Lightfoots are all over of course. Collected a small green stomatopod (intertidal), solid green, all over, also there are plenty of what appear to be Axius vevisi burrows. I'm nearly convenced Axius digs his own burrows in this solid rock, but not totally convinced yet. He seems to prefer building a mud-lined burrow between the stones, the walls being very tightly packed and sturdy - but he quite often is found in burrows in solid rock. Sometimes these rock burrows are odd-shaped and obviously not his doing but other times they are perfectly round, just like the mud burrows & it is these I think Axius may make himself. This hotel is really far out - overlooks Cape San Lucas & the crystal clear waters of the Pacific. Offshore are the Gorda Banks & San Francisco Banks, or reefs. The

there. I suspect what he refers to is a local upwelling. The algae flora here is tremendous, the best by far I've seen in the southern Gulf. Of the many types present I recognized Enteromorpha, Padina, Cladophora (?), Polysiphonia, etc. JLB complains hard about Dick Dwyer!

Dec. 4, 1971 Saturday

Some location - more collections marked station #10. Ophioderma teres, Ophiocoma aethiops, ophiocoma alexandri, and a couple new brittle stars are here. Porites californica and several species of Porcellipora are here. Heliaster microbranchus (?) and several new species of sea star, including 2 "bat-stars". The luminescent galatheid found at Bahia San Evaristo is here (blue body w/ glowing orange spots). The food at the motel Bajo Colorado isn't too hot although the hosts are pleasant. Selenkothuria lubrica still around.

Dec. 6, 1971 Monday

Bahía de la Concepcion, between Loreto and Mulege, Baja California sur, Mexico.

SAMPLE: PAZ-26: very little life although Barnard got a hell of a lot of Amphipods in about 1M of water. Many Pleuroncodes planipes washed ashore about midway down the bay on the east side. Loreto isn't much of a town. The hotels are new & shiny but they still don't have any business so service is poor, no good food no good restaurants in town, etc. The sample from here came from algae washed ashore & rinsed in formalin. Barnard used his collection number (PAZ-26) because he will sort it first for amphipods

STATION #11 Dec. 6, 1971

thallassinids for Burkenroad!
Collected in estuary of Mulege River, about 1/4 mile from mouth, along muddy shore. Probably Upogebia
Water at this point was warm and saline, but not as saline as ocean water.