MEXICO, Golfo de California, Baja California Norte, San Felipe. DEC. 31, 1975.

Collection made by hand on rocky point of town. Formalin wash of rocks with algal turf. No Sargassum present. 6 P.M. water T° = 13° C; air T° = 17°C. Cold, windy New Years Eve with Buddy Winn, Barry Wallerstein and Roy Houston. Area dominated by Cerithium stercusmuscarum. Only echinoderms observed: Ophioderma panamense & Ophionereis annulata (1 each). Small black murex, oysters, Crucibulum and barnacles abundant. Very few crustaceans. 1 sphaeromatid collected. Some anomurans taken for Janet Haig. Virtual absence of large algae indicates we may be here at the height of the winter floral "die-off." The absence of a large primary producer stock, plus the cold water temperatures, is likely the reason for so few animals being present.

Mexico, Baja California Norte (Golfo de California), San Felipe. JAN. 1, 1976

MORNING

First collections of the gear made on muddy tidal flats north of town (ca. 3 miles) at beach of "Campo Peewee". Cold, windy, overcast. Like the rocky point of San Felipe, the area is pretty depauperate with no good algal stands. Few crustaceans seen. Hermit crabs and one Upogebia collected for Janet Haig. No isopods. Several varieties of ectoproct collected (crustose). One Glottidia (palmeri?) found dead on surface. The brachyuran Hexapanopeus rubicundus Rathbun was taken.

EVENING

Jan. 1, 1976 (and morning of Jan. 2)
Coloraditos (ca. 40 mi. So. San Felipe).

Large coquina limestone reef, similar to Puerto Peñasco. Again, the area is depauperate-but not nearly as bad as San Felipe. No anemones but numerous echinoderms, including: Heliaster kubiniji, Othelia tenuispina, Astrometis sertulifera, Ophiocoma alexandri, ophioderma panamense, ophiothix spiculata. Many many sponges and tunicates, including a purple solitary ascidian resembling Rhopalium. Leucetta losangelensis (and an unidentified demospongiae) examined for commensal isopods, several collected, including Paracerceis (?) and other sphaeromatids.

There is a sulphur hot spring here, at about the 0-tide level. It emerges from 4 "holes". Local gringos have built small dikes around 3 of them to allow the H_2O to collect. At low tide they walk or drive out and get the water

for use in bathing, washing clothes and dishes, etc. I suspect the local mexican residents drink it as there appears to be no wells in the area. This human activity makes it impossible to gauge the effects of the thermal region on local marine life. The area around the [redacted] springs is, however, nearly barren. The temperature is over 110° F, probably close to 120°-130° F, and the effects of this may be felt in an area approximately 1250 ft^2. *Heliaster* was found in water from 15-20° C, as was *Acanthina* and a goby. Sea water temperature away from the springs was 11-12° C. Air T° at 7 A.M. = 12° C. Very cold & windy.

Sargassum washes made for isopods. *Colidotea* collected as well as some crabs and amphipods. *Epialtus minimus* common.

Axius vivisi is here, not uncommon!

Pelia tumida (a small brachyuran) lives in the chambers of *Leucetta* here, with the isopods. *Heteropanopeus rubicundus* was taken in the formalin washes.

2 Jan. 1976

Mexico, Baja California Norte, Gulf of California, ca. 5 mi. N. of Puertocitos. Limestone reef with basalt boulders. Evening tide collection made by formalin washing rocks covered with *Enteromorpha* sp. 6 p.m. Air T° = 9° C, H_2O T° = 10° C in pools, 11° C in onshore surf zone.

27 March 1976
saturday
Mexico, Baja California Norte (w. coast),
Ensenada area ∴ Punta Banda.

Tidepooling on rocky exposed southern shores of Punta Banda, ca. 1 mi. below "La Bufadora."
Brusca, winn + Biol. 469 (from U.S.C.).
Low tide, 1 p.m., approx. 0'.

No surf grass seen; abundant marine life; clear and warm; good surf. (but no surfboard for 50 miles!)

28 March 1976
Sunday
Mexico, Baja California Norte (w. coast),
Bahía Todos Santos. low tide.

Observations made on inside shore of sand spit, back of Bahía Todos Santos (an estero).

Monoculture stands of *Monanthochloe* (saltgrass), *Spartina* (cordgrass), and *Zostera* (eelgrass) present. Mixed and monoculture stands of *Batis* and *Salicornia* also present. Primary productivity appears high.

Uca crenulata, *Cerithidia californica*, *Bulla*, *Haminoea* (?), gobies (2 spp.).

10 APRIL 1976
Mexico, Sonora, Puerto Peñasco

Sargassum collections on rocky reef in front of Casa Garcia. Two types of Sargassum present and collected for examination by Bob Setzer. Colidotea findleyi n.sp. and Erichsonella corteri n.sp. both present. Air temp. (mid-day) ca. 80° F; H_2O T° ca. 65° F. Clear. No strong winds or surf. This is day I of the Segal-Brusca Peñasco expedition No. 6. Both species common (but not abundant) on Sargassum sp. 1 (HIGH); uncommon on Sargassum sp. 2 (low). Other algae present include, among others, Caulerpa, Padina, Dictyota, etc.

Two seperate samples were taken, one in the upper mid-intertidal, the other in the lower mid-intertidal. Both contained both species (plus some unidentified anthurids) but the higher sample had considerably fewer specimens.

Sphaeromatids taken from Leucetta losangelensis and leucosolenia.

30-31 MAY 1976

Reconnoitering the area between Tijuana and Ensenada for good rocky shore & surfing camp-sites. 6 localities found.

(1) Punta Banderas. Just past La Joya turn-off on Mex 1D (just so. 1st toll gate). Large rocks and boulders on flat rock bottom. Similar to "flat rock" area at Palos Verdes in so. calif. Camping area restricted; not too flat; a little junky; gringos present.

(2) Calafia. Looks like a resort that never got past the sign stage. Just so. of Rosarito on Mex 1. Small boulders and large rocks on hard rock substrate with adjacent sandy beach. Better than Punta Banderas but still a little junky from gringo campers (too close to main road.)

