JOURNAL 1949

JAMES W. BEE

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Museum of Natural History, University of Kansas, Lawrence, Kansas

Jan 2, 1949

This morning skinned out some Coyote-dog hybrids. Recorded several black and white photographs of these hybrids Photos 1-1-2-49 to 12-1-2-49 as follows:

(1-1-2-49) ♂ Canis latrans (hybrid) full view. Stomach empty. Measured 1340-390-216-47 lbs. (see Hall no. 6760)

(2-1-2-49) ♂ Canis latrans (hybrid) full view. Cow hair in stomach. (see Hall field no 6761)

(3-1-2-49) ♂ Canis latrans (hybrid) full view. Pig hair in stomach. Also ~~feathers~~ flakes of skin as if from butchering of a hog (see Hall no. 6762)

(4-1-2-49) ♂ Canis latrans (hybrid). Head view only (see Hall no 6761

(5-1-2-49) ♂ Canis latran (hybrid) Tail only showing bushy condition (see Hall no 6761)

(6-1-2-49) ♂ Canis latrans (hybrid) Hind foot only (see Hall no 6760)

(7-1-2-49) ♀ Canis latrans (typical) Full view (see " " 6763)

(8-1-2-49) ♀ Canis latrans (") Head view only (see Hall 6763)

(10-1-2-49) ♀ Canis latrans (") Hind foot only (see Hall 6763)

These coyotes were collected on Dec 31, 1948 by Edward A. Revey at 2 miles south of Le Loupe, Franklin Co., Kansas. The typical coyotes were also collected by Revey on Jan 2 (this date) 1949 in the same general area as was the case of the capture of the hybrid coyotes. Photo 11-1-2-49 in Color of Canis latron (hybrid). Same as photo 2-1-2-49 of above.

The following photographs recorded in notes are on the following page:

4-1-2-49 of hybrid showing similarity to dog in profile

8-1-2-49 a typical Coyote profile, hair darker.

2-1-2-49 Hybrid showing shorter legs & heavier flanks in hind quarters.

7-1-2-49 typical Coyote

6-1-2-49 Hybrid foot - relatively wide like in a dog

10-1-2-49 typical Coyote with narrow foot

2

490102-2

Photo 4-1-2-49 ♂

Coyote-dog hybrid

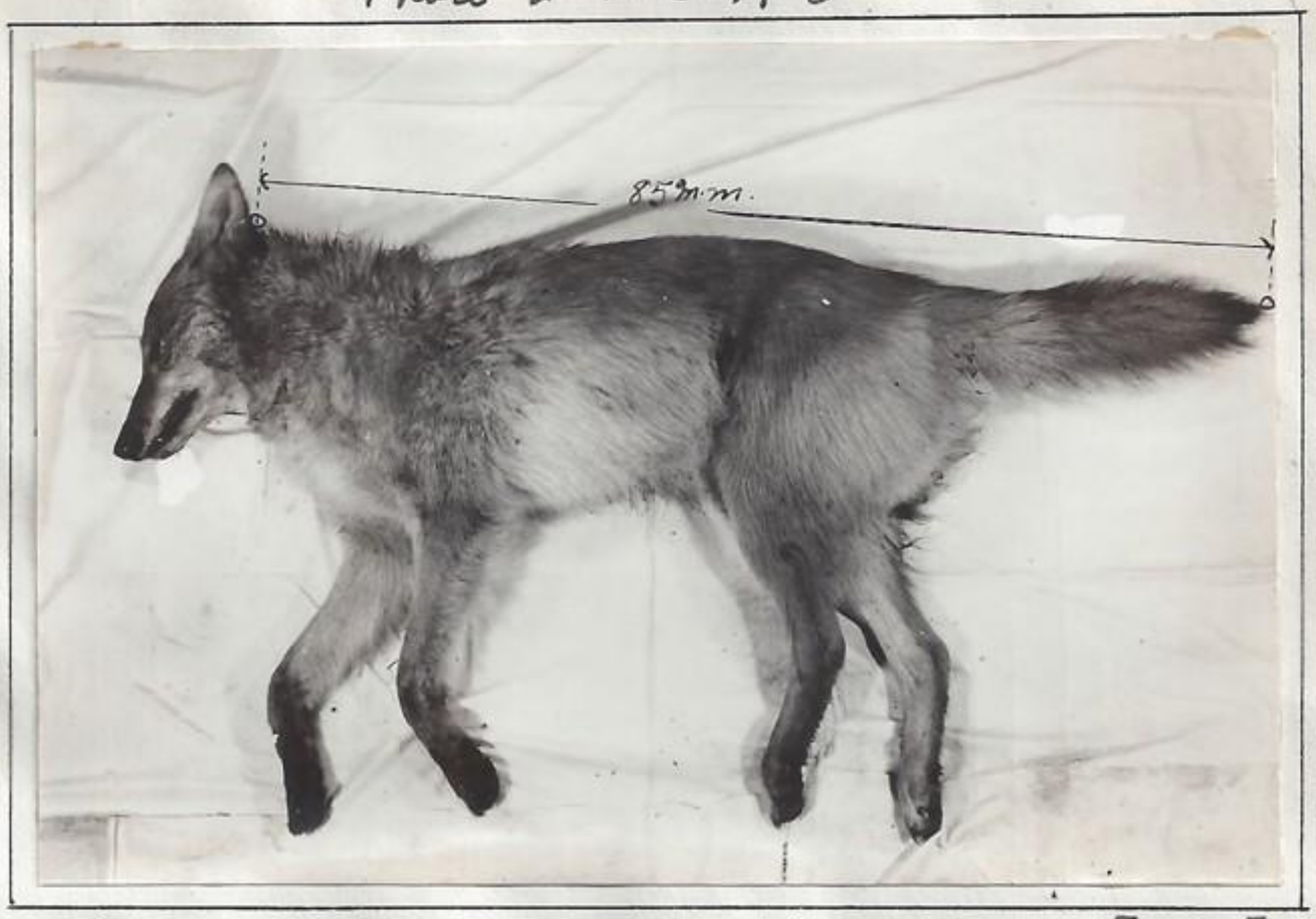
[6761]

Photo 8-1-2-49 ♀

Coyote

[6763]

Photo 2-1-2-49 ♂



Coyote-dog hybrid [6761]

Photo 7-1-2-49 ♀

[6763]

Coyote


859 m.m.


85m.m.

foot of hybrid

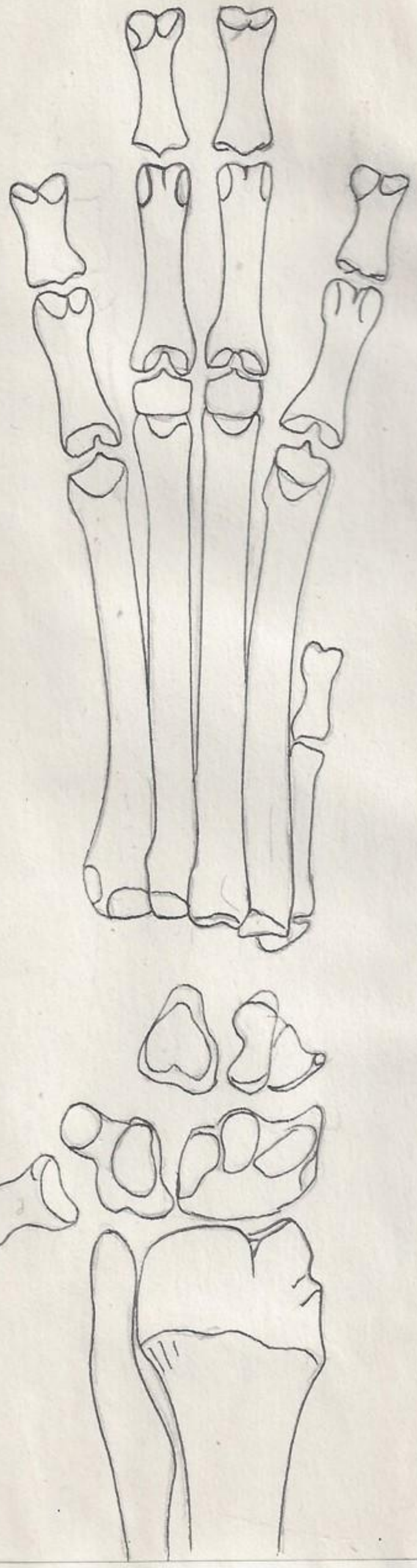


Photo 6-1-2-49

Coyote-dog hybrid [6760]

Photo 10-1-2-49

coyote [6763]

In comparison of this hybrid foot with the coyote it is larger but not as large as domestic dog. The phalanges are more curved than in the typical coyote.

5

490108-5

Lawrence, Douglas County, Kansas.

8 Jan. 1949

At 307 W. 23rd St., observed a Mus musculus running across the surface of the snow at 12:30 P.M. in bright sunlight. It had been using the osageorange hedge-row for an avenue of movement. When observed was crossing a 12 foot interval between hedge-row

Lake Shawnee, Shawnee Co., Kansas

8 Jan. 1949

Annette, Jay and I watched a host of ducks on this lake at 4:30 P.M. The following were represented.

Glaucionetta clangula americana 3
Branta canadensis 11
Mergus americana 6 8
Anas p. platyrhynchos 5000
Spatula clypeata 3
Fulica americana 8

The geese were flying overhead but did not settle on the ice or water. Mixed in among these birds were several mallard ducks (in with geese formation as if a member) ... mallard It would indicate their flying speed is comparable. about 1/4 of lake free of ice. Greater number of birds in water, few on ice.

3 1/2 mi. N. and 2 1/4 mi. W. Lawrence, Douglas County, Kansas

10 Jan 1949

Observed the following birds in the Kaw River at this point and on the south side of river. Distances from P.O. Ice accumulation bordering the river. Day cold and windy.

19 Branta canadensis on north side of river along the water edge. a small group of 18 Anas p. platyrhynchos left with these geese and formed part of the formation.

14 Glaucionetta clangula americana. These birds could likely be the same ones as observed at this identical point 30 Dec. 1948. At that time there were 14 birds. Three of these birds were good pure white males, the others females and subadults. These birds were observed for 2 hours during which time they would feed with the current for about 20 minutes during which time they would float down stream and then leave in. individuals or several and fly back again to start over. The ice sheets hindered their movement considerably. They would many by swimming under them. It would be interesting to know if these birds have any structural adaptations that could

have been caused by ice on their feeding environs. Another group of approx 2,000 Anas p. platyrhynchos were observed flying to the north. They were continually rising and settling beyond the limits of the stream.

18 Corvus brachyrhynchos used the river course for feeding.

307 W. 23rd St., Lawrence, Douglas County Kansas

28 Jan. 1949

15 Lab-white at feeder. These birds have kept up this number since the beginning of the severe low temperatures and heavy snow some three weeks ago. Their original number in the fall was 17 and the depreciation to 15 was before the first snows:

Museum of natural History, University of Kansas, Douglas Co., Kansas.

28 Jan, 1949

This afternoon prepared the following mammals for Dr. Rollin Baker. These specimens were taken at 1 mi. E. and 1/4 mi. S. Orange City, Sioux Co., Iowa.

♂	Reithrodontomys mamculatus	133-52-18-13-14 gms
♂	" "	145-57-19-14-15 gms
♀	" "	131-52-18.5-13-13 gms. (no emb)
♂	" "	148-62-19-14.5-17 gms
♂	" "	134-57-18-13-13 gms.
♀	" "	138-55-18.5-13-14 gms (no emb)
♀	" "	126-48-17-12-13 gms (no emb)
♂	" "	133-55-18-13-15 gms.
♀	Reithrodontomys	128-61-18-12-8 gms (no emb)
♂	Micratus ochrogaster	140-42-18.5-11-18 gms.
♂	" "	138-42-19-11-19 gms.

Museum of Natural History, University of Kansas, Douglas Co., Kansas.

28 Jan. 1949

The following made available to Mus. of Nat. History from Tularemia collection. Skulls only.

1.	Blarina brevicauda
2	Cryptotis parva
2	Sygnaptomys cooperi
11	Peromyscus leucopus
10	Neotoma floridana osagensis
25	Reithrodontomys
8	Sygmodon hispidus
20	Peromyscus (leucopus & maniculatus)
92	Micratus ochrogaster
5	Sylvilagus floridanus
4	Didelphis virginianus
4	Mephitis mephitis
2	Spilogale interupta.

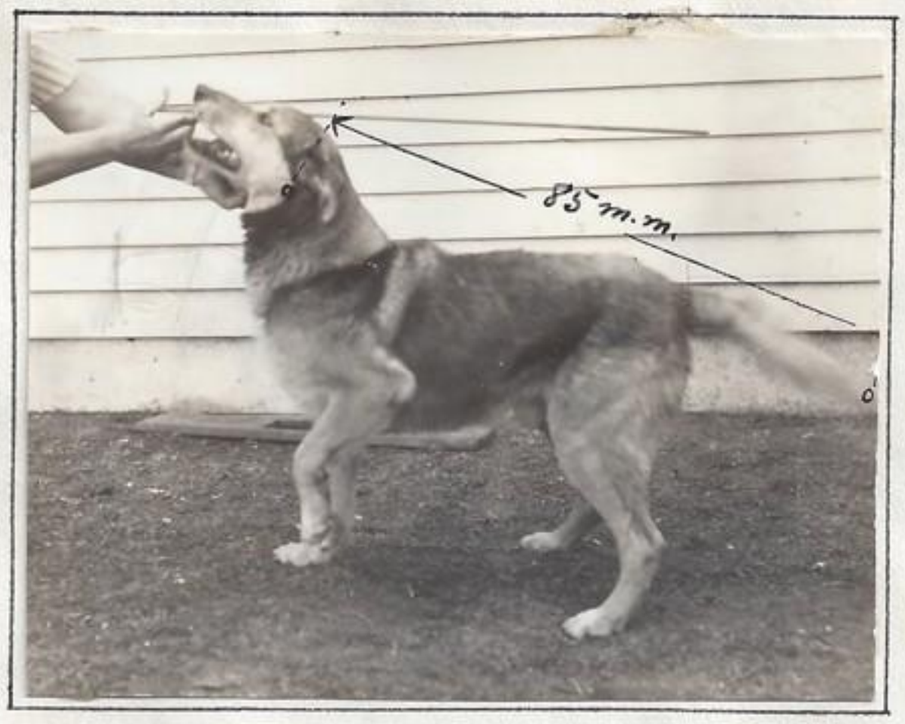
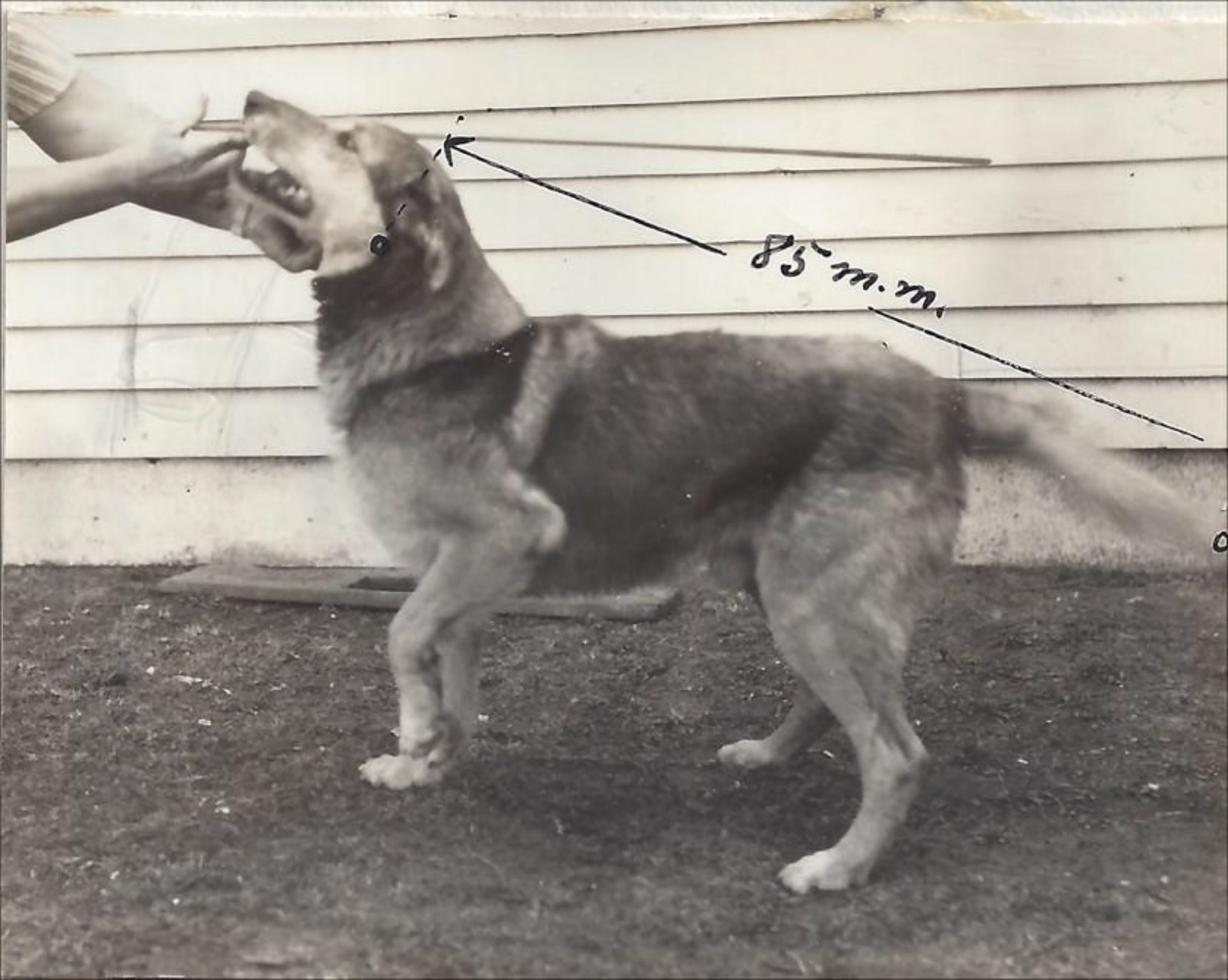


Photo 2-4-3-49

La Loupe, Franklin Co., Kansas
April 3, 1949

Dr Hall and myself visited Mr & Mrs Charles R Hunzicker of La Loupe. Mrs. Hunzicker (Ivo Graybill) gave us the following information concerning the dog-coyote hybrid problem. Her red dog (a cross between a female German police and a male yellow and black coon dog) was suspected of travelling with the coyotes on the Graybill Farm during the rutting season. Her dog, on this date, had two lame feet which might suggest the result of snapping of the ♂ coyote during periods of copulation. The dog was also in a run down condition. Considerable red hair was around the head and neck with the rest of the body with a lesser degree of red color. Tail is less bushy than in the coyotes. The measurements of this dog are: 1307-344-229-112-63 lbs. Recorded 2 profile photographs nos. 1-3-3-49 and 2-3-3-49. This dog is appro. 10 years old. Request was made to have this dog sent to the Museum of Nat. History upon its death. Color photos nos. 3-3-3-49 and 4-3-3-49 of this dog.