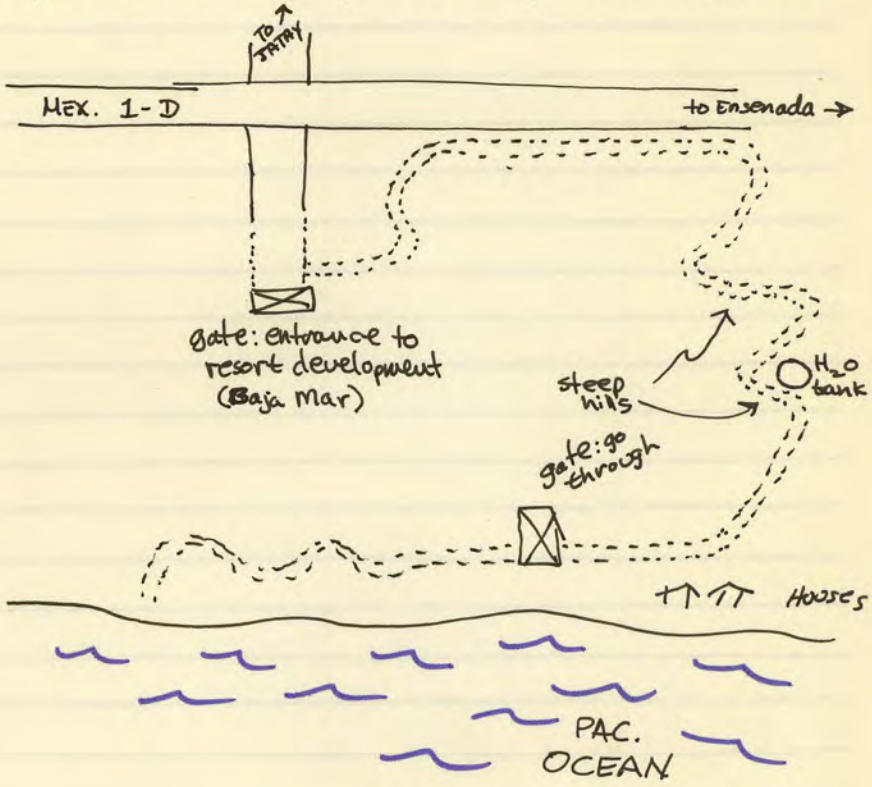
(3) Medio Camino (Half-way house). Good collecting. similar to "flat rock" area on Palos Verdes Penn. Camping better than Punta Banderas or Calafia.

(4) Jatay turnoff. Off Mex 1D. Road E. goes to Jatay; rd. west goes to new development "BAJA MAR" or "BAJA SUR". At entrance gate to development go left on dirt road (before going through gate). Road goes down into a very small wash and then

30-31 May 1976

Up again to head south, paralleling Mex 1-D. It runs along the toll road ca. 3-5 miles then cuts W. through the mountains and across to the ocean (another 30 minutes).

Littoral is Excellent here. Good mussel beds; many tidepools; abalone; NO GRINGOS

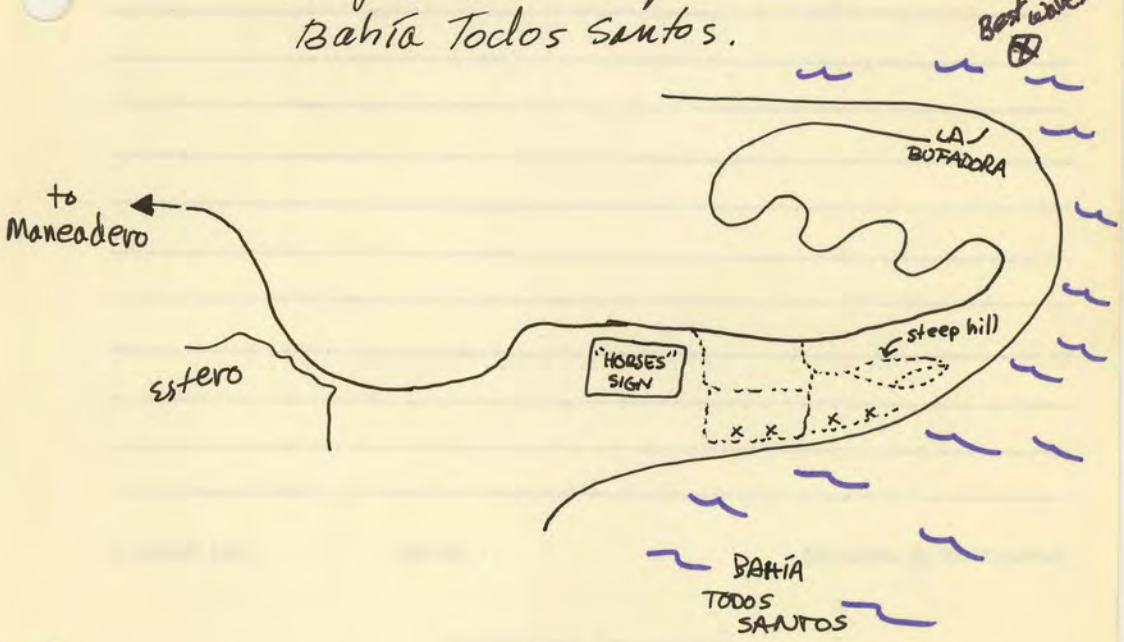


(5) Salsipuedes. Another good area but not as good as ④, above. Take "Salsipuedes" turn-off just No. of last toll gate (No. of El Sauzal). Go west down steep hill into olive tree orchard to camp. steep climb down to beach. small sandy beach and large

↑ Good surf spot

boulder beach present. Looks fairly rich. Surf grass present, (lobster?). Camping $1.00/car per day. Beautiful campsites. A few gringos.

⑥ Punta Banda. Excellent littoral but nearest good campsite is on Punta Banda itself. Take Pt. Banda turn-off out of Maneadero and go past estero and up on top of point. A small shack advertising horses is just before summet. The dirt road here meets the dirt road [on the right (No.)] between it and the summit campsite. This leads to good flat campsites overlooking Bahía Todos Santos.



31 July 1976

Mexico, Baja California Norte (w. coast), Punta Salsipuedes. [region known as "Jatay"). ca. 20 mi. N. Ensenada.

Dominant Plants

1) Agave (A. shawii)
2) Mesembyanthymum (chilensis ?)
3) Jojoba (= goatnut) (simmondsia chinensis)
4) Laurel Sumac (Rhus laurina)
5) Flattop buckwheat (Eriogonum fasciculatum)
6) small yellow daisy-like flowers; low growing; similar to mesquite
7) small purple flowers w/yellow stamens & pistils
8) Prickley Pear; small Barrel cactus; ~~saur pilayke~~ velvet cactus

Cetaceans

1 or 2 schools of pilot whales seen on fringes of kelp bed, 400-600' offshore. (Globicephala). Each school with 5-10 individuals.

Intertidal Region

Large surf (2'-10'); mild N-S breeze; air T° 1 hr. after sunrise = 17°C; noon T° = 25°C; sea surface (surf) T° = 12-13°C.

Volcanic point with massive basalt headland and large boulders.

The cold H_2O T° suggests some upwelling occurs on this point.

Robinson (1974) records offshore sea surface T° for Punta Salsipuedes at 16.6° C (=62°F), for month of July.

2 August 1976

Mexico, Baja California Norte (w. coast), Punta Salsipuedes ("Campo Jatay"), ca. 20 mi. N. Ensenada.

w/U.S.C. class - "Marine Ecology of the Baja California Peninsula"

Participants	rank	
R. Brusca	Instructor	
Bud Winn	T.A.	
Dick Zimmerman	T.A. & diving officer	
Bab Cimberg	T.A.	
Margaret Callahan	T.A.	
Barbara Chudzik	student	(grad student - Princeton)
Mark Crase	"	(Northridge)
Karl-Heinz Holtschwit	"	(Guaymas marine station)
Bruce Knudtson	"	
Susan Leeds	"	
Steve Meloan	"	
Patrick Moriarty	"	
Phil Pepe	"	
Diane Perry	"	
Bruce Scott	"	
Cheryl Strand	"	
Chris Sweeny	"	
Barry Wallerstein	"	
Anna Mary Mackey	Hanger-on	
Janet Haig	"	
Audrey Zimmerman	"	
Terry Tanahill	"	
Paula Rasmussen	"	

2 Aug. 1976 (cont.)

We are examing species diversity and food web complexity on rocky intertidal shores, from 32° S to the Tropic of Cancer, and Cabo San Lucas.

We are using the following indices:

① Menhinick, 1964: $D = S/\sqrt{N}$

② Gleason, 1962: $D = S/\log N$

③ Margalef, 1951: $D = S-1/\log N$

④ Menhinick, 1964: $D = \log S/\log N$

⑤ Shannon Index, 1949: $H' = -\sum p_i \ln p_i$

⑥ S & S'; J'

Methods.

4-6 20 cm^2 quadrats are scrapped clean in each of 4 zones: Zone I = periwinkle zone
Zone II = barnacle zone
Zone III = Pollicipes zone
Zone IV = Algae zone.

The choosing of each quadrat site is by use of a random numbers table. Chtamalus areas are subsampled with 2 cm^2 quadrats (number determined by a species area curve), and then adjusted to 20 cm^2. Zones are based on Ricketts, et al. (1968). Everything above 3 mm in size is counted. The following taxa are being surveyed:

1. crustacea (porcellanidae, paguroidea, Brachyura, barnades & isopods).
2. Molluscs (all)
3. Echinoderms (all)
4. Polychaetes

2 August 1976 (cont.)

The DATA

CRUSTACEANS

species:

- *Pollicipes polymerus* (zone III)
- *Balanus glandula* (zone III, few in zone II)
- *Chthamalus fissus* (zone II, few in zone III)
- Barnacle (unid. spp.) (zone III)
- *Tetraclita squamosa* (zone III, few in zone IV)
- *Tetraclita* sp. (resembles *B. cariosus*) (zone III, few in zone IV)
- *Pachygrapsus crassipes* (zone III & IV)
- *Petrolisthes cabrilloi* (zone III)
- *Petrolisthes* sp. (zone III)
- *Pugettia producta*, juvs. (zone IV)
- *Cirolana harfordi* (zone IV, few in zone III)
- '*Dynamenopsis*' sp. (zone IV)
- *Idotea* sp. (zone IV)
- *Idotea stenops* (zone IV)

	ZONE I	ZONE II	ZONE III	ZONE IV	
S'	$\bar{x}$ = 0	2	10	9	Σ = 14
H'	$\bar{x}$ = 0	$\bar{x}$ = .002	$\bar{x}$ = .627	$\bar{x}$ = 1.162	$\bar{x}$ = .4478
D (ln S'/ln N)	$\bar{x}$ = 0	$\bar{x}$ = .148	$\bar{x}$ = .394	$\bar{x}$ = .496	$\bar{x}$ = .2595

H' $\bar{X}$ of means = .4478

D $\bar{X}$ of means = .2595

2 August 1976 (cont.)

ECHINODERMS

Not enough specimens taken in quadrats to be statistically analysed.

species recorded: Strongylocentrotus purpuratus
Pisaster ochraceous
Patiria miniata
Amphiodia sp.
Henricia leviuscula, juv. (?)