Photo 2-3-3-49 above is the Hunzicker dog.


85 m.m.

Lawrence, Douglas County, Kansas (307 west 23rd St)

16 Feb. 1949

First time this winter that temperature permitted snow to leave the ground. Period of great water accumulation on the ground. This winter has been very severe in degree of snow accumulation and low temperatures.

17 Feb. 1949

A cat brought in a large fat Sigmodon from the area around the trailer. Water completely inundating 80% of the same area. Bob. white population at trailer still 15 birds. This number has been continuous throughout snow period of this winter season. They have not been seen feeding at trailer since snow left ground. Blue jays at feeder during first part of winter and then they seemed to made themselves scarce. Now, during the latter part of the winter they are more numerous.

24 Feb 1949

Robins in flocks around trailer for first time.

1 Mar 1949

Crows have been more in evidence since winter period.

9/10 mi. S and 2½ mi. W P.O, Lawrence, Douglas Co. Kansas.

2 Mar 1949

Set 20 live traps in same general area as research area C 12-16-48 of 16 Dec 1948. Signs of activity under snow of winter period. Debris strewn along corridors under snow and considerable eating of grass stems along runways. Ice patches still remain in the more protected growths of vegetation. Old runways still in operation. Several nests and superficial holes had been excavated by either skunk or coyote. Grass stand much as of last fall period. Set 20 museum traps 2 mi. W. P.O, Lawrence.

3 Mar 1949

Checked line of last night setting. Out of 20 museum traps set at 2 miles west of Lawrence P.O., caught only 1. Four other traps had been sprung & museum had eaten out. no results in 20 live traps in Museum set. This evening at 10:30 P.M heard a flock of Sandhill Cranes? flying over Museum of Natural History and trending northward also observed 18 Canadian Geese and several feeding flocks of duck at the trailer this afternoon

La Laupe, Franklin Co., Kansas

April 3, 1949

(← on opposite page)

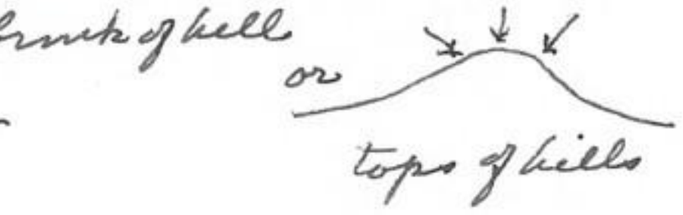
8

490429-8

3 mi West and 1 mi. S Manhattan, Riley Co., Kansas

April 29, 1949

Collected several snakes on highway 40 at a point where highway enters side of valley to the west + S. This area is just south of the golf course. This area also shows exposed rock outcrops. Andropogon and large deciduous trees border the drainage canyon. From under a rock measuring 4 inches in thickness and 2 square feet surface area collected a Diadophis punctatus no. 1-4-29-49. Others noted seemed to prefer certain exposures either



when rocks are lifted the remain in a curled position for a few minutes before moving and at that moment they are easily captured. From this area also collected 8 Diadophis, 1 Crotophylis callarus and 1 Coluber constrictor ruiventer and 1 Eumeces. The area investigated measured approx 400 feet x 30 feet.

?

7 miles E of Manhattan, Riley Co., Kansas

April 29, 1948

While driving in area to select herp collecting spots noted a raccoon road kill and a Lampropeltis calligaster in road. It measured approx 24 inches long and was also a road kill.

Approx. 5 mi. E and 3 mi. N Manhattan, Patawattomie Co., Kansas

April 29, 1949

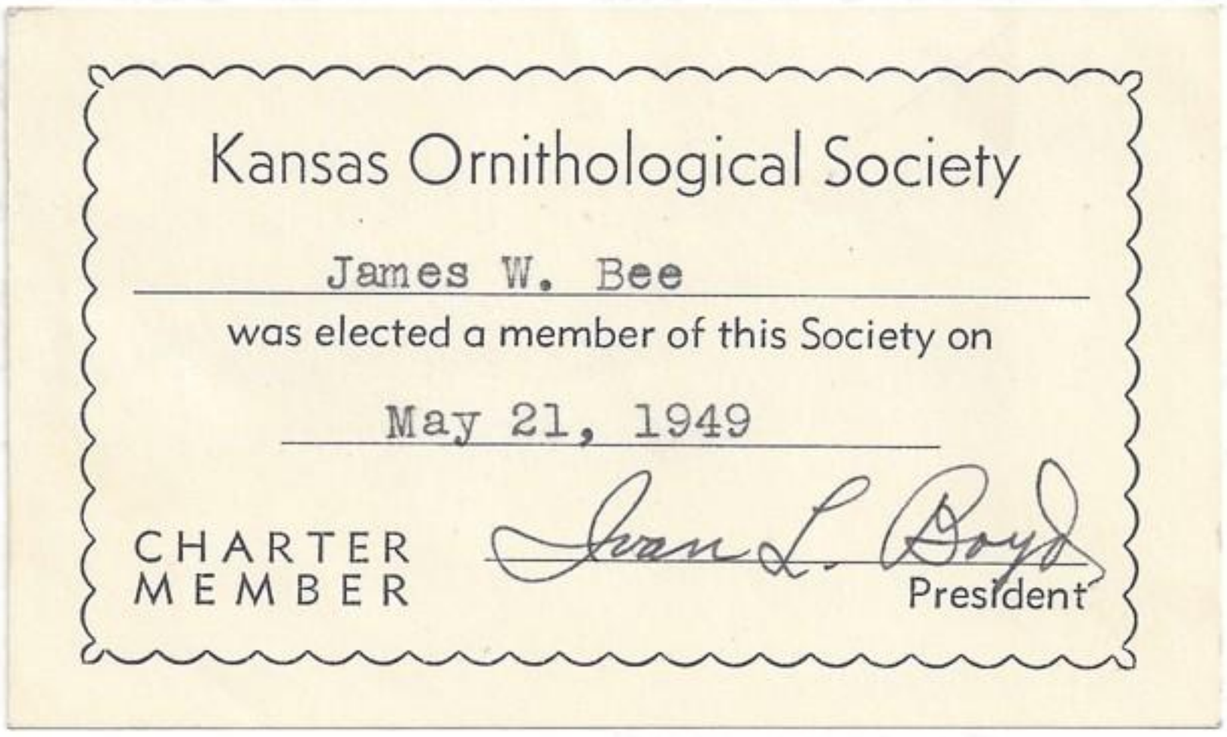
From the valley hills in an area of 20 feet x 20 feet collected 5 Diadophis punctatus and one small Eumeces. This area one of rock outcrops on a gently sloping hill, associated with native grasses on one side and sumac on the upper side. From deciduous trees in drainage system head a ~~wlop~~ poorwill. Several houses of Neotoma along these outcrops, all surface houses. A Cooper hawk was noted to fly over the area, alighting in deciduous trees in canyon bottom. A flock of bobwhites, cardinals and spurred towhee in area. In one half hour collected 1 Tropidoclonus lineatus, 2 Crotophytes.

5 1/2 miles W Wamego, Kansas

April 29, 1949

museum Natural History, Univ. Kansas, Lawrence, Kansas
May 21, 1949

Helped to organize and host the first meeting of the Kansas Ornithological Society at the museum of natural History.



4 JrBee
1949

490429-9

From the north valley hillside along highway, Collected the following herps. These were from a rock outcrop on brink of a hill. Area approx 300 feet × 20' along the edge of this benchland, open fields to N and sparse growth of deciduous trees on slope below the outcrop. Time in area 25 minutes:

5 Crotophytus collaris
4 Eumeces
10 Diadophis
1 Cnemidophoris (observed only)
1 blue racer

From under on rock collected one small Crotophytus and seven Diadophis. This rock was flat 2½ inches and appeared 3 sq. feet in with and just below the ledge of rocks. The surface was approx 80 per cent limestone ~~boo~~ rocks with grasses interspursed. Hackberry and osage orange directly below ledge. Two Diadophis punctatus arnyi were saved from this area and are numbers 2-4-29-49 and 3-4-29-49.

The occasion of this collecting near Manhattan was the presentation of a paper on Coyote-dog hebridization at the Kansas Academy of Sciences held today in Manhattan. Wilmer Tanner, Dr Henry Fitch and Duke Loomis in party.

At Topeka visited Dr Burt. He stated that reptile populations are decreasing in Kansas, particularly the large snakes. He believes that this is due to professional collecting and the removal of flat surface rocks for building purposes. The former is doubtful but the latter is perhaps a good reason for area surrounding towns where rocks are in demand. Change of use of land could be most important as a factor in decrease of herps. Dr. Burt is supersentive to formalin,

~~Columbia River Gorge, Oregon~~

16 June, 1949

Recorded two auto calls the A. M no (1-6-16-49) at a point where gorge begins, shortly after leaving the Dalles, and at a point where Columbia river changes its trend from a north to a west direction. The upper wave cut terraces in the photograph indicate the height of the Pleistocene lake, at this point. Photo. (2-6-16-49) taken at vantage point on Oregon side showing Columbia River gorge as it leaves the Cascade Range. This view is to the East.

J. W. Bee
1949

490622-10

22 June 1949

False Bay, San Juan Island, San Juan County, Washington. Dr Emery & Swan and myself visited False Bay to investigate problem for research. Suggested transect with special emphasis on natural History of certain species. Chitons chosen as special problem for invertebrate class. On return to Friday Harbor was informed by old timer that 7,000 salmon were taken from Mitchell bay some 40 years ago.

23 June

Oceanographic Laboratories, San Juan County, Washington visited Turn Island this A.M. with Dr Swan and class. This island is only instance when water below high tide and is located some ¼ blocks or so east of Turn Island proper. Examined the following forms in general.

Balanus cariosus ~~tintinnabulum~~. Conspicuous barnacle covering all exposed rocks and characterized by thatchwork at base.

Thais lamellosa dominant gastropod found interspersed among the Balanus of above.

Thais canaliculata equal in dominance to above. The columellar opening without overlapping columellar fold.

Littorina sitkana dominant gastropod. Color variation great in this species. also concentric sculpturing.

Acmea pelta limpet with coraline rubbing.

Acmea digitalis on all rock. Apex near anterior end.

Acmaea testudinalis. This form from arctic

Acmaea mitra also present in good numbers.

Corallina algae in tide pools.

Katharina tunicata most conspicuous Chiton.

Tonicella lineatus lined chiton with considerable variation. Second most conspicuous.

Polychaete. red tentacles conspicuous

Serpula vermicularia like an anemone.

Four echinoid echinoderms on same area but live in specific ecological niches

Strongylocentrotus droebachiensis a circumpolar species close to southern limit.

Cryptochitan stelleri Chiton sometimes bright red when cleaned of algae etc. Some gray on this area and may represent another species.

Calliostoma & Amphissa snails common

J W Bee
1949
3

490623-11

Phais laminosa studied by Kincaide on all islands and found variation due to isolation. This form in other areas differs on basis of food selection.

Mopalia. sp. mossy chiton. few in water.

Seawheat or oats. eggs of a mollusca. in compact groups.

Mytilus Californianus large mussel of more open water. few mainly on outer coastal areas.

Mytilus. edulis dominant mussel of higher tidal zone. when M. californianus is found along, grow to great size, sometimes 1 foot. Limpets on mytilus erode holes in shell  . Muscle poisoning due to toxic effect of ingested phytoplankton organisms, mainly Gonyaulax. The inland waters safe except the clams & mussels.

Hedophyllum algae of open water. crinkled or crenulated frin.

Seal. swam into within 20' of island among kelp and when discovered quickly ducked under and did not return.

Purpurea. may be here and is represented by three ribs.

The following phyla represented on one rock 1/2 sq foot - mollusca, Annelida, Platyhelminthes; Porifera, Tunicata, arthropoda. Bryozoa, Cnidaria.

Dodecaceria a polychaete worm from small holes in Coralline structure, black tentacles.

Cucumaria 2 forms present.

Pisaster ochraceous large purple ones. Enemy to pelycopods and mollusca. Much like eastern form but new genus. Color variable to orange.

Dermasterias leathery star fish. One examined.

at 10:45 dredged area south of Turn Point to south and after 25 minutes of continuous operation returned dredge to boat and found the following.

3 Pecten hirecus covered with spong growth (adductor muscle eaten)
14 sea urchins. Strongylocentrotus drobachiensis
1 Ophiuroid
few small stones
1 Terebratalia transversa

bottom layer considered rocky.

Second dredge from 11:20 - 11:28 in same area as follows:

7 Psolus chitonoides
4. Strongylocentrotus drobachiensis
2 " franciscanus.
1 Argobuccinum oregonensis

J. M. Bee
1949

490623-12

sections of kelp
1 kelp crab
1 hydraid.

From Turn Rock went to east sound and dredged at mouth of bay just beyond Cable crossing Northward from 12:45 - to 1:00 P.M. as follows:

Nemertans Cerebratulus - tusk shells
Nemertina - large to 10 inches or so
Sea pens
Compsomyax subdiafida - thin shelled clam. formerally Marcia.
Pandora filosus unsymmetrical bivalve several.
Cardium. approx ten specimens
Noctilucens. Clouded water in small patches 1/4 inch.
one Ctenophora in surface Collection.

A second dredge of 15 minutes yielded: (South Moran House)

Yoldia cosifera.
Pandora
Stenopsis
Pectenaria worms
Ctenophora

a third dredging in some area as above.
a fourth dredge in mud at N.E Upright head gave evidence of unidentifiable material but not identified.
At about 4:00 P.M made a dredge in shallow bar off Oceanography pier south to Brown island and collected many interesting forms from this gravel and shell bar.

24 June

False Bay, San Juan Island, San Juan County, Washington

Dr Swan and class visited False Bay this A.M to make a cursory examination of the sand and mud flats. At the upper east end on south side found the following on the ~~rough~~ rocks at the high level and in close association.

Littorina sitchana
Littorina scutulata
Acmaea digitalis
Mytilus edulus
Acmaea pelta
Balanus crenatis
Hemigrapsus nudus
Many amphipods under rocks
Ulva on rocks

On the sands of the bay proper

Protothaca tenaremia
Macoma secta - large ligament consisting of two

Along second bar from walu edge.
Nereid - tube 8" long
Chaetopteria -
Prolothaeas
Macoma
Crustacean under sand dollar. (Nebalia sp)
large numbers of worm tubes.
Tunicella and many amphipods.
Egg case of Philine a tectobranch snail.
Callistomus with Hermit Crab.
Calyptra Chinese hat shell. ♂ and ♀ on same shell.
Nebalia from beneith sand dollar from 8 to 25 in number.
High cool wind today. Occasional Cepphus columba beyond surf. One Haliaetus leucocephalus alascanus flew over bay from point at south side to north. Few gulls noticed. Flew 80 from surface of bay.

Larus glaucescens (18) in bay at all times and confined mainly to area near front. Conus brachyrhynchus cancinus common in bay area and trochs frequently observed in sands of bay. Left bay and visited Argyle lagoon where many clams were present. including.

Tapes semidecussata
Saxidomus gigantea
Mya arenaria

Return to Oceanographic Laboratories at 11:30 A.M.

24 June

Oceanographic Laboratories, San Juan Island, Wash
determined quadrat size of 31.65 m.m x 31.65 m.m or 1001.7325 sq m.m. or 1/10 sq meter. (1 sec = 30.885 meters)

25 June

Minnesota Reef, San Juan Island, San Juan County Washington. Dr Swan and Class inspected Minnesota Reef at the south end of San Juan Island. This reef isolated as an island due to the low dividing bar between the mainland and the reef. The island proper is rocky with typical island vegetation of conifers, salmon berry etc. Shows rock with considerable silt on east side. West side more typically rock and receives the blunt of the winds and waves of the Straights of Juan De Fuca to the south and west. Each student was to pursue own interests. Observed the Argobuccinum snail and egg mass of the low tide zone. This snail deposits its eggs along the outer surface of the egg mass. Shape highly suggestive of sunflower pattern and size of egg. East side best for clams of several species. Observed several more or less solitary Balanus nubilus.

separate siphons and hole only 1/16 inches in diameter. Frequently fills in with sand. white siphon.

Clinocardium nuttallii (Cardium corbis) dead shells only at upper reaches of the bay.

Dendraster excentricus stacks numerous on surface.

Arenicola worm castings on surface of sand. some 8" long.

Leptosynapta - small 1 inch cucumber-like form an Echinoderm, possess calcarous plates.

Clymenella. eggs pass from segment to segment where normally only fluid can pass in other forms. ♀ with eggs.

At the outer edge of bay along rock on south side observed the following.

Katharina tunicata mossy Chiton. not too uncommon and rocks and associated with common Chiton.

Phias canaliculata
" emarginata: and one other form conspicuous

Copepods among algae on outer bar, lee side. In great numbers. Considerable Ulva but not growing. The degenerating nature of this algae mass was probably responsible for the numerous copapods.

Chaetopterus worm tubes 1 inch out of sand numerous.

Polychaete. One observed to dig rapidly into sands.

Few amphipods and Leptosynapta in sand exposed to outer surf. Also near outer bar found Cardium nuttallii exposed and digging into sands.

Eel grass (Easter) in first tidal pool beyond outer bar.

Clymenella numerous in sand near outer bar.

Caprellids common in sands.

From sand screen (small) collected

Amphipods (
numerous worm tubes
small brownish clam (1mm to 2mm.m) Some sent to Keen for identification)

Cardium 4 inches deep. One egg mass like curled
intestine about 3" long Pronsenella tantilla small
clam and separate. young leave like adult except small.
2 sacs of young in body. Left sand bar and started to work
toward east end.

Lacuna snail on grass. One caprella amphipod of grasslike
shape. also on grass. Caprellidae like odd uncoordinated
organism (like ghosts) on edges of grass.