$S' = 5$

MOLLUSCS

Mytilus californianus
Septifer bifurcatus
Lottia gigantea
Acanthina spirata
Tegula funebralis
Tegula gallina
Collisella digitalis
Collisella scabra
Collisella limatula
juvenile limpets
Collisella strigatella - C. fenestrata complex
Homalopoma baculum
Littorina planaxis
Littorina scutulata
Mopalia muscosa
Odostomia sp.
Thais emarginata
Mitrella carinata
juvenile chiton
Cyanoplax hartwegii
Hiatella arctica
Fissuella volcanoe
Lucapinella callomarginata
Rostanga pulchra
Ocenebra circumtexta
Macron lividus

2 Aug. 1976 (cont.)

diversity:

	ZONE I (includes tidepool)	ZONE II	ZONE III	ZONE IV	
S'	$\Sigma = 8$ $\bar{x} = 2.2$	$\Sigma = 8$ $\bar{x} = 3$	$\Sigma = 16$ $\bar{x} = 8.8$	$\Sigma = 16$ $\bar{x} = 7$	$\Sigma = 25\text{-}27$
H'	$\bar{x} = .3443$	$\bar{x} = .1286$	$\bar{x} = .9061$	$\bar{x} = 1.0242$	$\bar{x} = .6008$
D ($\log S'/\log N$)	$\bar{x} = .2008$	$\bar{x} = .1576$	$\bar{x} = .3476$	$\bar{x} = .5536$	$\bar{x} = .3149$

4 August 1976 CATALOG #2039

Mexico, Baja California Norte (w. coast), on the coast over from Colonia Guerrero (ca. 12 mi. N. of San Quintin). This is on the south shore of Bahía San Ramon. Sign at Hwy. says "Dos Amigos".

A transverse range of low mountains intersects the coast here, creating a low alluvial valley on its so. side. The valley ends in an estuary that appears to get water only only during heavy storms. It is presently seperated from the sea by high sand dunes (3-6 m tall).

The coast is sandy in the most part but right in front of the mouth of this relict estuary is a mass of small boulders, 1/4 - 3/4 M in diameter. They are firmly embedded in a muddy-sand substrate with a high SO_2 content. Appears very stable, but must get rock turnover at least once every couple of months because there are no large barnacles or large echinoderms. Mud is anoxic 1-2 cm under surface.

Air T°: at Midnight = 17°C, at noon = 24°C

Water (surf) T°: at 3 p.m. 22°C.

Dominant plants of area

Junco (Rush), Juncus sp.
Willow, Salix sp. (stunted)
Oak, Quercus sp. (stunted)
Pickle weed, Salicornia pacifica

4 Aug. 1976 (cont.)

ice plant, *Mesembryanthimum* (*chilensis* ?)

Tamarisk, *Tamarix pentandra*

Jimsonweed, *Datura discolor*

DATA

CRUSTACEANS

Pachygrapsus crassipes

Pagurus samuelis

Pagarus hirsutiusculus

Hemigrapsus oregonensis

Pagurus sp.

Cancer productus

Pugettia producta

Chtamalus fissus

Cirolana harfordi

Idotea urotoma

"*Dynamenopsis*" sp.

Synidotea sp.

	zone I	zone II	zone III *		zone IV	
			upper	lower		
S'	$\Sigma = 3$ $\bar{X} = 2$	$\Sigma = 6$ $\bar{X} = 1.8$	$\Sigma = 5$	$\Sigma = 3$	$\Sigma = 7$ $\bar{X} = 1.8$	$\Sigma = 12$
$\bar{X}$ H'	.0029	.0754	.1227	.0065	.1437	$\bar{X} = .0702$
$\bar{X}$ D $\left(\frac{\ln S'}{\ln N}\right)$	.1038	.0833	.2242	.1287	.3462	$\bar{X} = .1772$

* zone III here is an *Ulva* zone (not *Pollicipes*, as at Jayty).

4 August 1976 (cont.)

Molluscs

°Littorina scutulata

°Tegula gallina

o = dominants

Tegula funebralis

Collisella asmi

Collisella limatula

Collisella strigatella – C. fenestrata complex

juvenile limpet

Petricola californianus

°Lacuna unifasciata

°Mitrella carinata

Mytilus edulis

Epitoneum tinctum

juvenile chiton

Tivela stultorum

Chione undatella

° Protothaca staminea

	ZONE I	ZONE II	ZONE III*	ZONE IV	
S'	$\Sigma = 6$ $\bar{x} = 2.5$	$\Sigma = 3$ $\bar{x} = 1.25$	$\Sigma = 2$ $\bar{x} = 1.2$	$\Sigma = 12$ $\bar{x} = 5.2$	$\Sigma = 16$
H'	$\bar{x} = .0696$	$\bar{x} = .0833$	$\bar{x} = .0155$	$\bar{x} = .4402$	$\bar{x} = .1522$
D $(\frac{1-S}{\ln N})$	$\bar{x} = .1771$	$\bar{x} = .1533$	$\bar{x} = .0402$	$\bar{x} = .5517$	$\bar{x} = .2306$

4 August 1976 (cont.)

Polychaetes

	ZONE I	ZONE II	ZONE III	ZONE IV
S'	$\Sigma = 3$ $\bar{x} = 1.5$	$\Sigma = 3$ $\bar{x} = 1.6$	$\Sigma = 4$ $\bar{x} = 1.0$	$\Sigma = 15$ $\bar{x} = 5.0$
H'	$\bar{x} = .33$	$\bar{x} = .40$	$\bar{x} = 0$	$\bar{x} = .59$
D ($ln S / ln N$)	$\bar{x} = .15$	$\bar{x} = 9.6$	$\bar{x} = 11.5$	$\bar{x} = 7.2$

Echinoderms

Lytechinus pictus

Patiria miniata

8 August 1976
Mexico, Baja California Sur, Laguna Ojo de Liebre ("Scammon's Lagoon").

Examined back waters of Scammon's Lagoon, in salt evaporation ponds. A spider, a fly and some insect larvae were collected. All were clinging to the underside of the salt crystal mat, in 2'-8" of water. Water T° ca. 80°F.

9 August 1976

Mexico, Baja California Sur, e. coast of peninsula, Punta Chivato (ca. 20 mi. so. Santa Rosalia).

Beautiful rocky pt. with coquina limestone and volcanic beds throughout littoral. We are camped ca. 3 miles past "Hotel Pt. Chivato."

Midday air T° = 36° C (98° F) – in shade

" H_2O T° = 28° C (82.4° F) – surf zone

Took a dive with AM – had a Porgy (Pacific) for dinner.

Next day (Aug. 10) we shot a Clown Hogfish for lunch. Good but boney. Lots of Panulirus inflatus seen but none captured by RC or AM, several taken by others.

Road to "Hotel Punta Chivato", from main Hwy., is 14 miles. Good in most places, rocky in a few spots. About 1.5 Hr. drive.

MOLLUSCS

Species List: Littorina aspera (zone I only)
Nerita scabricosta (zone II only)
Tegula mariana (bottom of zone I)
Mitrella guttata (zone III) – top of
Chiton virgulatus (zones III & IV)
Diplodonta inezensis (bottom of zone III)
Isognomon janus (bottom of zone III)

9 Aug. 1976 (cont.)

Nassarius versicolor (top of zone III)
Morula ferruginosa (zone IV)
Tegula corteziana (bottom of zone III)
Mitra lens (zone IV)
Mitrella delicata (zone IV)
Crepidula acoleata (zone IV)
Parametaria dupontii (zone IV)
Chiton stooksii (zone IV)
Callistochiton gabbii (zone IV)
Columbella fascata (zone IV)
Bulla gouldiana (zone IV)
Anachis varia (bottom of zone III)
Mitra tristis (zone IV)
Tagelus affinis (zone IV)
Crassispira discors (zone IV)
Octopus sp. (zone IV)
Cerithiopsis cosmia (zone IV)
Crassispira nymphia (zone IV)
Crepidula excavata (zone IV)
Barbatia sp. (zone IV)
Anachis hilli (zone IV)
Acanthochiton exquisita (zone IV)

9 Aug. 1976 (cont.)

	Zone I	zone II	zone III	zone IV	
S'	Σ= 2 $\bar{x}$= 1.25	Σ=3 $\bar{x}$= 1.0	Σ=8 $\bar{x}$= 2	Σ = 22 $\bar{x}$= 7.3	$\bar{x}$ = 2.86 Σ=31
$\bar{x}$ H'	.0373	.0495	.0876	.5495	$\bar{x}$ = .1810
$\bar{x}$ D (lnS/lnN)	.0453	.1249	.3358	.7997	$\bar{x}$ = .3264

Dominant molluscs (numbers of ind.):

(1) Littorina aspera
(2) Mitrella guttata
(3) Nerita scabricosta
(4) Morula ferruginosa
(5) Isognomon janus

CRUSTACEA

Leptodius occidentalis
Eriphia squamata
Glyptoxanthus sp.
Pachygrapsus transversus
Epialtus minimus
Xanthodes hebes
Panopeus purpureus
Collodes tumens
Cirolana sp.
Paracerceis sp.
Paranthura ~~sp. ?~~ infundibulatum ← Id. by Gary Poore 8/81
Stomatopod
Synalpheus sp. (2 spp.)

Petrolisthes ortmanni
" edwardsii
" hirtispinosus
Megalobrachium tuberculipes
Clibanarius digueti
Pagurus sp.
Alpheus (2 spp.)
Pachycheles sp.

Grapsus grapsus (not taken in quadrats)

9 Aug. 1976 (cont.)

	ZONE I	ZONE II	ZONE III	ZONE IV	
S'	$\Sigma = 1$ $\bar{X} = .5$	0	$\Sigma = 6$ $\bar{X} = 2.5$	$\Sigma = 19$ $\bar{X} = 6.5$	$\Sigma = 23$ $\bar{X} = 2.38$
$\bar{X}$ H'	0	0	.5572	1.2538	$\bar{X} = .4528$
$\bar{X}$ D	0	0	.3861	.8205	$\bar{X} = .3017$
$\bar{X}$ J'	0	0	.6081	.6698	$\bar{X} = .3195$

ECHINODERMS

Ophiothrix spiculata
Ophionereis annulata
Ophiactis simplex
Ophioderma panamense
Ophiocoma aethiops
Selenkothuria lubrica
Brandtothuria arenicola
Astrometis sertulifera
Pharia pyramidata
Arbacia incisa

	ZONE III	ZONE IV	
S'	$\Sigma = 6$ $\bar{X} = 1.1$	$\Sigma = 7$ $\bar{X} = 1.8$	$\Sigma = 10$
$\bar{X}$ H'	.2422	.3798	$\bar{X} = .3110$
$\bar{X}$ D	.4335	.1976	$\bar{X} = .3155$

$(\ln S / \ln N)$

14 August 1976

Mexico, Baja California Sur (E. coast), ± 5 miles No. Loreto at "Abajo" (between Loreto and Punta Tierra Firma). Site of an abandoned hotel project.

Good rocky shore of large cobble to boulder-sized rocks embedded in mud. Abundant algae. Best collecting appears to be off point in front of hotel foundation (where cement stairs are). Due to neap tides and strong offshore breezes we could not sample here. Stayed 2 nights then moved on to Mag Bay.

Air T° = 35° C H_2O T° = 29° - 30° C (surf)

At the end of 2 weeks of camping in Baja. The desolate land, empty beaches, and ever-present sea have begun to message my soul and my mind flies forward & backward in time as I let the sounds of the rolling surf carry me away on quiet flights of fantasy. From the past a desert childhood bekons; from the future, silent streets of Singapore awaken to the golden glows of an eastern sun.

16 August 1976

Mexico, Baja California Sur (w. coast), Bahía Magdalena. Camped near concrete bridge over tidal channel, ca. 3 mi. before Puerto San Carlos. [at Mag Bay Aug. 15-17] H_2O T° ca. 27°c

Mangroves healthy; reds 6'-12' tall; blacks & whites present. Samples taken on roots, between roots, in mid-channel. Roots dominated by Littorina fasciata, Cerithium stercusmuscarum, Ostraea palmula, Balanus pacificus & Chthamalus fissopora.