~~Haliotis~~ Haliotis - a Calcareous

Podadesmus uncommon but occasionally observed on the underside of rocks in association with the polychaete Calcarmus shells and the Pecten. The pectens and podas are nodaubt permenantly attached and one find it almost impossible to dislodge them from their attachments. A commercial digger filled a basket of the common clams in an area 4 x 8 feet. This area in sand pocket among the solid rock massee. Found one starfish in the act of eating a mussy Chiton. Fauna usual otherwise. From the zone of low tide collected the following Chitons from the rocks. The greatest number were found on north exposure and generally on the underside of the rocks. Kartharina dome & Chiton in area. The specimens collected are as follows:

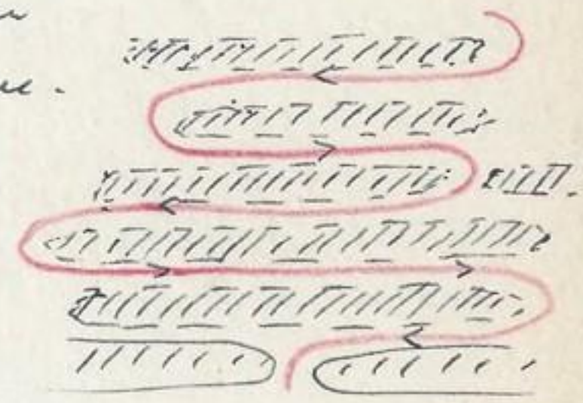
1 - 6 - 25 - 49 Lepidochiton lineata
2 - 6 - 25 - 49 ~~Lepidochiton~~ Mopalia
3 - 6 - 25 - 49
4 - 6 - 25 - 49 Lepidochiton Kurtzwegii
5 - 6 - 25 - 49 Lepidochiton lineata
6 - 6 - 25 - 49 Ischnochiton mertensii
7 - 6 - 25 - 49 mopalia mucosa.
8 - 6 - 25 - 49 Kartharina tunicata
9 - 6 - 25 - 49 Lepidochiton lineata
10 - 6 - 25 - 49 " Kurtzwegii
11 - 6 - 25 - 49
12 - 6 - 25 - 49
13 - 6 - 25 - 49 Kartharina tunicata
14 - 6 - 25 - 49 Lepidochiton lineata
15 - 6 - 25 - 49 " Kurtzwegii
16 - 6 - 25 - 49 Lepidochiton lineata.
17 - 6 - 25 - 49 Lepidochiton lineata
18 - 6 - 25 - 49 " "
19 - 6 - 25 - 49 Lepidochiton lineata
20 - 6 - 25 - 49 " Kurtzwegii
21 - 6 - 25 - 49 Lepidochiton lineata.
22 - 6 - 25 - 49 Lepidochiton lineata.
23 - 6 - 25 - 49 " Kurtzwegii
24 - 6 - 25 - 49
25 - 6 - 25 - 49 Lepidochiton lineata
26 - 6 - 25 - 49 " "
27 - 6 - 25 - 49 Kartharina tunicata
28 - 6 - 25 - 49 " "
29 - 6 - 25 - 49 Lepidochiton lineata.
30 - 6 - 25 - 49 " "
31 - 6 - 25 - 49 Lepidochiton kurtzwegii
32 - 6 - 25 - 49 Lepidochiton lineata.
33 - 6 - 25 - 49 " "
34 - 6 - 25 - 49 mopalia mucosa.
35 - 6 - 25 - 49 Kartharina tunicata
36 - 6 - 25 - 49 Lepidochiton lineata.
37 - 6 - 25 - 49 Lepidochiton lineata

38-6-25-49 Cryptochitan stelleri × 490625-15 (muddendorf) taken from low tide on rock - associated with Strongylocentrotus and a few Aegabuccinum.

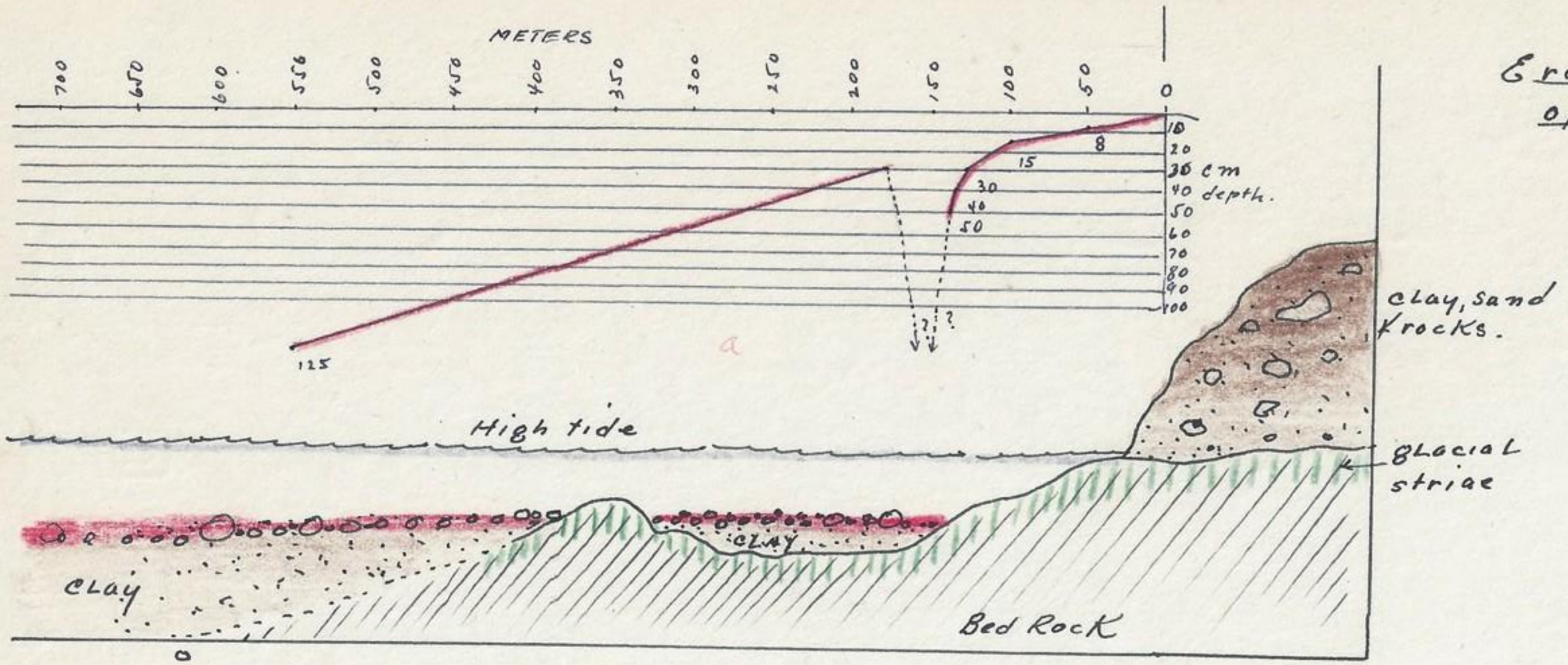
26 June

False Bay San Juan Island San Juan County Washington.
Started preliminary investigation of False Bay. Transect established from point 198 m east of center of channel of fresh water creek at north end of bay, to the highest point on largest rock island at entrance of channel into bay. This transect bisects the east side of the last large erratic rock in the bay. Linear distance of 1100 feet from north edge of bay to edge of low tide. Staked at 5 m. intervals to first 100 m. Zone every 50 m out to water edge. Accompanying maps and transect line follows: General observations made this date at False Bay. One Halocynthia hilgendorfi observed in area and from the south. Larus glaucescens continually in area and number appear as permanent residents. This number fluctuates. They are generally found at the tidal edge and when tide moves in they follow and remain upon the sands and probing rocks until forced to move beyond. They do more feeding as the tide goes out. Observed 7 instances of gulls taking Clinocardium cardis from superficial sands at outer bar, an area of 600 m linear x 30 m width of the outer barrier sand bar. One three instances observed the gulls fly with a Clinocardium to about 30 m high and then drop it upon the sand where it was immediately impelled again. These shells were dropped on the sands and apparently did no harm. In certain areas of rocks and boulder zones at north end of transect observed many dead shells of Clinocardium and Macoma secta and are wondering if possibly this accumulation was due to the dropping by these shells upon these rocks. Whether this was intentional or just accidental that the shell was dropped upon a rock is not known. If this should be intentional one should find them on the rocky slopes adjacent outer limits of coast and bay edges. Three Urdea lucidus fusana in tide pools adjacent outer sand bar. They leave when one approaches the area. Six Grampus rectipinna (Cope) working some 200 m beyond last island in bay. They were frequently observed during the morning. From an examination of rock surfaces find evidence of Continental-like glaciation over this area with all striae trending in a southern direction. The bay proper is undoubtedly created by glacial action. Examined these striae and rocks mentain in all area in bay and above bay level to higher hills. Few erratics on west side of bay channel. The accumulation of boulders and gravel at the north end of bay can probably be explained on the basis of three or four consecutive. It may more likely be the remains of a terminal moraine which has be disrupted by wave action, or they may have accumulated as a result of placement by trees which have taken them to this point in their roots, or they may

may be as a result of differential erosion of the regular main land shoreline. None of these explanations seem to perfectly fit the situation but might represent a combination of the factors considered. They seem to be arranged at the n. n. E end of the bay. The prevailing winds strike the n. n. w exposures and one should find a similar situation here but it is not comparable with the n. n. E section. My assumption is that the glacial action is no doubt mainly responsible. The outermost boulders are large and apparently are lying upon the sand surface. It is questionable how these boulder got out to their position by any of the above considered factors. The greater part of the bay represents a succession of damp sand bars and shallow intertidal pools which are apparently barren of animal form. This situation varies to the extent that the fresh water stream has deposited an alluvial fan of gravels and sands at the mouth of the stream and the fact that mud is better represented in the more protected areas of the bay. The numerous tidal channels are arranged in a somewhat n.w-s e direction across the bay and are the result of successive sand bar accumulations. The pools are barren and vary from 1 cm to 14 cm in depth. When the tide is either coming in or going out these parallel pools form water courses and the water have a directional movement until completely covered by higher tide. Except in some pools where there is not temporary outlet, all pools have movement throughout the period caused by low tide. There is no dominant life except a few fragment of Ulva. The sand bars are marked by ripples varying from 7 to 14 cm in width. Generally at the pool edge the water can be found to be occupying the ripple valleys and sands supersaturated. Size of ripple may have significance in distribution of animals. Here found the deepest area of bay are at the outer cliff area on both side where the water penetrates farther into the bay. The rain on shallow ponds may have some controlling significance. Macoma secta and macoma nasuta common as dead shells - Corvus b. caurinus. Approx eight in bay area and feeding in sands and shore line. This bird has the advantage over the gulls in that it can hold a clam in its foot while extracting to body. One two occasions observed a Phoca vitulina richardsii feeding among kelp and out 15 m from east rocks in channel of bay at low tide. A small group of approx 15 melanitta perspicillata and melanitta deglandi are always found feeding above submerged algae on trawled line at about the 12.00 - 1300 m area. These birds will drift with the mening tide and then race back again to their usual position above the algae beds. 2 Aechmorphorus occidentalis spend considerable time in same zone as seaters. The other dominant and conspicuous bird is the cormorants — Phalacrocorax pelagicus resplendens and (?) Phalacrocorax auritus.



Erosion on west side of False Bay



Erosion at head of False Bay

490626-17

10

490626-18

+ 123° 4' 30"

North

+ 123° 4' 15"

123° 4'

+ 123° 3' 45"

+ 48° 29' 30"

Rock and gravel beaches

U.S.

100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
1100
1200
1300

G.3

48° 29' 15"

Sandy beaches

Barrier Sand bar

Glacial striae

Kelp.

48° 29'

G.S.

G.S.

U.S.A.

48° 28' 45"

FALSE BAY

0 100 200 300 400 500

METERS

490626-19

The preceding map and detailed transect constructed from field observations. Except for approx 130 m. the bay floor is essentially a series of shallow water channels and sand bars of low relief.

The more significant measurements are:

1100 m. to beginning of submerged algae in subtidal water, all water floors bare.

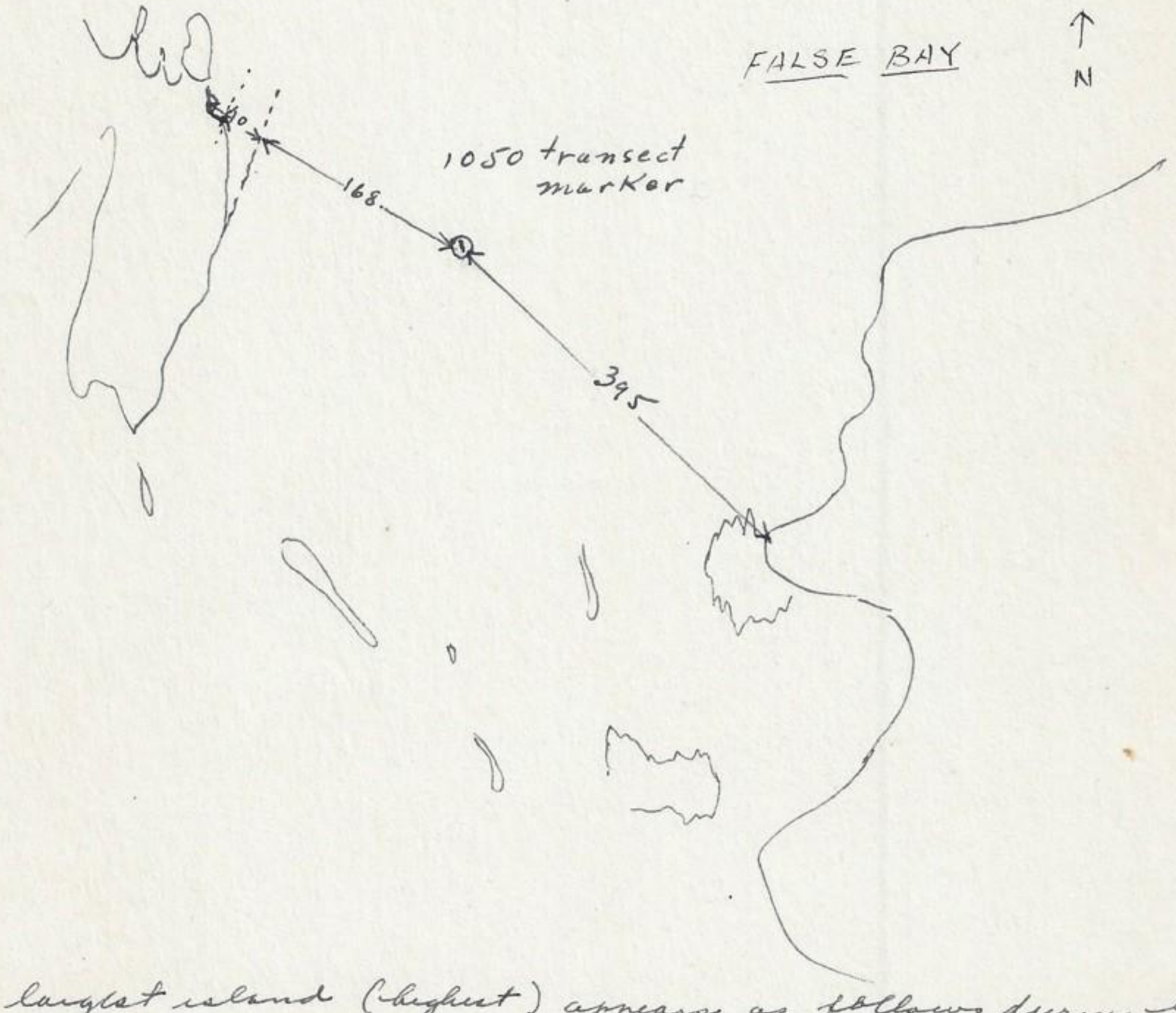
1068 m. Low tide mark.

1033 m. highest point on crest of barrier sand bar.

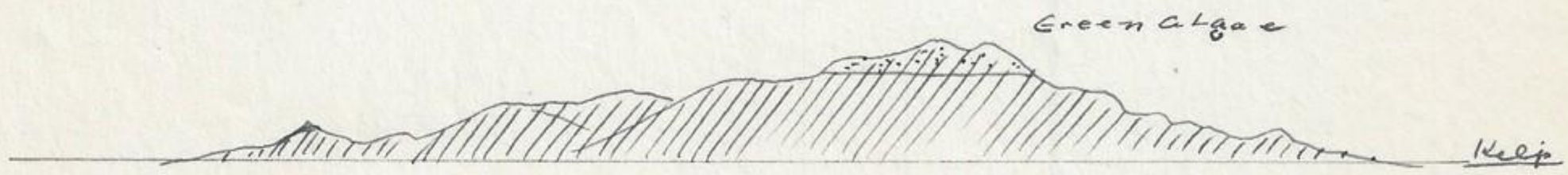
395 m. from point 1050 m to east point

198 " " " " " west point or 208 meters from 1050 mark to point where west coast turns abruptly to the west.

198 meter south of middle fresh water creek canal to station 7 transect.



The largest island (highest) appears as follows during low tide:



General observations:

Outer barrier bar covered with water on approx 3 hour from low tide level.

85 Phalacrocorax auritus flew north at mouth of Channel. 10 birds left group and inspected bay, hence out again to join flock.

1 Mopalia mucosa on pebble 7 cm in diameter. This rock was isolated and on sand some 3 meters from cliff rocks and approx 8 feet below high tide level.

490626-20

0 drift logs, wood chips upon gravel base, rems of algae 600

5 sand, finer gravel, slope, nearing 11:50 more algae

11:50 zone sand free of algae

12

complete coverage of algae washed upon sandy-muddy floor. Surface does not support weight like sand. few erratics. at 16 meters spring begin

700

30 50% algae - 50% ripple, muddy sands. old sand bar with supersaturated surface. Few pools. Fewer erratics.

45 Solid but more water

48 water, 2cm deep, few erratics, out

50 supersaturated sands with ripple marks

52 800 mass of boulders and erratics 80% coverage, sand interspersed

58 water, moving out 2cm deep sand rippled and few rocks.

62

solid pebble mass with range of coverage are 5-15 cm in. few large (40cm) erratics. Small sand patches interspersed.

900

81 supersaturated sands 50% algae and 50° of standing water of small pools

1000

100

115 standing water over ripple marks. 60% algae, edge of sand line

119

129 appear and rocks. water 2cm deep. algae mainly in center few erratics.

sand, damp, bare, ripples 7cm areas

157

water, clear, 8cm deep, algae fragment rare. 1100

175

(Cont) A ↓

590 (Cont.)

Sand, bar, abrupt N side (lee) excellent ripple marks.

615 water, 1½ cm deep. No movement

625

Sand, ~~4cm deep~~, ~~movement out~~ fewer ripple mark.

655 water, 4 cm deep movement out

666-50

X

Sand, .11cm wide ripples imperfectly exposed.

701 water, 10cm deep, movement out.

720

Sand, damp. no ripple marks

747 water, 10cm deep, movement out

762

Sand, ripples

798 water, 4cm deep, Movement out.

806

Sand, ripples 9cm wavelength best ripple marks on transect.

848 water in ripple marks

850 water. 7cm deep, first eelgrass

868

Sand, wide ripple marks indistinct sand softer and wetter.

~~845~~

905

Sand and pools created by islands of sand captured by eelgrass.

938

Sand and eelgrass, old ripple marks 5cm wavelength

~~960~~

988 water, channel

water in main drainage flow of mud flats areas sand bar.

1005 water, channel.

~~1018~~ 1018

1018 Sand, large ripples but indistinct

1038 zone of eelgrass filled in with sand.

1036

(1038 highest point in bar)
(1050 rock placement)

1068 outer tide level

water, sand bottom gradually increasing in depth, few algae patches.

(Cont) B ↓

1100 first massive underwater algae.

A

B

200

sand, damp, undulation mud, slight, ripples 9 cm across.

300

224

water, cant, 4 cm deep, side ripple marks 11 cm.

250

water on elpaced ripple marks

270

sand, damp, slightly rippled

289-50

water, 6 cm deep, no movement.

4.
300

301-50

Sand, ripple marks 7 cm across.

360 water, 2 cm deep, outlet.

367-50 no movement.

Sand, slightly rippled.

400

407

water, 12 cm deep, no outlet.