Mollusk Data

Littorina fasciata (on roots)
Cerithium stercusmuscarum (on roots)
Crepidula incurva
Theodoxus leuteofasciatus
Ostraea palmula
Turbo fluctuosus
Anachis coronata
Nassarius tiarula
Chione amathusia
Argopecten circularis
Chione undatella
Crepidula striolatta
Diodora inequalis
Crepidula onyx
Crucibulum spinosum
Crucibulum concameratum
Crucibulum scutellatum
Acteocina infrequens

Chama buddiana

Ostrea iridescens

Brachiodontes semilaevis

misc. small bivalves

		mangrove roots	mud around roots	channel mud + rocks	
	S'	$\Sigma = 5$	$\Sigma = 3$	$\Sigma = 17$	$\Sigma = 22$
	$\bar{H}'$	.2304	.1093	.6675	$\bar{x} = .3357$
$(\log S / \log N)$	$\bar{D}$	.3179	.2186	.4447	$\bar{x} = .3271$
	J'	—	—	—	

ECHINODERM DATA

Arbacia incisa

Ophiothrix spiculata

Ophiactis simplex

Ophionereis annulata

Ophioderma teres

Astrocaneum spinosum

lg. orange asteroid - resembles O. tennispina!

$S' = 7$

$N = 80$

$H' = 1.2081$

$D = .4440$

$J' = .6208$

all echinoderms collected from rocks in mid-channel.

16 Aug. 1976 (cont.)

CRUSTACEA DATA

Balanus pacificus (on mangrove roots & rocks in channel)
Chthamalus anisopoma (on mangrove roots)
Upogebia sp.
Dynamenella sp. (or ♀ Paracerceis)
Tetragrapsus jouyi
Cirolana sp.
Pinnotheridae
Eurytium affine
Leptodius occidentalis
Lophopanopeus ?
Paracerceis sp.
Pagurus sp.
Collodes tumens ?

Pachygrapsus (sp.?)

	mangrove roots	mud between roots	channel mud, sand & rocks	
S'	3	2	10	$\Sigma = 15$
H'	.1558	0	.9384	$\bar{x} = .3647$
D	.3297	0	.3918	$\bar{x} = .2405$
J'	.1558	0	.0938	$\bar{x} = .0832$

19 - 22 August 1976

Mexico, Baja California Sur, La Paz

4 days in La Paz for R & R. A valve stuck in old paint (#1 cylinder); NO compression at all. The local V.W. dealer did a complete ring job & valve grind by hand (pocket knife & sandpaper) — $168.00. She'll never be the same! La Paz is even more expensive than I remembered — tequila in most bars is $1.60, mixed drinks $2.00. Stayed at the Hotel Lori for $14.00/night. La Perla was asking $20.00/night and up (double); Los Arcos (the nicest in La Paz) was $30 & up.

23 August 1976

Mexico, Baja California Sur, 5 miles east of Cabo San Lucas (ca. 1 mi. past Hotel Cabo San Lucas), on coast at site of beached Japanese freighter.

Beautiful site, good rocky shore & sandy beach here. Strong currents & surge. H_2O T° = 27°C
Great wave break for 8' board.

Mollusks

Littorina aspera
Littorina pullata
Nerita scabricosta
Purpura pansa
Septifer zeteki
Epitonium tinctum
Conus nux
Rissoina stricta
Triphora haumai
Hipponix pilusus
Isognomon recognitus
Acanthochitona sp.
Cerithium sculptum
Mitra tristis
Spondylus sp.
Thais speciosa
unidentified tectibranch
Serpulorbis squamigerus
Quoyala madreporarum
Lithophaga aristata

	I	II	III	large tidepool	
S'	3	3	11	10	$\Sigma = 20$
$\bar{H}'$	.0966	.3414	1.0519	.6985	$\bar{x} = .5471$
$\bar{D}$	.0807	.1313	.6875	.5248	$\bar{x} = .3561$

23 August 1976 (cont.)

CRUSTACEA

Pachygrapsus transversus
Eriphia squamata
Calcinus californiensis
Collodes tumens
Eriphia granulosa ?
Leptodius occidentalis
Calcinus explorator
Eusymmerus attenuatus
Cirolana sp.
Dynamenella sp. (?)
Xanthodes hobes
Alpheus sp.
Aegia sp.
Microphrys platysoma
Petrolisthes glasselli
Epialtus minimus
Pitho picteti
3 unidentified brachyurans
3 " cariid shrimps

Lophopanopeus ??

23 August 1976 (Cont.)

	I	II	III surfaces	III crevices	permanent large tidepool
S'	0	1	5	9	16
$\bar{H}'$	0	[illegible]	.5416	.9604	.4298
$\bar{D}$	0	[illegible]	.3314	.9207	.3505

ECHINODERMS

Selenkothuria lubrica

Brandtothuria arenicola (?)

Ophiactis simplex

Ophionereis annulata

Ophiocoma alexandri

Ophiophragmus (?)

Echinometra vanbrunti

Diadema mexicana

Phataria unifascialis

Heliaster kubiniji

Janet Haig & Diane Perry collected large Hippa at sandy beach near fish cannery - about a dozen specimens (of 2 species?).

27 August 1976

Mexico, Baja California Sur (E. coast), Bahía Pulmo (= Cabo Pulmo).

Three days at Cabo Pulmo winding up the class (Bio 478: Marine Ecology of the Baja California Peninsula). Since 31 July 1976 we have been examining species diversity on both shores of Baja. In retrospect I think the biggest mistake we made (scientifically) was to try and compare temperate littoral zones to tropical, without altering our concept of a "zone" or the treatment of the data. The tropics are so rich (s') and so lacking in dominance that small (20 cm²) quadrats simply did not capture a fair representation of the total species present. Instead of doing 4 20 cm² quadrats & computing the H' & D for each, then taking the mean; we should have lumped the data from all 4 and figured a single H' & D. Checking back I found this approx. doubled our mean H', D & S' figures in the Gulf, but had little effect on the Pacific data (which further substantiates the need for differing the work-up as one moves into the tropics). Also, next time I teach a course like this I intend not to pick a single ecological phenomenon to examine, but rather, look at a different

ecological concept at each study site. As last year (on the Sonoran coast) all the teams of students found habit heterogeneity and stability to be the most significant parameters effecting diversity on a small scale (ie. within the larger global pattern of sea temperatures).