424

Sand, damp, 7 cm ripple across

(451 rock)

470 water, 2 cm deep

485

ripples filled with water

500

497

Sand, damp, ripples 7 cm across

552 (553 center last rock)

water, 12 cm deep. mass algae center of pond.

571

Aerial photo San Juan Island. (Green postcard)


FALSE BAY
FRIDAY HARBOR

Hylocuchla ustulata sing in conifers on shore.
Examined three mopalia muscosa on an isolated rock surrounded by sands and 50 m from shore. associated with barnacles, algae masses, large crab etc. Their position recorded on rock from determination of movement during the night
Tide at 3:00 P.M. touched Chiton first with a layer of Ulva and then gradual rise of water. Chitons did not react.

collected a chiton (1-6-26-44) from a small piece of drift wood (1 foot long and 2 inch wide) which was lying on the sand 3 feet from the isolated rock mentioned above. Chiton on top of piece of wood; sands damp. Observed reveal mopalia muscosa at the sand, rock contact and half buried with sands. The community of these isolated rocks are ~~fucus~~ Fucus, Balanus, Mytilus edulis, crabs and other algae masses. Rocks isolated.
The morning tide advances as follows:
In the first 30 secs it travels 5 meters carrying with it a sandy scum.
In the second 30 secs travels 5 meters in 25 secs bring fragments of Ulva.
Five minutes after the first appearance of the tide the water is traveling 5 meters in 15 sec.
Ten minutes after the first " " " " " "
is traveling 5 meters in 13 sec, after which the rate becomes constant. The movement of the water is thru channels between the sand bars. It takes considerable more time for the tide to (5 min)
move up the sand bars proper. Closely following the tide will be found approx 6 mmmm (Cotidae) per 25 sq meters of flow.
The base of the 100 meter stake received water at the same instant as the top of the large rock at station 553 became completely submerged. Water at stake 30 meters at 4:45 P.M. and at stake 20 m. at 4:50 P.M.
From the mouth of the channel thru the last barrier bar found a Scorpaenichthys marmoratus Gard (Sculpin) which measured 29 inches long. It was swimming in 190 m.m of water, as the tide was just beginning to enter bay. Rather slow in movement & uptake but has forceful flap of tail when disturbed.

27 June
False Bay, San Juan Island, San Juan County, Washington.
Collected the following Chitons from rock on east side of the bay at the channel area. Most of these specimens were taken at what would be equivalent to the low tide level where subtidal water supply continued aequatic media.

(1-6-27-49)	to	(9-6-27-49)	Katharina tunicata
(10-6-27-49)	to	(20-6-27-49)	Mopalia muscosa
(21-6-27-49)		(23-6-27-49)	Mopalia-like but short small hairs

23

490627-23

(24-6-27-49) — (28-6-27-49) farm of Chiton * without hairs

(29-6-27-49) — (37-6-27-49) fine hair with wide but narrow plate.

(38-6-27-49) (42-6-27-49) " " ditto.

(43-6-27-49) (70-6-27-49) Lepidochiton lineata

(76-6-27-49) (78-6-27-49) " " small in vile

(79-6-27-49) (90-6-27-49) " "

Found Katharina tunicata dominant form at tide level. Less effected by lack of water than Lepidochiton lineata preferes of water. Mopalia muscosa greatest latitude of forms studied. would estimate M. muscosa 1/15 of K. tunicata population. K. tunicata has preference for cracks, and under racks or ledges. Lepidochiton lineata common under rocks in tidepools where conditions are similar to subtidal zones. Many large forms. It is possible that the younger forms are found at deeper levels. Several specimen of undetermined species found in association with Lepidochiton lineata.

June 28

Lopez Island, San Juan County, Washington. Clam trip to south end of Lopez Island. Placa velutina richardii in. channel between Turn Rock and Turn Island among kelp. First dredge at 30 fathom half way between Long Island and Richardson City on the Lopez Island as follows:

Hydroids, tunicates, Bryozoans, Balanus nebulus, Balanus (smooth types) and Balanus cariosus, + Strongylocentrotus franciscanus.

2nd Dredging 1/2 mi S. Richardson at 10:00 A.M for 20 minutes. egg case of Kumeria., 20 ray starfish, Bankia, Argobuccinum oregonensis, Calliostoma, Pagurus, Polynices, Pecten hericus, Strongylocentrotus drobachiensis, egg case of skate, Stichopus, Limpets, razor clam, Analcydons, + S. franciscanus, Podogdemus, Chimera egg case, Thais lamellosa, Pisaster brevispes. Callophyhs and Cryptochora constitute 80% of mass. shrimps, isopods, ijaldea and several small Lepidochiton lineata appear 6 mm & less in length. It would appear that these small ones are found at greater depths and then move into the interdidal-subtidal zone of contact, Cancer oregonensis, Petralithes cronemus, Scyrantyformis (Kelp Crab), Hydrates. Pugettia gracilis, Chorilia longipes,

3rd dredge at 10:45 A.M at 6 fathoms at McKay Harbour.
Lamminaria on dredge mouth.
Cancer oregonensis. Sturgeon like fish near Cattidar.
Pugettia bregenensis
Cancer productus
Polychaetes
Cancer magester

24

490628-24

4th dredge Appro. 800 meters N.N.W Iceberg Point on Lopez Island,
2 bushels of pectens of two species.
1/10 percent rocks. From racks took several Chitons but all small 7 m.m. no large forms. They could be considered uncommon. In fact the crabs and other forms were all smaller in size than the previous dredges.

On Iceberg Point found the usual form with the addition of Mitella polymerus in limited numbers in crevasses on direct exposure of the coast. Kastharina tunicata and Mopalia muscosa dominant forms. Lepidochiton lineata as in usual number. Only on Cryptochiton stelleri taken which measured 160 x 105 m.m. One Grampus rectiprinna surfaced continuably during our stay at Iceberg point. It worked off shore south of the Point. A loud gushing of air is heard when the whale breaks water. The following forms of Chitons were collected from the low tide level at Iceberg Point. among the heavily algae covered rock on the point.

1 - 6-28-49 Lepidochiton lineata
2 - 6-28-49 " "
3 - 6-28-49 " "
4 - 6-28-49 " "
5 - 6-28-49 " "
6 - 6-28-49 " "
7 - 6-28-49 " "
8 - 6-28-49 " "
9 - 6-28-49 " "

July 2, 1949

False Bay, San Juan Island, San Juan Co., Washington
Collected chitons from east side of channel as of previous days collecting. These chitons, as well as all other chitons collected from False Bay, were taken from two tide pools at the point where barrier sand bars joins the east side of the channel, or point A (see map) where the low tide exposes low island-like mass of glaciated rock immediately adjoining the mainland. These tidepools are the best pools represented in the bay area and represent a fauna similar to that found below tide level. Practically all forms taken from under rocks or in protected places. These forms are as follows:

1-7-2-49	to	7-7-2-49	Mopalia muscosa
8-7-2-49	to	20-7-2-49	" lignosa
21-7-2-49	to	26-7-2-49	" "
27-7-2-49	to	31-7-2-49	" ciliata.
32-7-2-49	to	33-7-2-49	" ciliata (?)
34-7-2-49	to	70-7-2-49	Tonicella lineata.
71-7-2-49			Katharina tunicata
72-7-2-49	to	73-7-2-49	Mopalia ciliata
74-7-2-49	to	82-7-2-49	Tonicella lineata
82-7-2-49	to	109-7-2-49	Lepitochiton raymondi.

The Mopalia muscosa had the greatest latitude of range. Katharina tunicata the dominant form in tidepools and at the low tide zone. Tonicella lineata dominant under rocks and were, however, found in exposed situations but

25

490702-25

generally under water. They are only above the water levels. Mopalia ciliata & lignosa (occasionally taken) were typically under rock forms. Lepidochitona raymondi also takes this position. no Cryptochiton stelleri found in these tide pools but is no doubt represent in the deeper waters below low tide. Three species of scoters were observed to be continually feeding over algae beds directly south of the barrier reef. at high tide these birds may move northward to a point above the eel grass but unanimously beyond they are. Oidemia americana, melanitta deglandi, melanitta perspicillata. Adult Larus glaucescens fed at help zone and above submerged algae area by eating what appeared to be small fish. They follow the Baird cormorants and eat fish and invertebrate as they are disturbed by the diving Cormorants.

July 2.

Oceanographic Laboratories, Friday Harbor, Wash.

Determined layer sequence for transect problem as follows.

$\frac{1}{1000}$ cu meter = 1,000 sq cm (1/10 sq meter)	× 0 cm	= surface	①
$\frac{1}{500}$ " " = " " " " "	× 2 cm	= 2 cm depth	②
$\frac{1}{250}$ " " " " " " "	× 4 cm	= 4 cm depth	③
$\frac{1}{125}$ " " " " " " "	× 8 cm	= 8 cm depth	④
$\frac{1}{62.5}$ " " " " " " "	× 16 cm	= 16 cm depth	⑤
$\frac{1}{31.25}$ " " " " " " "	× 32 cm	= 32 cm depth	
$\frac{1}{15.625}$ " " " " " " "	× 64 cm	= 64 cm depth	
$\frac{1}{7.8125}$ " " " " " " "	× 128 cm	= 128 cm depth.	
$\frac{1}{3.90625}$ " " " " " " "	× 265 cm	= 256 cm depth.	

July 5

False Bay, San Juan Island, San Juan County, Washington.

Collected series of Chitons from some tide pool all all previous collections. The tide pool is approx 15 × 10 meters and 1 meter deep in deepest part. At near high tide the water enters the pool. During the low period it is quiet and slightly warmer in temperature. The following chitons were taken from beneith the boulders in the pool.

1-7-5-49 to 11-7-5-49 Lepidochitona raymondi.

12-7-5-49 mopalia lignosa. Screened sands and muds 10 feet from shore line and found numerous Axinopsis at about 50 m.m to 150 m.m. deep generally resting on clay. Sent 13-7-5-49 Leptosmapta taken at 1050 stake in False Bay for identification.

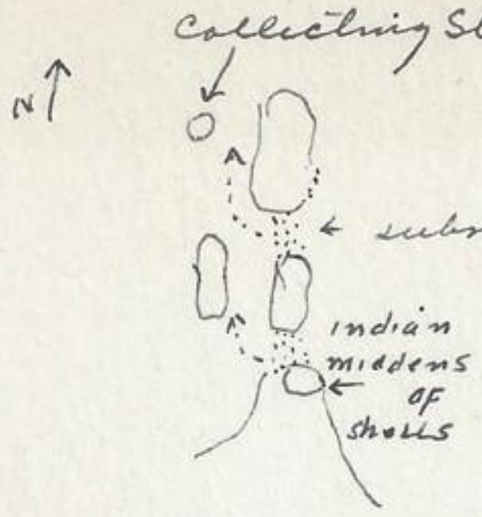
July 7

Minnesota Ledge, San Juan Island, San Juan County, Washington

Class group collected from outer soland appros 100 meters S.E of the ledge. This area has proven to be the most prolific of the various collecting station, as apply to chitons. This may be due to the actual topography, or to the combination of partially protected position and the constant source of detritus supplied by the main reef to the west. This general circulation of water

26

would suggest such a situation as being very probable.



The direction of wave movement is from the west and brings detritus from the west to the lee side of the island where the collecting station is located. Beyond the last projection is found the open waters of the straights of Juan de Fuca. Indian midden of shells some few feet above high tide and exposed in cross section which would suggest a certain degree of erosion by wave action of the land mass. The degree of erosion should be determined so it could be used as a key to land erosion for a known period of time. Collected the factors chitons from this island, as indicated on above map.

1-7-7-49	to	9-7-7-49	Ischnochiton
10-7-7-49	to	12-7-7-49	mapalia lignosa
23-7-7-49	to	24-7-7-49	" citiata
25-7-7-49	to	26-7-7-49	Tonicella lineata.
27-7-7-49		29-7-7-49	white chitons

These Chitons were taken from under rocks in tide pools and principally below low tide under rocks. Mapalia muscosa appeared to be in unusually small numbers on this island. At Pavine Pass at 9 fathoms collected several chitons from dredge of rocks, dominant bectens and few algae. This specimens are small and are as follows.

30-7-7-49 - 47-7-7-49 Ischnochitons

8 July.

False Bay, San Juan Island, San Juan County, Washington. Took sample series from 950 meter stake, crest sand bar. this a.m at 10:30 A.M. 2 x 4 x 8 x 16 x 32

11 July

False Bay, San Juan Island, San Juan County, Washington made series of collections at False Bay. These collections were made from 1/10 sq meter surface areas to a depth of 2 1/2 cms. Six samples were taken from the stations on the transect. and combined into one sample. All from within 2 meters from stake. These stations are recorded by meter posetions from shore and except for first 100 meters, are placed at 50 meter intervals. Results of this days collection are tabulated as follows. (Corrected to one sample unit or 1/6 original)

Station field no.	non-living material displacement in H_2O		Percentage of mud residue after live animals were taken from sample. Gravel	wood	Shell fragments	worm cases	Remarks
10(H)7-11-49	~~4000 ml~~	666.6	98	1%	1%	0 entirely of minute worm tubes	decomposed organic ulva mainly & order.
25(H)7-11-49	~~140 ml~~	23.3	0	0	0		
50(1), 7-11-49	~~36 ml~~	6.0	20 (12 m.m largest)	20%	trace	40% (05 m.m wide)	
100(1)-7-11-49	~~36 ml~~	6.0	trace	20% (30 × 8 mm)	trace (average 2 m.m)	80% (05 m.m)	
150(1)-7-11-49	~~37 ml~~	6.1	30 (12 m m largest) (mainly 3 m.m)	30% (1 piece 16 × 6 m.m)	30%	0	
200(1) 7-11-49	~~42 ml~~	7.0	0	50% (2 × 6 m.m) largest size	2% (3 m.m)	48% (3 m.m)	5 of ~~2 macoma nasuta~~ 4 × 3 m.m
250(1)-7-11-49	~~115 ml~~	1.9	70% (18 m.m largest)	10%	20%		Shells of Protothaca macoma secta & nasuta.
300(1)-7-11-49	~~20 ml~~	3.3	0	50%	25%	25%	12 macoma nasuta from 7 × 5 to 4.5 × 3.8
350(1)-7-11-49	~~10 ml~~	1.7	25% (small)	50%	25%	0	1 macoma nasuta 4 × 5
400(1)-7-11-49	~~30 ml~~	5.0	50%	25%	50%	0	most of shell fragment in one Macoma nasuta (.26 of 16 mac. nasuta 7 × 5 to 6 × 4
450(1)-7-11-49	~~16 ml~~	2.6	0	50%	trace	0 ---- 50% (3 m m) ?	
500(1)-7-11-49	~~16 ml~~	2.6	trace	40%	20% (largest shell 12 m.m)	40%	mya arenaria (only) shell frag and siphon 1 m.m long 13 macoma nasuta from 9 × 6 to 5 × 4
550(1)-7-11-49	~~40 ml~~	6.6	80% (largest 10 m m) (average 3 m.m)		20%	0	1 macoma nasuta 5 m.m 1 " " 4.7 m m
600(1)-7-11-49	~~21 ml~~	3.5	~~12.5~~ 13 %	~~12.5~~ 11 %	25%	50% (3 m.m)	2 macoma nasuta 12 × 9
650(1)-7-11-49	~~33 ml~~	5.5	0	33% (12 × 6 m m) largest	67%		.26 of one macoma nasuta 25 m m in length
700(1)-7-11-49	~~24 ml~~	4.0	0	0	20%	80% (3 m.m)	4 mac nasuta 11 × 1 × 17 to 2 × 3 .26 of 3/2 macoma nasuta 8 × 6
750(1)-7-11-49	~~20 ml~~	3.3	0	0	20%	80% (3 m.m)	one Glenchaster ca 9 m.m in diameter
800(1)-7-11-49	~~17 ml~~	2.9	0	0	25%	75% (3 m.m one 7 m.m)	.26 of and 1 Mya secta (7 m.m) 1 " nasuta (13 mm) 1 " " (5 × 4 m.m)
850(1)-7-11-49	~~25 ml~~	4.2	0	20%	trace	80% (3 m.m)	
900(1)-7-11-49	~~46 ml~~	7.6	0	0	10%	40% (3 m.m 3 tubes 6 m.m wide)	1 mac nasuta 17 × 11

(continued)

The samples taken today were during period of from low tide to high tide, starting with the ~~intersection~~ first thus permitting a full period of exposure for all organisms. It may be that there is a migration downward according to the time of tide exposure. Observed one Macoma nasuta on the surface sand at station 600 m. marker, trying to dig into the sand. It had made a groove 3 inches long (shell 10 m.m long) These exposed shells are probably picked up by the Larus glaucescens which are always present in the area. Observed a Mopalia Muscosa in an area of isolated rock upon the sands that had only moved 2 inches since 3 days ago. Apparently it remains on this rock as ones has a territory. Collected the following Cryptochetons stellesi from subtidal zone on rocks at east side of channel entrance that measured the following

20 Cm x 16 Cm.
27 Cm x 18 Cm.
23 Cm x 13 Cm.
15 Cm x 12 Cm.
30 Cm x 19 Cm.
8 Cm x 6 Cm

(186-7-24-49)

False Bay, San Juan Island, San Juan County Washington

12 July

Returned to False Bay and collected the second zone of transect station. This zone is a layer 5 Cm in thickness below the first 2 1/2 Cm zone

2 1/2 Cm zone
5 Cm zone.

This collection was made with the 1/10 sq meter column. Upper 2 1/2 Cm surface removed first before 2nd zone was taken. One sample only was collected from each collecting station except as specified. The calculations for the following chart have corrected those cases where more than one or a part of one sample was taken. The live animals remain in proportions as indicated on label as to whether 1/2 or 2 times sample area. (sample beyond 950 meters are 2 times sample or two 1/10 m plots per sample. All others single as as specified)

950(1)-7-11-49	5.7	Hyale	—	4	25%	trace
1000(1)-7-11-49	5.1	Hyale	—	4	25%	—
1050 (1)-7-11-49	4.1	Hyale	—	3	75% (3 m.m)	2 m.m)
75-(1)-7-11-49	8.1	Hyale	—	3	75% (3 m.m)	(2-7 m.m)
					100% (3 m.m).	