Anna Mary & I took a dive on the coral reefs here. Best act of the Baja follies was Phil Pepe & Mark Crase's fashion show (with clothes stolen from other participants.). Best "off-broadway" show was Barry & Margaret. Best T.A. was Cimberg without a doubt - he was great. was another disappointment, as he was last year. Dick could have been good but only rarely spoke up. His fish work was excellent & showed initiative,

Best students were Phil Pepe, Mark Crase, Cheryl Strand, Diane Perry & Barry Wallerstein.

On the following page is a list of the reptile recorded on Baja this summer by Cheryl Strand.

1 Sept. 1976

Mexico, Jalisco, Puerto Vallarta

Ferry from Cabo San Lucas to Puerto Vallarta was exceptional for its cleanliness & beauty – at least equivalent to the Greyhound terminal in downtown L.A. Old points' value is beginning to stick again. Spent 1 extra day here at V.W. shop, they couldn't find the problem. Will try again today. Clutch is also acting up. Spent the night at Trailer Court "Tacho's", across from the ferry terminal. Very very nice. Showers, clean heads, good pool, $3.60 - 4.00/night. Only other trailer court in Vallarta is the "Trailer Court Puerto Vallarta" – it's pretty raunchy & has no pool. Bar hopping in the evening has further fixed my concepts regarding the aspect of "quality" in Mexican culture. The most expensive

places are those that emulate all that is plastic in the U.S. (ie. Holiday Inn, etc.), where the exchange rate is $12.40, coffee is 50¢ a cup, & meals & rooms are outrageous. The best of Mexico still lies in the dirty, downtown bars & small cafes. Barry Wallerstein & Phil Pepe are making this stumbling journey from Cabo San Lucas to Tucson with us - via Puerto Vallarta, Guadalajara, Mazatlan & up the coast. I've had more problems on this Mexico trip than I've ever had on any trip previously - enrolment hassles, TA fuck-ups, car problems, trouble finding sampling sites, etc. etc. I think my Mexican karma has finally begun to shift.

4 Sept. 1976

MEXICO, COLIMA, Manzanillo, Bahía (= Playa) Audienoia (beach [redacted] 1 bay S. of Hotel Las Hadas). Collections made on north shore of bay, 12 noon – 2 p.m. (local time). Exposed granite bedrock & boulders. Water line ca. 2½-3' below apparent high water line.

Overcast & rainy. Air T° = 27-28°C. Water T° (surf line) = 30°C.

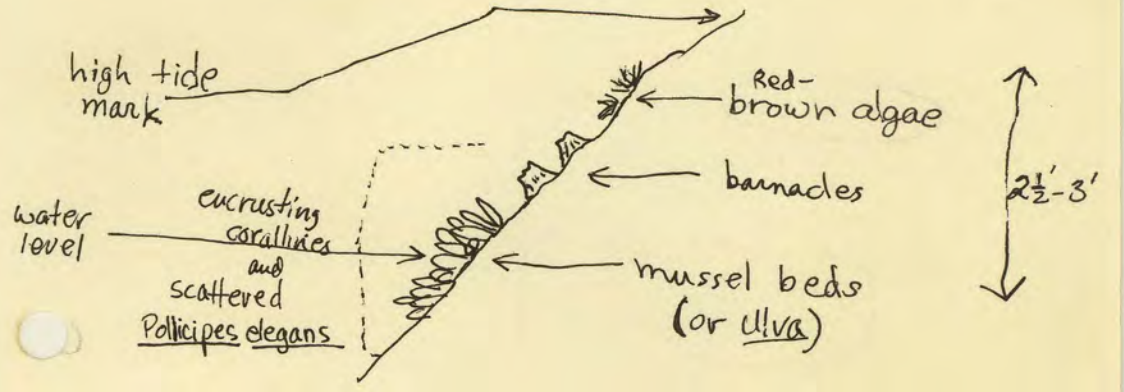
4 discreet collections made:

1. Mussel bed. Thin & patchy, one layer of mussels only.
2. Barnacle zone. Most barnacles empty. Heliaster microbranchius present.
3. Red-Brown algae zone
4. Ulva zone. (ulva washs)

Megabalanus peninsularis (Pilsbry) (id. by W. Newman) → 2

← id. by Setzer & Gray

3 → Dermonema frappieri (Mont. & Mill.) Borg and Chaonospora minima (Hering) Papenfuss



Collectors: Brusca, Barry Wallerstein, Phil Pepe, A.M. Mackey

5-6 Sept. 1976

Mexico, Jalisco, Guadalajara.

2 days is not enough time to see all of the "Mercado Libertad" let alone the rest of this lovely city.

Mexico, Nayarit, San Blas

Isopods taken under rock ca. 15' from shore of Rio San Blas (?) - near Mantanchen (ca. 5 miles, by road, from San Blas). Oniscoidians.

7 Sept. 1976

Mexico, Sinaloa, Mazatlan

3 collections made.

#1 muddy rocks at rocky point south of town. formalin washes got no isopods

#2 small mussel bed on rocky outcropping along "Embarcaderos".

#3 Rocky point at far northern end of beach in front of town - north of the old Jergens coconut plantation. Collections of a stiff, bushy, green alga revealed numerous sphaeromids + a few polychaetes.

H_2O T°: 29-31° C - surf line

Brusca / Mackey / Wallerstein / Pepe

Sargassum Project I

23 Oct. 1976

Mexico, Baja California Norte (E. coast), Coloraditos (ca. 40 mi. S. San Felipe).

Brusca did not accompany this field party, which consisted of: B. Wallerstein, Diane Perry, Phil Pepe (& Roy Houston).

5 gallon bucket was filled with Sargassum from a beach drainage channel, in 2.7' of water, at low tide (-5' at 2000 hrs.). Air T° = 18° C

Water T° = 22° C

Salinity (surf) = 37 ‰

Total wgt. Sargassum = 2096.2 gms

Jim Norris (USNM) identifies this alga as S. sinicola Setchell et Gardner (1924), although notes that its muricate stipes are characteristic of S. camouii Dawson, a species the he considers to be a morphological variant of S. sinicola.

Amphipods: Zimmerman is handling

Isopods: see following page

All other material: "saved"

21 November 1974

California, Santa Catalina Island, SE (lee) side, otter trawls off R/V Nautilus in 40-50 fms on sandy bottom. Inverts collected for Cal State Northridge. Fishes examined for isopod parasites. Approximately 10 out of 200 Pacific Sanddabs were infested (*Citharichthys sordidus*) = 5% infestation rate.

Sargassum Project II

17 January 1977

Mexico, Baja California Norte, Coloraditos (ca. 40 mi. S. San Felipe)

H_2O T° = 12.5° C

6, 1 gal. samples of Sargassum taken.

Collections made by R. Hooston (Brusca or Zimmerman not present).

Sample #1:
high tidepool
899.0 gm

Sample #2:
high tidepool
976.6 gm

Sample #3:
tidal channel
755.1 gm

Sample #4:
tidal channel
864.7 gm

Sample #5:
low intertidal tidepool
1240 gm

Sample #6:
low intertidal tidepool
774.8 gm

Mexico, Sonora, Puerto Peñasco (Golfo de California). 4 April 1977.

Isopods, pycnogonids & caprellids taken from *Sargassum* sp. on Station Beach reef. H_2O T° ca. 68° F; highest air T° ca. 85° F; clear; sunny.

Isopods included *Colidotea findleyi*
Erischonella cortezi
various anthurids & sphaeromatids

Live material saved for B. Wallerstein.

7 May 1977

Sargassum Project III

Mexico, Baja California Norte (E. coast), Coloraditos (ca. 40 mi. S. San Felipe)

Air T° = 16°C (0600 HRS) 21°C (0930 HRS)

H_2O T° = 20.5°C (surf) " 24°C (tidepool) "

Sargassum taken in low tidepools (6 gallons). Plants very small; generally sparse all over the reef.

Sample #1: 724.13 gm

Sample #2: 578.65 gm

Sample #3: 651.90 gm

Sample #4: 721.75 gm

Sample #5: 754.40 gm

Sample #6: 819.05 gm

Mexico, Baja California Sur, Bahía Concepción. 25 July 1977

A quick stop for Rich. Air T° = 36°C (shade); H_2O T° = 35°C (surf); Salinity = 38 ‰ (surf); Sand T° (sun) = 40°C.

Sargassum Project II

13 November 1977
Mexico, Baja California Norte (E. coast), Coloraditos
(ca. 40 mi. S. San Felipe)

Surf temp. = 22°C
tidepool temp. = 20°C
air temp. = ca. 27°C
} 0830 hrs.

Sky clear; weather good; wind < 5 kts.;
seas very calm.

Sargassum samples taken at low tide (-1 ft. at 0900 hrs.). 6 gallons taken in large tidepool (same tidepool most other samples taken from). Tidepool is 100' x 30'; Sargassum cover 25-30% (about the same as last July's sampling period; plants relatively short, with much "new growth").

~~Some~~ Padina present. T° in hot spring = 65°C.

Live Colidotea taken for Barry.

22 January 1978 Sargassum Project III

Mexico, Baja California Norte, Coloraditas

Sargassum collections made by Roy Houston.

Time = 0730 H_2O T° = 15° C

20 August 1978 SARGASSUM VII

Mexico, Baja California Norte, Coloraditos (40 mi. So. San Felipe).

Sargassum collections made. Sargassum sparse but still present in fair-sized clumps in large tide pool (ca. +1 or 2 ft.). H_2O T° = 84° F. Clear & warm.

17 December 1978

Mexico, Baja California Norte (Gulf of California), San Felipe, Campo Peewee.

worked night tide with Ernie Iverson & some students from Biol. 469 (incl. Blayne Hartman). Water to (8 p.m.) in standing pools 13°C. Captured *Ancinus* sp. in "amphioxus sand", as well as a two sphaeromatids (*Paracerceis* ? ♀). Little life on mud/sand flats in front of campo Peewee. No *Pseudobolerites* or compound ascidians. Barnacles taken for Bill Newman. Hermit crabs taken for Janet Haig. One heart urchin (*Brissius* ??) collected. Cold & raining.

18 December 1978

Mexico, Baja California Norte (Gulf of California), San Felipe.

Worked rocky point of Punta San Felipe with E. Iverson & A.M. Mackey. H_2O T° (10 AM) in surf 15°C. cold & rainy. As usual in the winter the tidepools were dominated by several species of barnacle, Tegula sp., Chiton virgulatus & Clibanarius digueti. Very little else seen. One Eriphia squamata found, and several Eurytium sp. under rocks. No octopods, few chitons or snails, No algae whatsoever (one small patch of a scrubby red found). No Hexaplex or Muricanthus & NO Sargassum. Appears that San Felipe has suffered its increasingly frequent, cold, winter die-off. Not even a live Turbo found.

31 December 1978

Mexico, Sonora, Guaymas (Bahia San Francisco) ["San Carlos"]. Small rocky outcropping in front of Lloyd T. Findley's house. Low tide collection made ca. 5 p.m. H_2O (surf) T° = ~65° F. (18-19°C)

Enteromorpha, Codium, Padina abundant; Sargassum less than abundant. "Pedunculate" barnacles abundant, forming hummocks; specimens photographed & collected for Bill Newman.

Paracerceis n. sp.(?) present on Sargassum - no other isopods found. Cloudy & cool - the long cold snap of the northern Gulf seems to be just over, at least at this latitude.

The ferry service for Santa Rosalia (from Guaymas) is its usual unreliable self & is "under repair" for an unspecified number of days; so despite our efforts to make reservations from L.A. by phone we will now have to drive from Guaymas all the way north again & down Baja via San Diego/Tijuana. We'll do it tonight or tomorrow night in one long drive.