{ 1 museum sample 3x4

Station Field number	non-living material displacement H_2O	Percentages of misc residual after live animals were taken from sample. Gravel	Wood	Shell fragment	worm case	Remarks.
10(2)-7-12-49	1350 ml	100% (largest up to 8 m.m in diameter)	0	0	0	
25(2)-7-12-49	50	90%	4%	6%	0	
50(2)-7-12-49	50	85% (10 m.m largest)		15%	5%	
100(2)-7-12-49	140	40% (6 m m largest)	20%	20%	0	live 1 macoma nasuta 30 x 21 m.m
150(2)-7-12-49	25	10% (4 m m largest)	85%	5%	0	
200(2)-7-12-49	20	50% (3 m.m)	25%	25%	0	
250(2)-7-12-49	324	90%	5%	5%		
300(2)7-12-49	32	70% (8 m.m largest)	45%	45%	0	2 Shell fragment macoma nasuta. 10x7
350(2)7-12-49	5	5%	50% (in three pieces)	50% (in two large fragment)		
400(2)-7-12-49	12	0	15%	80% Shell (large)		
450(2)-7-12-49	10	50%	8%	60%	2%	
500(2)-7-12-49	5	40%	20%	40% (1 macoma nasuta 18 x 13)		
550(2)7-12-49	37	30%	60	9%	2% (3 m.m)	1 live macoma nasuta 19 x 15
600(2)-7-12-49	16	5% (largest 2 m.m)	0	85%	2%	1 live macoma nasuta
650(2)-7-12-49	12	30%	0	40%	30% (3 m.m)	
700(2)-7-12-49	18	0	0	20%	80% (3 m.m)	1 live M. nasuta 44 x 30
750(2)7-12-49	10	0	0	50	50%	2 M. nasuta 26 x 19
800(2)-7-12-49	20	trace (2 m.m)	trace.	50% (Macoma nasuta 16 x 11 22 x 15	50%	
850(2)-7-12-49	7	0	0	10%	90%	
900(2)-7-12-49	17	0	0	10%	90% (3 m.m)	1 live maconia nasuta 20 x 13
950(2)-7-12-49	105	0	0	0	100% (2.5 m m) Small hole	
1000(2)-7-12-49.	5	triangonal (2 m.m)	0	50%	50%	
1050(2)-7-12-49	11	0	0	5%	95% (3 m.m	1 Ammodytes tabranus & M. nasuta
1075(2)-7-12-49	4	(trace gravel 1 m.m)	0	10%	90%	

(all above sample calculated for 1 sample population except live specimens)

490712-29

470713-30

Oceanography Laboratories, San Juan Island, Washington

13 July

Mammals of San Juan Island:

Sorex vagrans vagrus
Procyon lotor psora
mustela vison energumenus
Eutamias townsendii townsendii
Peromyscus maniculatus ballisteri
Microtus townsendii pugetti
Ondatra zibethicus osoyoosensis
Rattus rattus rattus
Rattus rattus alexandrinus
Rattus norvegicus norvegicus
Mus musculus musculus
Odocoileus hemionus columbianus
Canis lupus fuscus (extirpated)
Grampus rectipinna Killer whale
Globicephalus scammonii Blackfish
Rhachianectes glaucus Gray whale.
Phocoena vomerina Harbor porpoise.
Bats.
Lutra canadensis vancouverensis
Panoscurus douglasii douglasii
Castor canadensis leucodonta
domestic rabbit introduced.

Cumpician plants

Pseudotsuga taxifolia
Arbutus menziesii
Quercus garryana
Acer macrophyllum
Pinus contorta
Tsuga heterophylla
Abies grandis

Minnesota Reef, San Juan Island, San Juan County, Wash.

13 July

Collected the following chitons from one low tide pool at the extreme S. E. end of the island reef. This pool was on a solid rock base at about 1 foot above low tide and within this area of 2 x 2 meters were several rocks of about 10 cm in size. bottom of shell and rock-gravel debris. Collected only those desired for collection. It would appear that such a tidepool offers the best habitat for these chitons, as just beyond on all side did not find this population

of chitons in any degree of numbers.

1-7-13-49 to 19-7-13-49 _____ _____ small white chitons largest up to 10 m.m long. Under rocks in gravel & sand.

20-7-13-49 to 27-7-13-49 Tonicella Lineata

28-7-13-49 to 36-7-13-49 Ischnochiton _____ small 10cm dark forms.

37-7-13-49 — 42-7-13-49 Ischnochiton _____ small evenly colored forms.

43-7-13-49 — 52-7-13-49 Mopalia ciliata group.

53-7-13-49 — 87-7-13-49 Ischnochiton group.

88-7-13-49 — 95-7-13-49 Mopalia lignosa group

46-7-13-49 — 102-7-13-49 Ischnochiton group.

103-7-13-49 ~~ma~~ Tonicella lineata

104-7-13-49 Ischnochiton.

105-7-13-49 Mopalia muscosa.

The white chitons were found most deeply set of any of the chitons and may be due to small size. They were associated with certain calcarian tubed worms and other forms that must have the the rock placed in a clay base.

False Bay, ~~San Juan Island~~, San Juan County, Washington

13 July

Collected several chitons from tidepool on east side of bay at channel area. This pool is protected from the direct wave action of the outer waters by an island of rock beyond. This area is in sand position as all previous chiton collecting.

106-7-13-49 Mopalia ciliata.

107-7-13-49 Cryptochiton stelleri

108-7-13-49 Tonicella lineata

109-7-13-49 Tonicella lineata

110-7-13-49 Ischnochiton _____

111-7-13-49 to 116-7-13-49 Mopalia lignosa

119-7-13-49 to 120-7-13-49 Mopalia lignosa

121-7-13-49 Katharina tunicata

122-7-13-49 ~~Isch~~ Mopalia ciliata ?

123-7-13-49 to 124-7-13-49 Ischnochiton _____

Pacific Pass, San Juan Islands, San Juan County, Wash.

14 July

Collected 2 chiton from 17 fathoms between Pacific Pass and Upright Head.

1-7-14-49 Mopalia lignosa

2-7-14-49 Mopalia lignosa

32

49071 7-32

Mt. Baker Lodge, approx. 4630', Co., Washington

17 July.

Trip to Mt Baker with family. at a point near the lodge recorded the following Ansco Color pictures.

1-7-17-49 Lower Lake with Jay on rocks in front. Mt. Shuksan

2-7-17-49 upper lake which is just below the lodge to the north. Jay in foreground on moss covered shore. Mt Shuksan

3-7-17-49 Annette and Jay on snow bank above Lodge Mt Shuksan in background.

4-7-17-49 same lake as 1-7-17-49 with Annette, Jay and Chris in foreground. Mt Shuksan in background. Returned to Oceanography Labs at San Juan Island and recorded Invert. Lab with Friday Harbor in background 5-7-17-49, and one of Chris 6-7-17-49 at same place. Visited Healy at Bellingham where Mrs Clara Vaughan was visiting.

False Bay, San Juan County Islands, Washington

19 July.

Collected one Callianassan from 10 foot stake at 50 cm depth. Found in clay in tunnel size of Callianassa. Presented to Mrs Margaret Dunn a student in Invertebrates.

Between Parker Reef and Orcas Island, San Juan Islands area, San Juan County, Washington

19 July.

Mrs Margarite Dunn collected three Ischnochitons from 10 fathoms of water at this point. They are as follows.

1-7-19-49 Ischnochiton

2-7-19-49 Ischnochiton

3-7-19-49 ~~Ischnochiton~~ dent

Oceanographic Laboratories, Univ. of Washington, San Juan Islands, San Juan Co., Washington.

20 July 1949

Mr. Comita, a student in advanced invertebrate zoology, presented the following 25 m.m Radiolarians, taken on dredging trip. Taken in vicinity of Oceanographic Laboratories and in the general sound area near the Oceanographic Station.

1-7-20-49 Clam dredge used for floor analysis at mouth of False Bay. Screen set to left.

2-7-20-49 Rent accommodations at Station. Annette & L had one similar to this one

3-7-20-49. Advanced Invert. Lab.

4-7-20-49 The Copoped used by Dr. E. Swan. Specimen traps to left.

5-7-20-49 Students in Invert class. Margaret Dunn in foreground, Univ of Hawaii.

6-7-20-49 Hydah used for dredging. Formerly Wakefields boat used in Alaska. and Uncle of Mil. Culbertson.

7-7-20-49 Part of docks, Invert Lab and Dunny hall in distance.

8-7-20-49 Dredging apparatus & graduated sieves on Hydah.

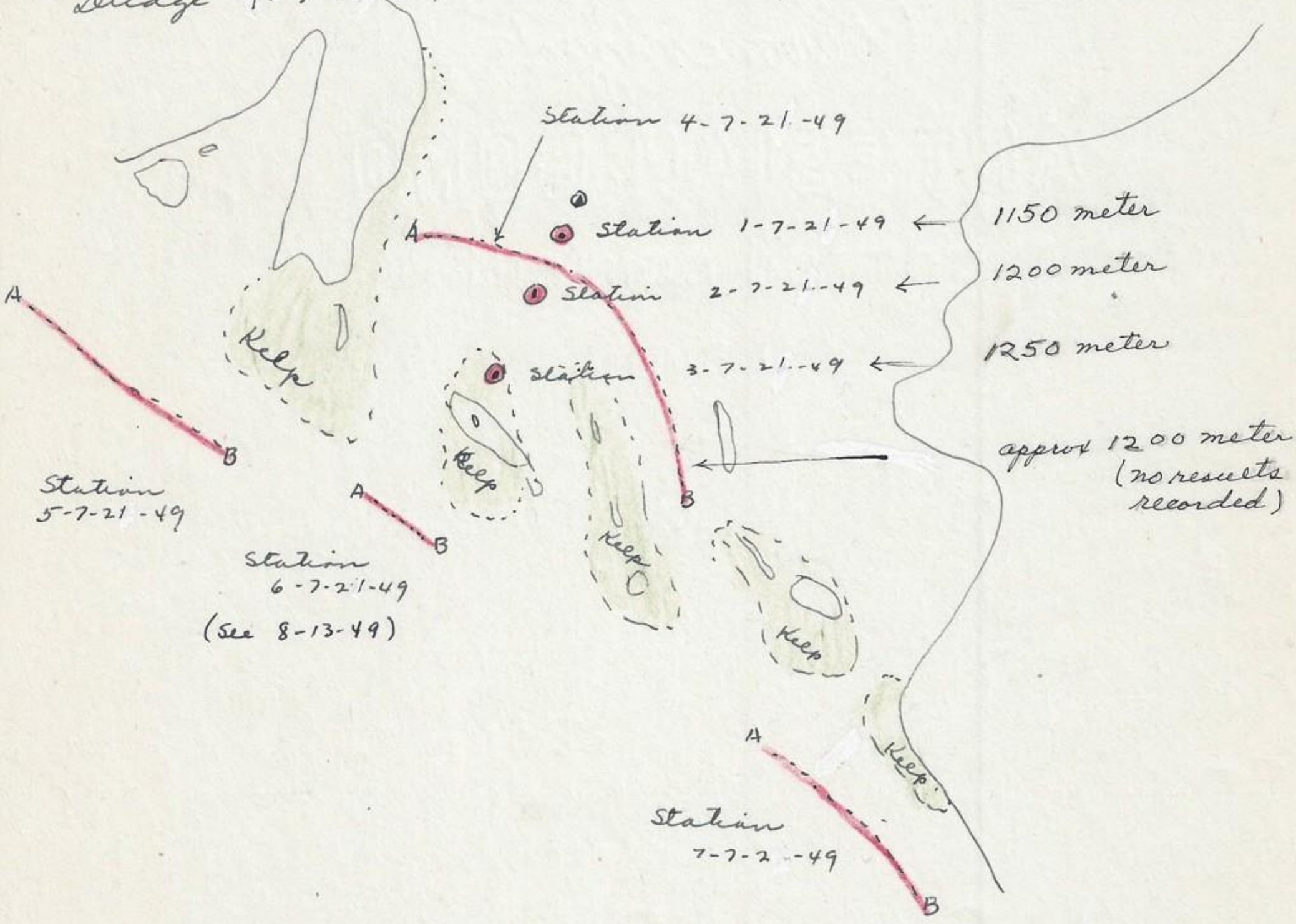
3 JnBee 1949

490721-33

False Bay, San Juan Island, San Juan County, Washington

July 21, 1949

Dredged outer limits of False Bay this A.M between 10:30 A.M and 12:00 A.M. dredge, (Clam shell dredge) 1-7-21-49 from approximately 1150 meters on transect line. Second clam shell dredge 2-7-21-49 from approximately 1200 meter position on transect. Thud dredge 3-7-21-49 appro 45 miles from out rock on transect. These three dredges were taken with a clam shell dredge with approximately 1/10 mile capacity surface coverage. Dredge 4-7-21-49 across transect at about 1200 mile station from point A to point B.
Dredge 5-7-21-49 along outer limits of kelp from point A to point B.
Dredge 6-7-21-49 " " " " " " " " " "
Dredge 7-7-21-49 " " " " " " " " " "



Station 1-7-21-49 - Hard sandy bottom surround by large submerged growing kelp. Result of dredge (approx 1/10 surface area and 1 cm deep. as follows: Approx. 1150 miles station (Sample = 1 (1)-7-21-49

1% gravel with one rock 8 m m
other gravel average 1 m. m
2% wood and 60% algae - zostera debris
1% shell fragment.
36% worm tubes 3 m m wide
displacement of entire mass = 30 ml.

Station 2-7-21-49 Hard sandy bottom in cleared area among submerged algae. Results as follows: (Appros $\frac{1}{10}$ m. surface 1cm deep) clam shell dredge. 80% Zostera. approx 1200 meter station (sample = 2(1)-7-21-49)

250 ml water displacement of mass 80% of which was live Zostera. 2% gravel, 80% live Zostera and 18% roots of Zostera, 2 worm tubes. The following figure converted to not account for above surface growth.

(60 ml displacent, ground 4% ~~plant~~ wood ~~no plant~~ 94 P.; 2% worm tubes)

1 macoma nasuta (live) 8 x 5 m.m.

Station 3-7-21-49 Rock surface in 5 meters of water. Time approx 11:00. Tide up to 700 meter station. Results as follows. clam shell dredge 40% Zostera approx. 1270

150 ml water displacement. no gravel, no shell (dead), no wood but 100% red algae turnus. Live material Cumulus 2 shells and 5 worms. Sample from bare rock surface.

Station ~~B~~ 4-7-21-49 Transverse dredge across 1200 m station on transect. Sandy bottom and submerged algae. Results as follows:

Station 5-7-21-49 approx. 40 miles beyond kelp beds. This dredge suggests algal forms ~~of~~ various depths and is probably representative of low and high points of the outer channels. This station was peculiar in that an excellent collection of corals were found associated with the Strongylocentrotus franciscanus - Agelenum group. Results as follows:

Strongylocentrotus franciscanus	six large and about ¼ dredge capacity. Gravid in some cases.
Strongylocentrotus drobachiensis	one medium size specimen.
Austritas oregonensis	Six specimens mostly large forms.
Balanus nubilis.	3 or 4 large specimens.
" rostratus	few on shells and other debris
Calliostoma	numerous
Trochatrophis	numerous.
Pecten hericius	only 1 cm size specimen only. no large living forms present.

490721-35

Clinocardium. Small large form only.
Solasta stimpsoni 1 specimen rare dead shell of specimens larger
Crepidula. Small conical forms only.
Stichopus californicus 3 specimens
Modiolus modiolus few imbedded securely in matrix of debris of algae kelpants and other material. appeared to be encased in a slimy covering.
4 or 5 specim of shrimp
Few white worms.
Pagurus hemerlyi. few.
2 specim of Isopods - numerous
Neptuna tabulatus. dead shells only
Pugetia gracilis a most common form but not too well represented. Forms from gray to red in color.
Cucumaria. Small white form.
Small sculpin. 3.
Three specs of blenny. one of which was green.
Epiactis prolifera 1,
1 nudibranch small and filamentas decoration.
Cryptochiton. 24 cm in length.
Schmackeria. small in size and 5 collected. and others.
Nereocystis, Laminaria, Alaria, Costaria represented and constituted 80 percent of bulk
Lacuna common on kelp.
Capulus few. 1 Goeduck shell (shell only) meaning
This dredge as stated above supported several forms of coral. as a result of position away from immediate outlet of False Bay channels.

Station 6-7-21-49 differed from above in a noticeable lack of the coral representatives. and a slightly greater number of S. franciscanus. The period of dredge was about 1/6 of the dredge 5-7-1-49. Algae occurred in about the same percentage of bulk.

Station 7-7-21-49 supplied the greatest number of S. franciscanus 10 in number and constituted 1/4 of the bulk. 3 Stichopus californicus represented. This station approached station 5-7-21-49 in position but did not have the coral representation to the same degree. In addition to the above listings of other dredges took a small brownish fish probably Ascelichthys rhodorus. Also 2 Cancer oregonensis. One large Polonicus. One Euphausia. 35 m.m long

Enroute to False Bay recorded the following birds. These birds were all observed near Cattle point and channel to east around Hall islands.

Puffinus griseus. Two birds left water at 400 meters east and south of cattle point.

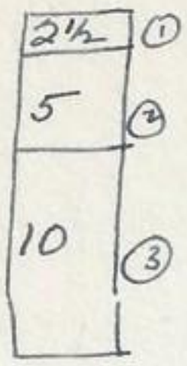
Phalacrocorax penicillatus. Common
Phalacrocorax pelagicus resplendens. Common and breeding birds in this area particularly on mainland cliffs and Buck Island.
Ardea herodias fannini. 1 bird observed
Nycticorax nycticorax hoactli. Occasionally observed and generally around kelp beds at the various islands.
Melanitta deglandi Groups of 2 to 50
Melanitta perspicillata. About as common as above
Oidemia americana ? one bird.
Cathartes aura septentrionalis flying over island areas
Buteo borealis calurus. Along shore line trees.
Haliaeetus leucocephalus leucocephalus. pair at Cattle point where they remained in same area. Observed bird on practically every trip among islands of the area.
Phasianus colchicus torquatus. False Bay.
Haematopus bachmani. pair at Hall island
Oxyechus vociferus vociferus. Near False Bay
Aramus melanocephala 18 at Hall island
Aphriza virgata 2 at Hall island
Larus glaucescens Common nesting birds. 250 banded at Hall island. young 3/4 size of adult in some cases.
Larus philadelphia. Increasing in numbers the last week. approx 20 observed today.
Larus heermanni Generally found in association with other glaucous wing gull populations.
Uria aalge californica. 18 in channel N. of Hall Island
Cepphus columba Common all along route, generally in pairs.
Brachyramphus marmoratus. 1 bird and generally in pairs.
Cerorhinca monocerata 2 pairs in channel N Hall Island
Bubo virginianus saturatus. One at False Bay. on point west of False Bay Channel.
Selasphorus rufus False Bay.
Hirundo erythrogastra, False Bay.
Corvus brachyrhynchos caurinus Common along entire route
Pentheles rufescens rufescens False Bay.
Empidonax difficilis difficilis " "

Jun Bee
1949

False Bay, San Juan Island, San Juan County, Washington. 470726-37

26 July

made collection of third layer of transect stations. This zone consists of 10 cm of $\frac{1}{10}$ of meter area in the following position. Zone no. 3. The tide was out and followed as I worked progressively from the outer limits of the bay to the head of bay. The results are tabulated on the following page. measured various depth of clay at the following position on transect.



It would appear that at point 138 m the clay disappears but reappears at 175 meters indicating the variation in depth. The surface of this clay is irregular with hump and depression of minor extent. The discovery of numerous rocks on the clay surface beyond the exposed boulder zone of the upper bay would indicate that these boulders are not confined to this zone but are found covered by the sands above. The zones of shells at various layers are found to be associated with running or circulating water and this probably accounts for the shells of live Macoma secta found at these zone. Whether these layers of shells have been formed by living shells or have been covered by sands is a question. It may be that the wood and gravel bergh has supplied the proper condition for water circulation and then the clams subsequently entered this zone to form the shell layer. The later seem more likely as it is difficult to explain how such a massive and extensive layer of shells could be formed on the surface and then covered without shifting of shells. Measured the siphon of one macoma secta which measured 33 cm in length. Tube transparent and pliable and about 2½ mm in thickness at point where it entered shell. The clay base to the upper limits of the bay may be responsible for the water holding capacity of the bay and accounts

50 m = 8 cm to clay
100 m = 15 cm to clay
127 m = 30 cm " "
132 m = 40 cm to clay
138 m = 50 cm to clay
142 m = ? but at least beyond 100 cm.
150 m = no clay at 1 meter and 10 cm depth.
175 m = 30 cm to clay. Small rock lying upon clay. No wood but Crumbable shells.
550 = clay at 1 meter and 25 cm depth. no variation ~~of~~ on the rock at these depths but confined to present water influence or top of sand level. Numerous shells and wood & rock below.

Station Field number	non-living material displacement in H_2O	Percentage of mine residue after live animals were taken from sample. Gravel	wood	Shell fragment	worm tubes	Remarks
10(3)7-26-49	0	0	0	0	0	
25(3)-7-26-49	0	0	0	0	0	
50(3)-7-26-49	0	0	0	0	0	
100(3)-7-26-49	300 ml	75%	trace	25%	0	clay 15 cm from surface. Sample representing 5 cm of sand & 8 cm of clay.
150(3) 7-26-49	320 ml	15%	80%	5%	0	1 live Macoma nasuta 42 m.m.
200(3) 7-26-49	478 ml	2%	97%	1%	0	1 live Macoma nasuta 49 m.m
250(3) 7-26-49	603 ml	38%	60%	2%	0	
300(3)-7-26-49	30 ml	70%	20%.	10%	0	
350(3)-7-26-49	40 ml	trace	60%	40%	2 cases	
400(3)-7-26-49	25 ml	4%	48%	4%		
450(3)·7-26-49	260 ml	2%	97%	1%		
500(3)-7-26-49	40 ml	20%	70%	10%		1 live Macoma nasuta 40 m.m
550(3)- 7-26-49	900 ml	20%	40%	40%		no living forms
600(3)- 7-26-49	1125 ml	1%	97%	2%		" " "
650(3)- 7-26-49	800 ml	3.9%	95%	.1%		
700(3)- 7-26-49	40 ml	30%	10%	60%		
750(3)-7-26-49	35 ml	1%	96% (in upper-most zone)	3%	trace	1 live Macoma nasuta 45 m.m
900(3)- 7-26-49	30 ml	2%	70%	28%		1 live Macoma nasuta 40 m.m).
850(3)- 7-26-49	4 ml	0	0	85%	15	
900(3)- 7-26-49	30 ml	trace	93% (zostera roots)	1%	6%	(1 live Mesodesma opterus
950(3)- 7-26-49	12 ml	0	96% (zostera roots)	4%	0	
1000(3)- 7-26-49	1 ml	0	0	100%	0	
1050(3)- 7-26-49	2 ml	trace	0	99%	1	
1075(3)- 7-26-49	8 ml	0	0	99%	1%	
1150		1%	2%	1%	36%	one rock 8 mm, 60% Zostera debris
1200		4%	94%		2%	not including living Zostera
1250		0				100% live red algae

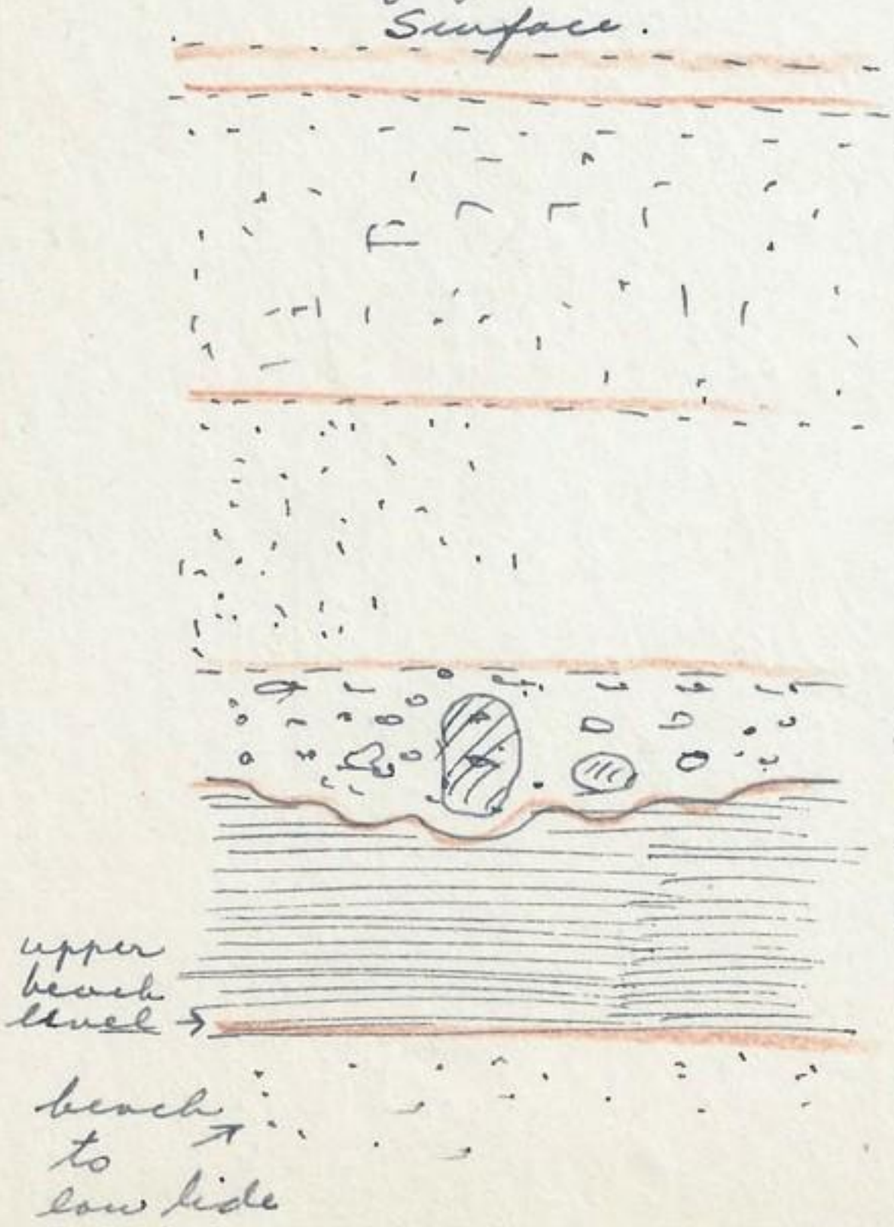
490726-38

for the presence of shells in the various zones, for example, Mocoma nasuta is found to be common at outer limits of bay and also at the upper reaches of the bay but with decreasing numbers in the center of the bay. Examined several Schizothaerus nuttallii and found them inactive during low tide even when found covered with water and siphons exposed. The expelled water was considerable later than the surface water about. The temperature of the water may be a more important factor than the presence or lack of water in this case. Found the distribution between the two species of Arenicola interesting with the large one confined to the low tide zone and the small one to the upper limit of bay. These two worms would be useful in determing the oxygen or respiratin factor of two closely related forms of annelida. Tapes Californica in some population number as last week, with appox 50 percent.

Smith Island, San Juan Island, San Juan County, Wash. Approx 122° 50½' longitude and 48° 19' latitude.

28 July

Investigated this island for chitons and made collection (1(1)-7-28-49) to 1(12)-7-28-49
(1-7-28-48) from the low tide level on north side of island. These chitons were found under the numerous rocks that line these beaches. While the boulders were numerous they were silted in which made the available undureside of rocks exposure useless for the chitons. The stratigraphy is interesting for this island and consists as follows:



recent black & brown soils.
coarser gravels
dirty clay to dirt like with boulders included. grading from pure clay to contaminated clay.

Fine sand but not as perfectly stratified as

gravel upon eroded surface of stratified sands below. Some conglomerate blocks of clay & gravel, boulders & various grades of gravel.
Fine stratified sands merging into clay below. upper surface irregular but with curved surface as if eroded by glacier.

clay (unknown depth but making up beach with boulder overlain.

40

490728-40

The profile from east to west as follows.
indicating
the movement ——— → ———
of the glacier from N. E to S.W. The island
has eroded approx 50 feet on the west side in 90 years
with this eroded material forming an island to the lee-
ward some 2 blocks beyond with bar connecting and
exposed at low tide. Birds observed on this island
and in surrounding waters are as follows:

~~Squatarola~~ squatarola 5
Crocethia alba 3
Arenaria melanocephala 50
Arenaria interpres marinella 3
Actitis macularia 3
Melanitta perspicillata appx 50
Melanitta deglandi 20
Larus heermanni 12
Larus glaucescens 25
Phalacrocorax pelagicus resplendens
" pencillatus
Stelgidopteryx ruficollis serripennis
Hirundo erythrogastra
Anser aecuta tyrtyrka 8
anser p. platyrhynchus 2
Cepphus columba
Heteroscelus incanus 1
Brachyramphus marmoratus few but mainly on islands Cl.
Cerorhinca monocerata 1 " " " " "
Puffinus griseus 2 about 1 mile N. W of island
Eremetes mauri 18

From a dredge at about ½ mile N. W of Smith island
at 60 fathoms collected the following chitons. These
chitons were associated with a dominance of Pectens and
pebbles. no algae. They are as follows:
(2-7-28-49) (2(1)-7-28-49 to 2(12)-7-28-49)

Oceanographic Laboratories, San Juan Island, San Juan
County, Washington.

29 July
~~Encounter~~ at ~~Bo~~, False Bay observed the following birds that
I have not previously observed at this point
Circus hudsonius
Lophortyx californica californica
Charadrius semipalmatus. 6 in group of 50 westerns at
head of False Bay.
Megaceryle alcyon caurina.
Calaplex cafer cafer

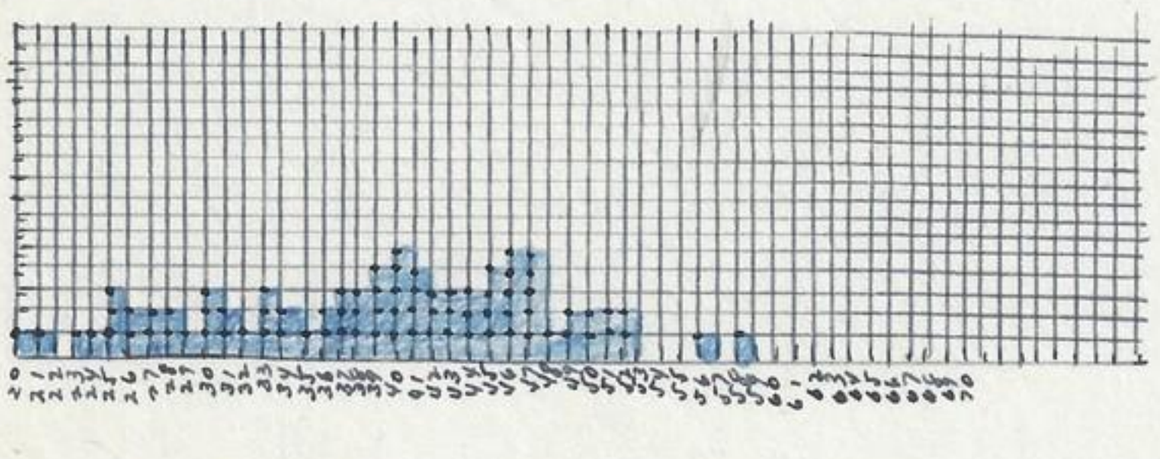
490728-41

Pentacta rufescens rufescens
Astia canadensis
Certhia familiaris occidentalis
Turdus fuscescens saurinus
Nyctea nivea nivea
Bombycilla cedrorum
Wilsonia pusilla chryseola
Spinus pinus pinus
Spinus tristis salicamans
Pipilo maculatus oregonus
Junco oreganus shufeldti
Spizella passerina arizonae
Zonotrichia leucophrys gambeli
Sturnella neglecta
Otocoris

Oceanographic Laboratories, San Juan Island, San Juan Co., Washington.

Aug 3.

Opened Transennella tantilla from sample of 450(1)-7-11-49 and counted young from the 6.5 m.m specimen. Lower reading = unit of measurement in which 50 = .7 m.m. 83 young in the tube ranging from a recognizable spheroid form 20 units in length to 42 units in length. Largest specimen .7 m.m.



Parker Reef, San Juan Islands, San Juan County, Washington

5 Aug. 1949

This S.M Annette, myself and group visited Parker Reef at the north end of Orcas Island. This ref is only exposed at periods below high tide. It is characterized by the differential erosion of upturned beds of slate and harder rocks of possibly Cretaceous? formation. The animals and plants are rich in species but the life form is beaten down so to speak and the result is quite different than other more protected places. The starfish were dominant (Pycnopodia helianthoides and a few Evasterias plus smaller forms. Along with the great numbers of starfish were the lack of good numbers of Mytilus. Rhodichdea pinata in the tops rocks at low tide level. Some of the chiton and other gastropod & pelecypod used these holes as protection.

490805-42

Winnecook Ranch
Box 277, Harlowton.
Montana

5. VIII. 1949

Mr. James W. Bee,
Oceanographic Laboratory,
Friday Harbor, Wash.

Dear Mr. Bee:

My having to be in Montana this summer has delayed my reply to your letter of July 10th.

I would be very glad insofar as I am able to help you with your chiton determinations, and could probably name most of the commoner forms for you at a glance. Small and deep water chaps might give rather more trouble. Through August you could send any specimens you wanted named to me here; after that to Redlands again. Material intended for my own collection should go to Redlands. Although mine is probably about the best study collection of Pacific chitons (both dry and alcoholic) in existence I am far from rich in good series from your region, even of the commoner things.

I intended to post you a copy of my paper on collecting and preserving chitons before I left Redlands and hope I didn't overlook it in the final rush.

Very truly yours

S. S. Berry

1949
Parker.

490805-43

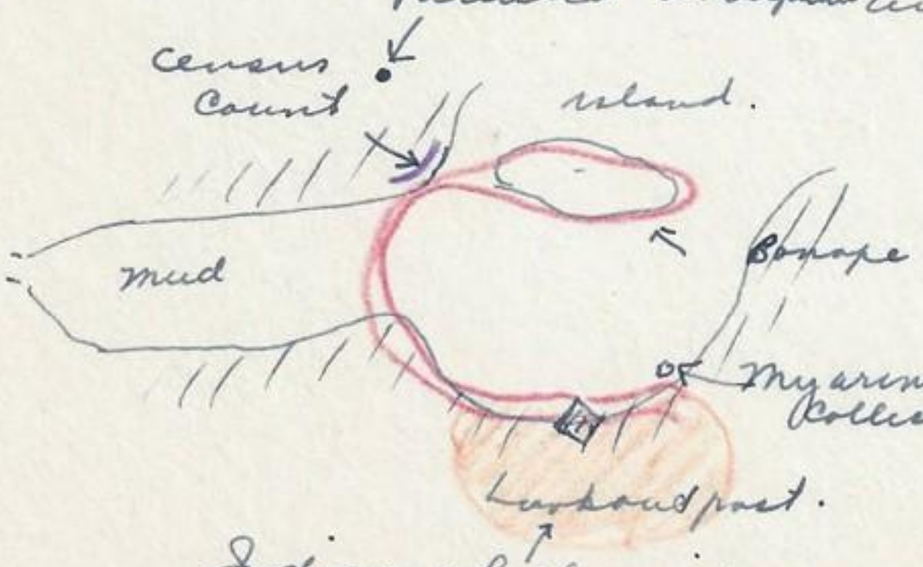
From this rep collected a series of chitons ✓ 1(1)-8-5-49 to 1(19)-8-5-49 of the common species represented, particularly the larger size range of the species which seemed to be better represented than in other areas collected. Observed several Cryptochiton stelleri of large size, approx 25 cm. in size (length). Upon approach to this island observed a large Haliotis kamtschatkana clarkeana perched upon a rock group at the south east end of the island. At 90 fathom depth some 1500 meters west of. collected one dark chiton (2-8-5-49) (may be recorded under (2-8-5-49) Dachnochiton _____.

In regard to Parker reef, it has many ecological factors worthy of investigation. For instance. Mytilus edulis is very poorly represented and when found are small and sparcely represented. There is a great number of which are open and body gone but shell still remaining. This may be due to increased fresh water influence of Fraser River, or to depredation of Pisaster ochraceus. Also it may be that the island is to deep during high tide to support the Mytilus. The nature of the rock varied also indicated the inability of the Mytilis to permanently attach. Great masses of detached Fucus algae in low spots on island some 1 foot deep. All encountered forms are not forms showing effect of salinity change. The puffin and guel colonys to the west may be a factor in predation. Thais lamellosa dominant gastropod and found in large numbers. Entrance to this island from Occanographic base at Friday Harbor observed increased number of Bonaparte Gulls, the progen gulemot, and fewer marbled murrelet common form. At island west of Parker reef found Tufted Puffin common about the immediate vicinity of the island.

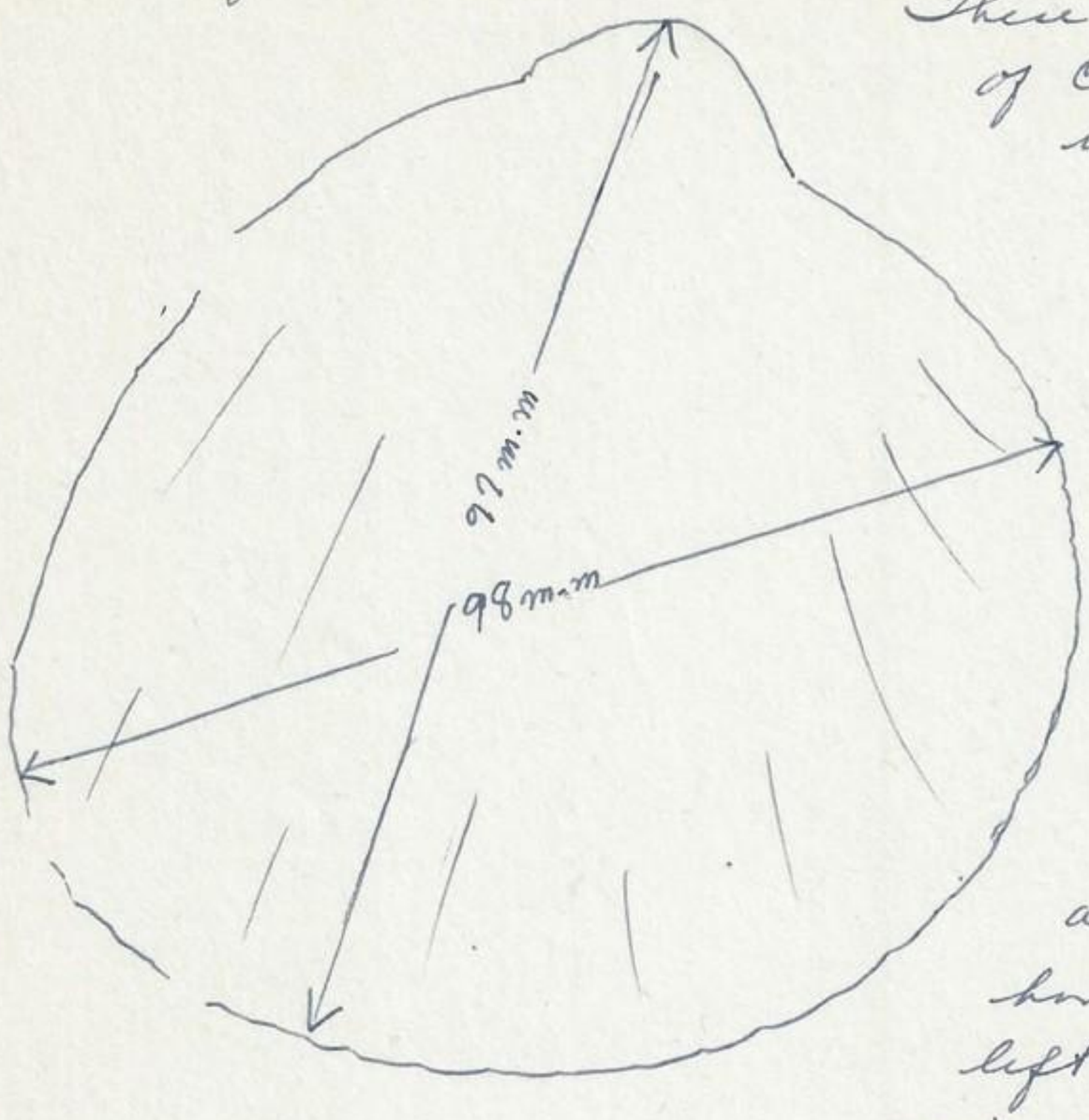
English Camp, San Juan Island, San Juan County, Washington.

Aug. 7, 1949

Dr Swan, Carmita and myself spent morning digging clams at Haba Bay. Schizothaerus nuttallii and Capax dominant clams and found in great numbers in tidal zone. At point indicate took Census at 4 feet above low tide level for 150 linear feet at 4 feet wide. or 600 sq feet. In this Corridor Counted. 160 Schizothaerus nuttallii and Capax or 2.1 Clams per 1 sq yard. In one sq yard counted 6 clams. The entire bay is being filled in by the accumulation of shells to matrix. Green clay base at about 3 feet down, shallower near shore. The Penope ~~Capax~~ not so common and found most of them near outer N end of island



They are abant 1 foot deeper or 50 cm to upper surface of shell. Collected 5 specimens of this clam. Schizothaerus from surface shell exposed to 40 cm deep. average 25 cm deep Clinocardium giganteum also dominant and covered entire area as surface shells. Waned approximate 1 per 2 sq meters. One large one measured (greatest length and width)



These forms held the form of capapods generally found in the Schizothaerus.

Mya arenaria dominant form at upper beach limit. Indian shell midden most extensive on island as indicated. Before English created parade ground, which was scraped as much as 8 feet, these midden were abant 15 feet deep. Dominhomesteaded after English left the area. Ceophlaeus pileatus picinus as indicated

Some Schizothaerus siphons exposed on surface for 20 cm. Day dull and cool.

False Bay San Juan Island San Juan County Washington

Aug 11, 1946

Checked on following items in False Bay. First Schizothaerus nuttallii found at 658 meters. This first occurrence of the horse clam is represented by a small aggregation of about 32 clams in a restricted area. Most of these clams are found either on the ~~clam~~ bord saturated shore line of the tidal pools but mainly in the water channels where the water remains. Just the plates of the siphon exposed. The clams are found from this point out to water edge in more limited numbers. The Callaniassa out to 210 meters but are found in normal numbers at abant 130 meters inland to near high tide shore line. Mya arenaria begin at 50 meters and extend out to 80 meters which is essentially the exposed rock area of the beach. The small Arenicola Claperedii ? sp. begin at 25 meter position and are found in good numbers out to 117 meters which may be governed

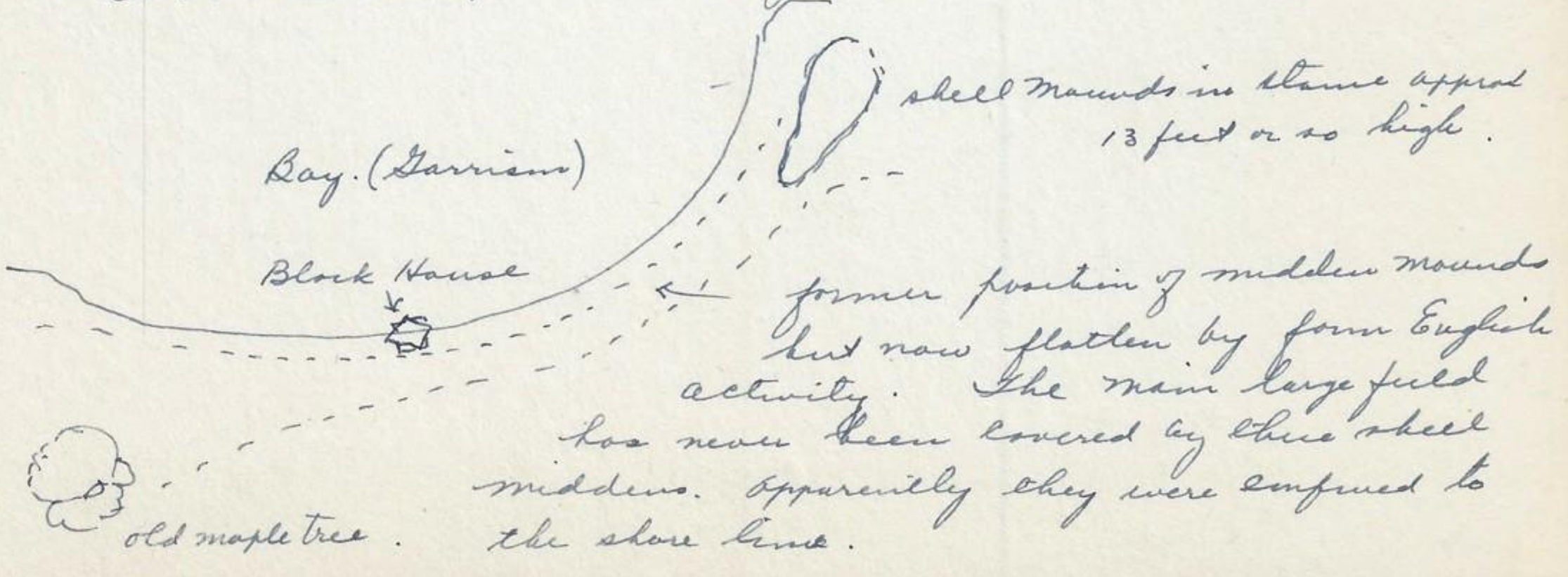
the subchalc clay. The western sandpiper were represented by about 500 birds over the exposed mud & sand flats during low tide. One greater yellowlegs present. When a rock was thrown at this bird it became confused and fluttered awkwardly toward me for about 3 feet before it took a keen stance. It remained motionless & did not call until I made another movement at which time it flew rapidly or hurriedly from the area and called continuously. Tried this experiment on the feeding sandpipers and found many birds momentarily confused when rock would come too close. Their movement was not coordinated with the other birds when rising from the ground surface. Counted 68 Arenaria Claperedii mounds in 1 sq meter at 35 meter station. Occasional Mytilus edulis up to 40 meters. Barnacle up to 5 meter station. Large logs on high bench from 0 meter to 7 meter position.

English Camp, San Juan County, San Juan Island, Wash.

Aug. 13, 1949

Took photo (1-8-13-49) of block House at English Camp. Pamphlet 1a-8-13-49 covers history of this photo.
Showed old maple tree with base of appox 7 feet across resposed on old midden shell midden. This tree had apparently grown upon this midden after the Indians had departed. The flat area formed by English soldiers in providing parade & flat surface for

marching & drill. According to Mrs Cook Davis who now lives at this place, the shell midden were originally found completely across the field and since the English established camps had been flatten out.



490813-46

Oceanographic Laboratories, San Juan Island, San Juan Co., Washington

Aug 13, 1949

Prepared amphipods and Isopods material for identification. These forms were collected from False Bay transect as established 7-11-49 and 7-12-49 and 7-21-49. They represent a composite collection and are recorded as found by graph on special report. This collection is a follows:

(1-8-13-49) amphipod _____

(2-8-13-49) amphipod _____

(3-8-13-49) amphipod _____

(4-8-13-49) amphipod _____

(5-8-13-49) amphipod _____

(6-8-13-49) amphipods _____

(7-8-13-49) amphipod. _____

(9-8-13-49) amphipod _____

red eye dissolved in alcohol.

(10-8-13-49) amphipod _____

(11-8-13-49) amphipod _____

red-brown-orange eye.

(12-8-13-49) amphipod _____

(13-8-13-49) amphipod _____

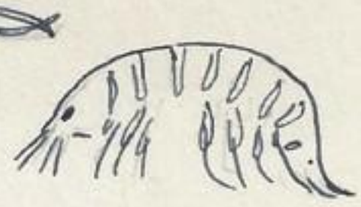
(14-8-13-49) amphipod. _____

47

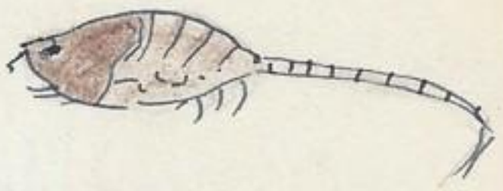
490813-47

(15-8-13-49) ~~Isopoda~~

(16-8-13-49) Amphipod.



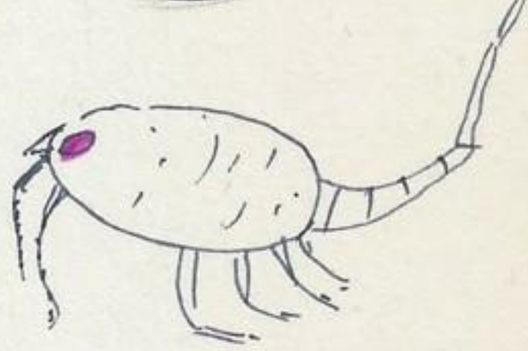
(17-8-13-49) Cumacea



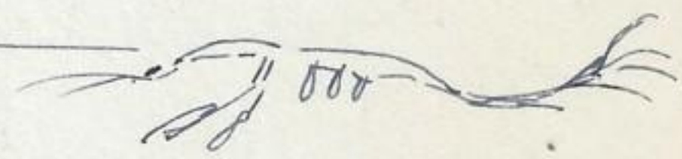
(18-8-13-49) Cumacea

(19-8-13-49) Cumacea

(20-8-13-49) Epimeliadia



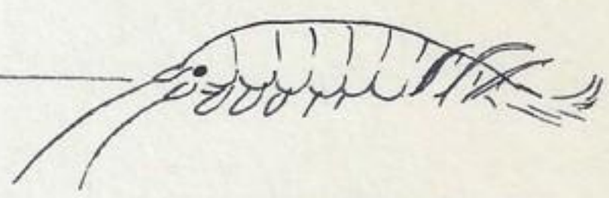
(21-8-13-49) Caprellidae



(22-8-13-49) Isopoda

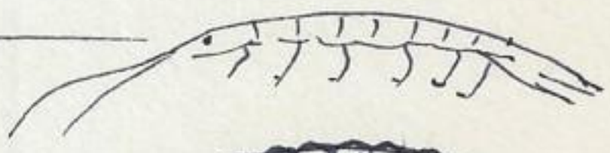
(23-8-13-49) Isopoda

(24-8-13-49) Amphipod

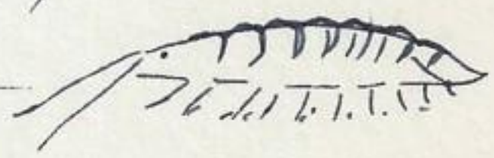


(25-8-13-49) Amphipod

(6(1)-7-21-49) Isopod



(6(2)-7-21-49) Isopod



~~Oceanographic Laboratories, San Juan Island, San Juan County, Washington.~~

Aug. 13, 1949

Observed 3 Phocoena vomerina (Gill)? pass by the meteorological pier east of the Oceanographic Labs. These porpoises surface about 3 times and then swam under water for about 300 feet before coming to surface. Took photograph in

490813-48

Annes 7 day (71-8-13-49) showing the cliff where jay fell down the bank to beach below. Jay appears thru bandage and closed right eye. The accident occurred yesterday at about 12:00 A.M. His statches on face Completed assigning of number to worms collected in False Bay from stations on transect. These Annelida are given numbers 26 to 64 as follows:

26-8-13-49 _____
27-8-13-49 _____
28-8-13-49 _____
29-8-13-49 _____
30-8-13-49 _____
31-8-13-49 _____
32-8-13-49 _____
33-8-13-49 _____
34-8-13-49 _____
35-8-13-49 _____
36-8-13-49 _____
37-8-13-49 _____
38-8-13-49 _____
39-8-13-49 _____
40-8-13-49 _____
41-8-13-49 _____
42-8-13-49 _____
43-8-13-49 _____
44-8-13-49 _____
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46-8-13-49 _____
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56-8-13-49 _____
57-8-13-49 _____
58-8-13-49 _____
59-8-13-49 _____
60-8-13-49 _____
61-8-13-49 _____
62-8-13-49 _____
63-8-13-49 _____
64-8-13-49 _____

The following graph and table incorporated as composite collecting from False Bay.

Station	Zone	H2O Displacement	Gravel %	Wood(w) Plant(p)	Shell fragments	Amelida tubes	Transennella tantilla (Gould)	Rochefortia tumida Carpenter	macoma nasuta	Dendraster excentricus	Psephidia lordi (Baird)	Leptosynapta sp.	Tellina carpenter	1-8-13-49 Amphipoda	2-8-13-49 Amphipoda	3-8-13-49 Amphipoda	4-8-13-49 Amphipoda	5-8-13-49 Amphipoda	6-8-13-49 Amphipoda	7-8-13-49 Amphipoda	8-8-13-49 Amphipoda	9-8-13-49 Amphipoda	10-8-13-49 Amphipoda	11-8-13-49 Amphipoda	12-8-13-49 Amphipoda	13-8-13-49 Amphipoda	14-8-13-49 Amphipoda	15-8-13-49 Amphipoda	16-8-13-49 Amphipoda	17-8-13-49 Cumacea
0	AB					0	0	0																						
10	A	666.6	98	1	1	0	0	0																					40	
	B	1350.0	100	0	0	0	0	0																						
	C	0.0	0	0	0	0	0	0																						
25	A	23.3	0	0	0	100	0	0								.16			.16										4	
	B	50.0	90	4	6	0	0	0																						
	C	0.0	0.0	0	0	0	0	0																						
50	A	6.0	20	20	+	40	.17	0								1			.16										14	
	B	50.0	85	0	15	5	0	0																						
	C	0.0	0	0	0	0	0	0																						
100	A	6.0	+	20	+	80	0	0							.16				.16						.16				6	
	B	140.0	40	20	20	0	3	0	1																					
	C	300.0	75	+	25	0	0	0																						
150	A	6.1	30	30	30	0	1	0	1																				9	
	B	25.0	10	85	5	0	0	0																						
	C	320.0	15	80	5	0	0	0	1																					
200	A	7.0	0	50	2	48	.17	0	.5																					
	B	20.0	50	25	25	0	0	0																						
	C	478.0	2	97	1	0	0	0	1																					
250	A	1.9	70	10	20	0	.5	6																		.16				
	B	324.0	90	5	5	0	0	0																	1					
	C	603.0	38	60	2	0	0	0																						
300	A	3.3	0	50	25	25	24	0	2							6														
	B	32.0	10	45	45	0	1	0	2																					
	C	30.0	70	20	10	0	0	0																						
350	A	1.7	25	50	25	0	9	0	.16							1														
	B	5.0	5	50	45	0	0	0																						
	C	40.0	+	60	40	0	0	0																						
400	A	5.0	50	25	50	0	22	0							.17	3			.33											
	B	12.0	0	15	80	+	0	0																						
	C	25.0	4	48	4	0	0	0																						
450	A	2.6	0	50	+	50	82	0	1										7							.17				
	B	10.0	50	8	60	2	0	0																						
	C	260.0	2	97	1	0	0	0																						
500	A	2.6	+	40	20	40	83	0	2.1							5			28							.33				
	B	5.0	40	20	40	0	1	0																	1					
	C	40.0	20	70	10	0	0	0	1																					
550	A	6.6	80	0	20	0	14	0	.33				1		.16	4														
	B	37.0	30	60	9	2	0	0	1																					
	C	900.0	20	40	40	0	0	0																						
600	A	3.5	13	11	25	50	33	0	.33				1			3			2							.33				
	B	16.0	5	0	85	2	0	0	1																					
	C	1125.0	1	97	2	0	0	0																						
650	A	5.5	0	33	67	0	21.5	0	.83			2				4			.33							1				.16
	B	12.0	30	0	40	30	0	0				6																		
	C	800.0	3.9	95	.1	0	0	0				0																		
700	A	4.0	0	0	20	80	36	0	.5			12.5							.16	1.6						4.16			1	.16
	B	18.0	0	0	20	80	0	0	1			39							1											
	C	40.0	30	10	60	0	0	0				0																		
750	A	3.3	0	0	20	80	41.5	.5	.5	1		14.3	1		.16			.5	18							3.5			.33	.16
	B	10.0	0	0	50	50	2	2	2			37																		
	C	35.0	1	96	3	+	0	0	1			0																		
800	A	2.9	0	0	25	75	20	1	2	1		6.6	1		.5	5		.33	.33							2				
	B	20.0	+	+	50	50	0	3				13						2												
	C	30.0	2	70	28	0	0	0				0																		
850	A	4.7	0	20	+	80	11	2		1		14	1		.5	4		2	.33			7	1.5			.5				
	B	7.0	0	0	10	90	0	14				18						3												
	C	4.0	0	0	85	15	0	0	1			1						0												
900	A	7.6	0	0	10	90	23.6	8	1.5	7		9	1			6		8	2	.33			2			83			.16	
	B	17.0	0	~~30~~	10	90	0	16				20						9												
	C	30.0	+	93	1	6	0	0				2						0												
950	A	5.7	0	0	+	100	1.3	2		1		3	1	.16	2	20	.5	4	9				8			1	.33	1		
	B	105.0	0	0	0	100	0	6				4						7												
	C	12.0	0	96	4	0	0	0				0						0												
1000	A	0	0	0	0	0	3	0	.16	2		19	1	.16	3	23		2	57	2	.5		12	.16	2	1	2		1	
	B	5.0	+	0	50	50	0	5				40						6												
	C	1.0	0	0	100	0	0	0				1						0												
1050	A	1.6	0	0	25	75	2	10		1		11		.16	1	10		7	14	.33	.33		18		1	1	.16		.33	
	B	11.0	0	0	5	95	0	4				5						5												
	C	2.0	+	0	99	1	0	0				2						0												
1075	A	4.8	0	0	25	75	.5	12.5				11	2	3	3.5	35	3	8.3	2	5.2	6	.33	10	13			2.16			
	B	4.0	+	0	10	90	0	0				0						2												
	C	8.0	0	0	99	1	0	0				0																		
1150	A	30.0	1	2(w) 6(p)	1	36	5	28			28	3	3	6		15							8		7	14	1			
1200	A	60	4	94(p)	0	2	~~81~~	19	1		16	0		8		8							10	1		4				
1270	A	150	0	100(p)	0	0	0	0			0	0																		
1450	D	60,000.0	4	10(p)	86	+	—	—				—																		

490813-50

Station	Zone	18-8-13-49 Cumacea	19-8-13-49 Cumacea	20-8-13-49 Gammaria	21-8-13-49 Caprellid	22-8-13-49 Isopoda	23-8-13-49 Amphipoda	24-8-13-49 Amphipoda	25-8-13-49 Amphipoda	6(1)-7-21-49 Isopoda	6(2)-7-21-49 Isopoda	26-8-13-49 Annelida	27-8-13-49 Annelida	28-8-13-49 Annelida	29-8-13-49 Annelida	30-8-13-49 Annelida	31-8-13-49 Annelida	32-8-13-49 Annelida	33-8-13-49 Annelida	34-8-13-49 Annelida	35-8-13-49 Annelida	36-8-13-49 Annelida	37-8-13-49 Annelida	38-8-13-49 Annelida	39-8-13-49 Annelida	40-8-13-49 Annelida	41-8-13-49 Annelida	42-8-13-49 Annelida	43-8-13-49 Annelida	44-8-13-49 Annelida	45-8-13-49 Annelida	46-8-13-49 Annel.	47-8-13-49 Annel.	48-8-13-49 Annel.	49-8-13-49 Annel.	50-8-13-49 Annel.	51-8-13-49 Annel.	52-8-13-49 Annel.	53-8-13-49 Annel.	54-8-13-49 Annel.	55-8-13-49 Annel.	56-8-13-49 Annelida	57-8-13-49 Annelida	58-8-13-49 Annelida	59-8-13-49 Annelida	60-8-13-49 Annelida	61-8-13-49 Annelida	62-8-13-49 Annelida	63-8-13-49 Annelida	64-8-13-49 Annelida
0	AB																																																
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100	A						.5																																									
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150	A																	2																															
	B					.33	8											20																															
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200	A						7											3																															
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300	A						1											3																															
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400	A						4											1																															
	B																	27																															
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450	A						1											2																															
	B																	8																															
	C																																															
500	A				.16		1										1	2																															
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550	A				.33																																											
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600	A																	1																															
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650	A						6			1								1																															
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	C																																															
700	A																																															
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750	A																																															
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800	A																																															
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	C																	5																															
850	A																																															
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	C															2		3		1																													
900	A				.33																																											
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	C																	2	2		3																											
950	A				.163																																											
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	C																	4	6			* 2	1																							
1000	A				1																																										
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1150	A			2	54																																										
1200	A				6		1	1																																							
1270	A						1																																								
1450	A																																														

51

Annelida

490813-51

FORM C1

UNIVERSITY OF WASHINGTON

18

Zonal Frequency of Annelida as Composite Group.

Thysanoessa sp. 32-8-12-49 Annelida

1270 1200 1100 1075 1050 1000 950 900 850 800 750 700 650 600 550 500 450 400 350 300 250 200 150 100 50 25 10 0

C. B. A. B. A.

FREQUENCY 1SQUARE = 1

52

Amphipods
6-8-13-49
Zone A.B.
separated

FORM C1 UNIVERSITY OF WASHINGTON

490813-52

A AND B ZONES
6-8-13 -49
23-8-13 -49.
22-8-13 -49.
21-8-13 -49.
20-8-13-49
19-8-13-49
18-8-13-49
17-8-13-49

ZONE B (2½cm to 7½cm)

B

ZONE A (2½cm)

A

1 SQ=5 INDIVIDUALS 1 SQ=1

53

490813-53

FORM C1

UNIVERSITY OF WASHINGTON

16-8-13-49

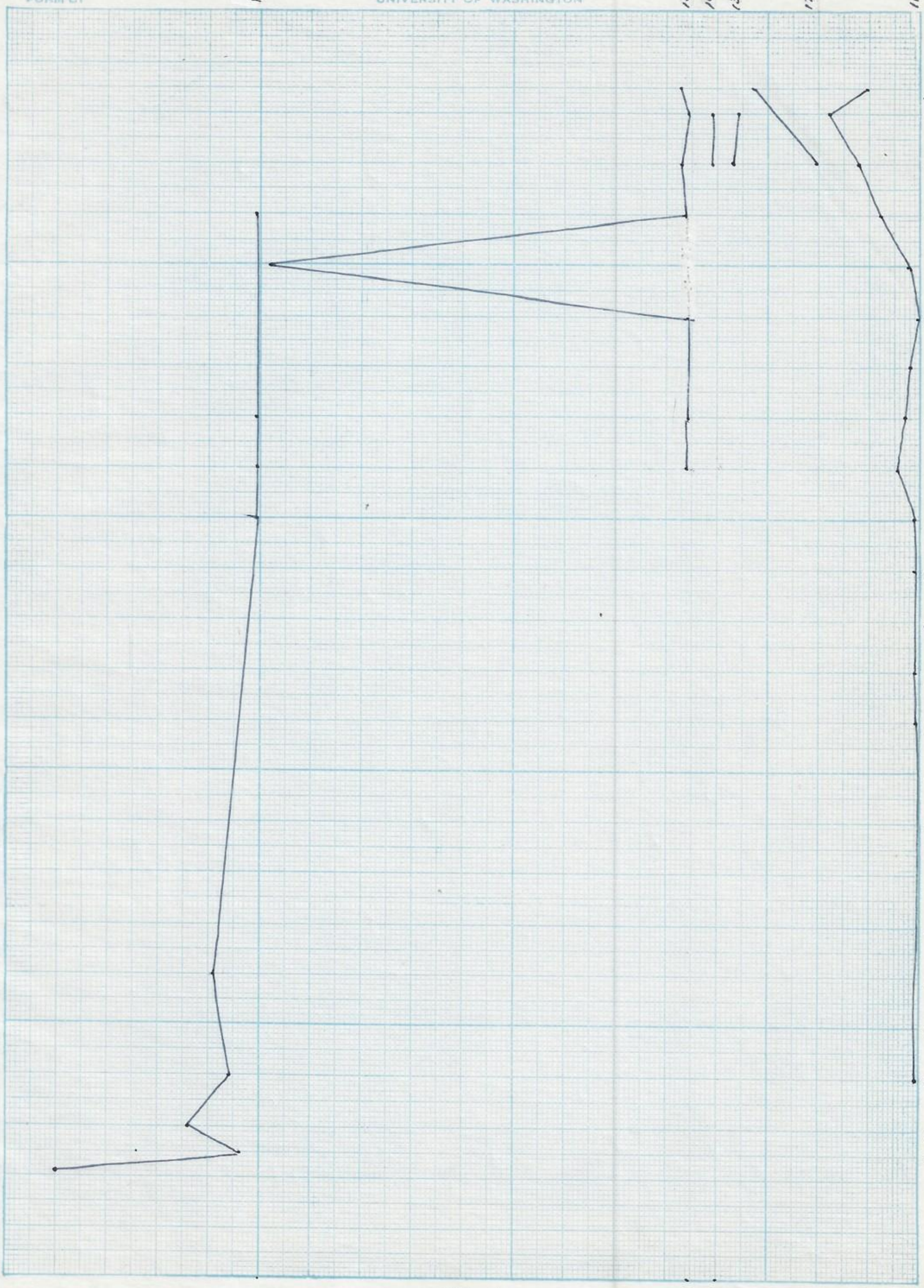
15-8-13-49

14-8-13-49

13-8-13-49

12-8-13-49

11-8-13-49



1SQ = 1

Add 2

FORM C1

UNIVERSITY OF WASHINGTON

490813-54

10-8-13-49

9-8-13-49

8-8-13-49

6-8-13-49

5-8-13-49

3-8-13-49

2-8-13-49

1-8-13-49

SL01
0501
0001
950
900
850
800
750
700
650
600
550
500
450
400
350
300
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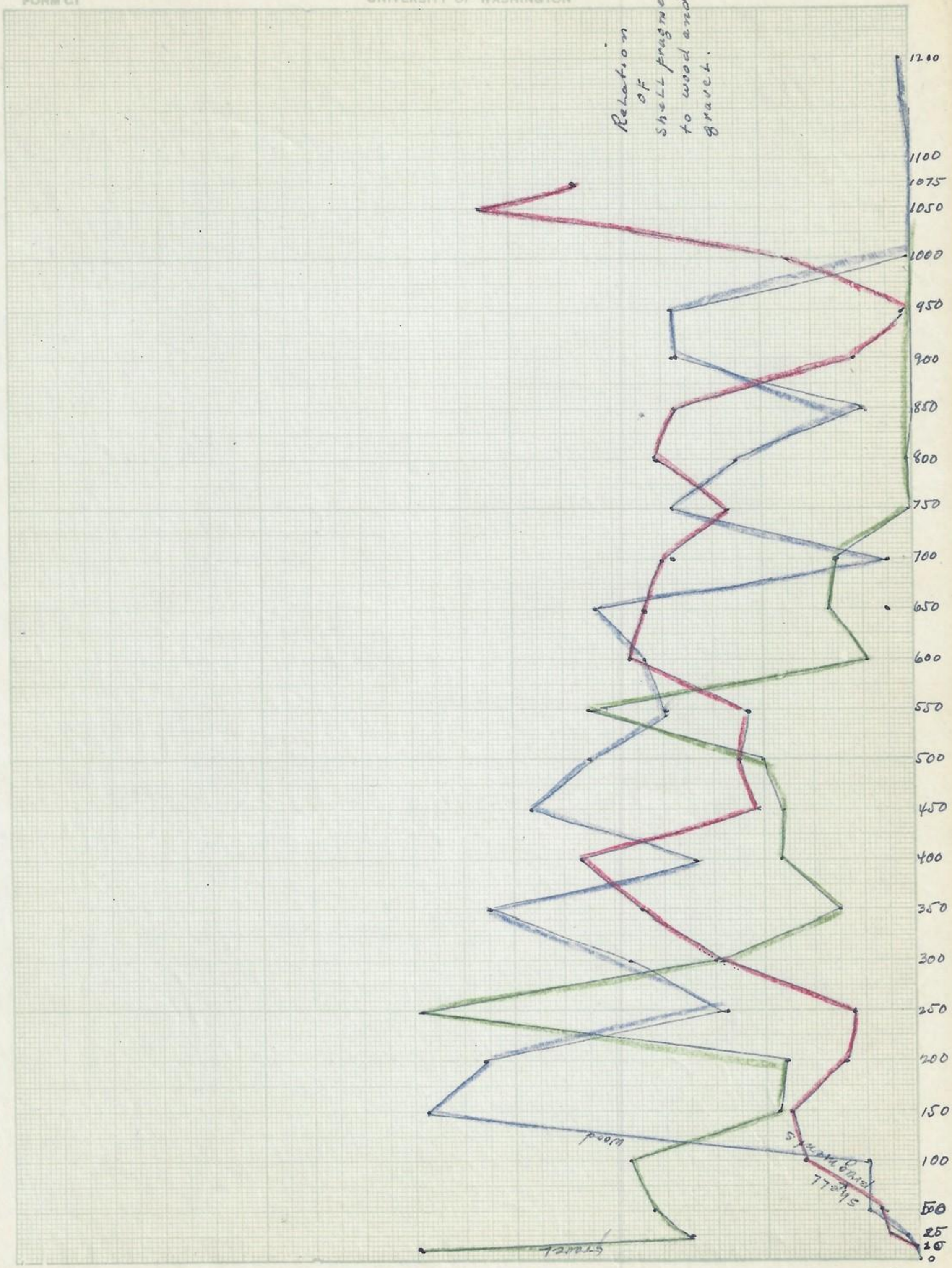
200
150
100
50
25
10
0

1 SQ. = 1

490813-55

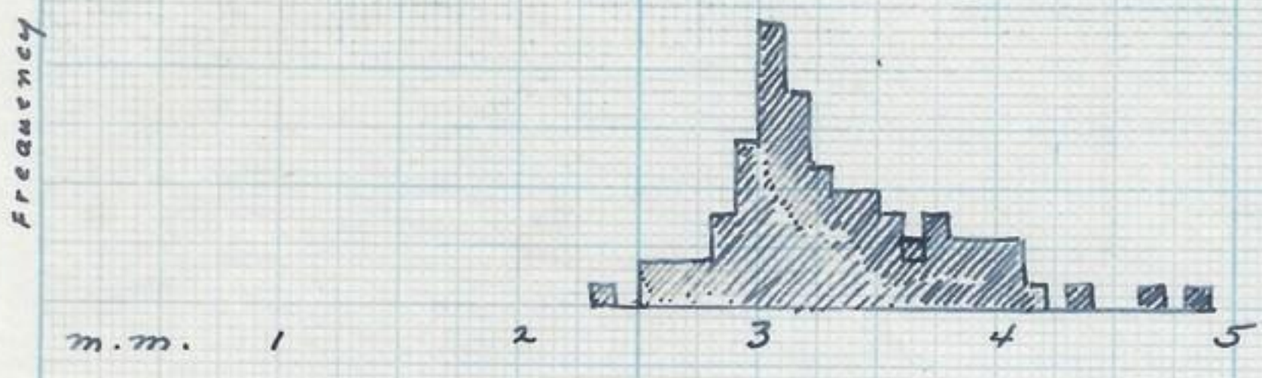
FORM C1 UNIVERSITY OF WASHINGTON



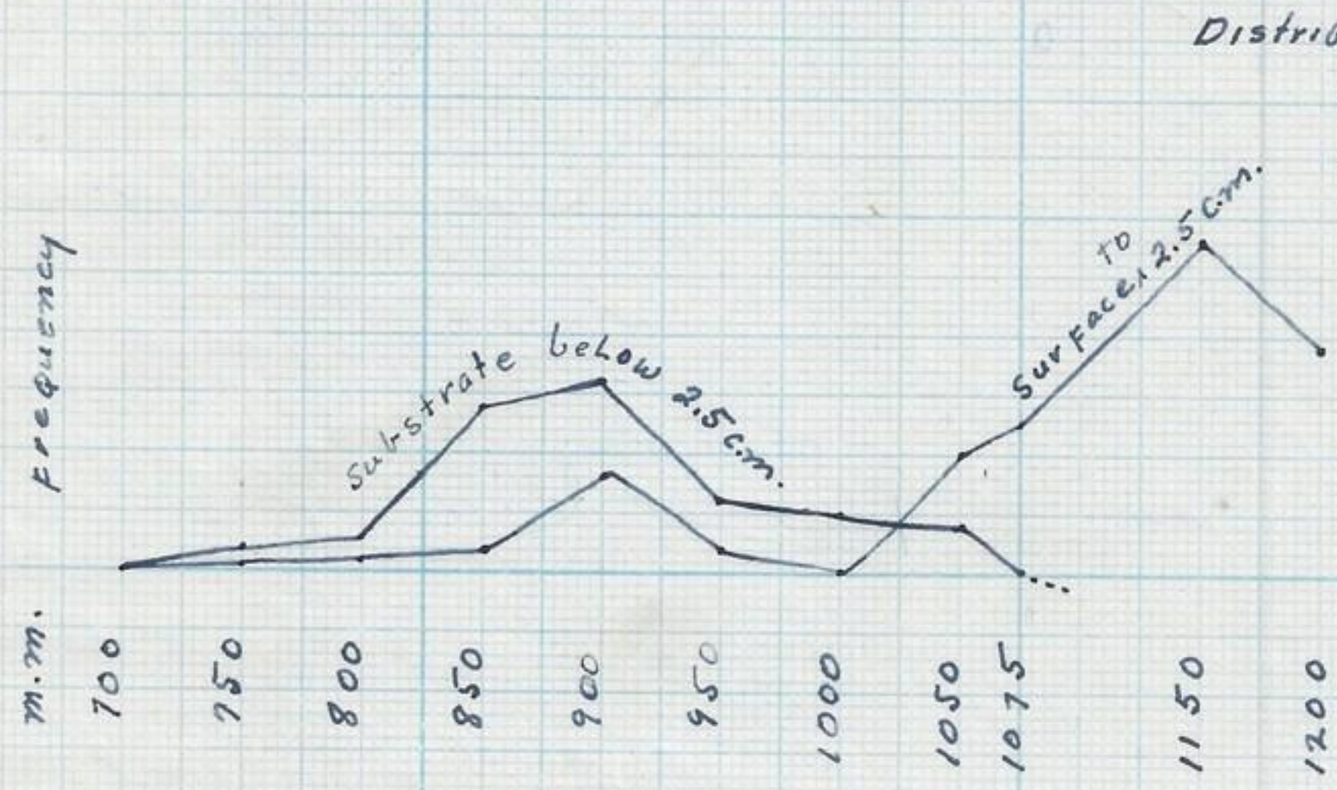
55

490813-56

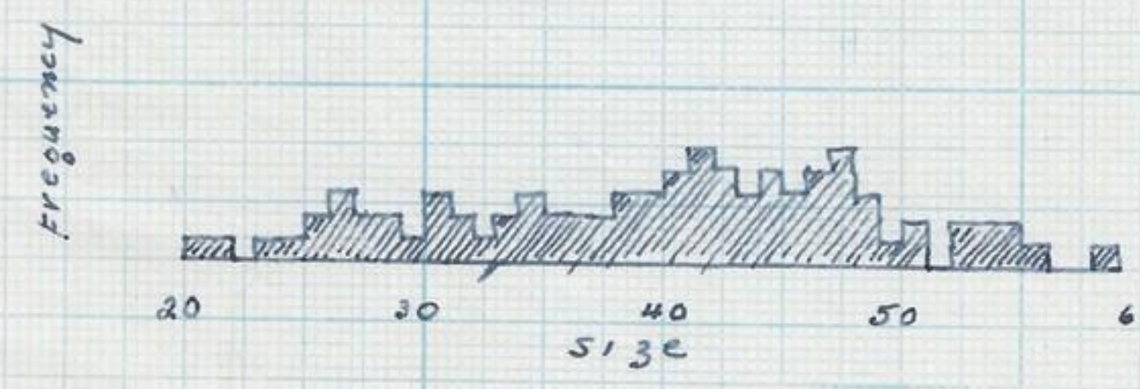
FORM C1 UNIVERSITY OF WASHINGTON



Typical growth curve of Rochefortia tumida Carpenter taken from $\frac{6}{10}$ sq.meter area 2.5 cm deep. From station 1075 meters.



Distribution of Rochefortia tumida showing tendency toward Substrate existence above Low tide and surface position below Low tide. Crossover at approximately 1025 meter position.

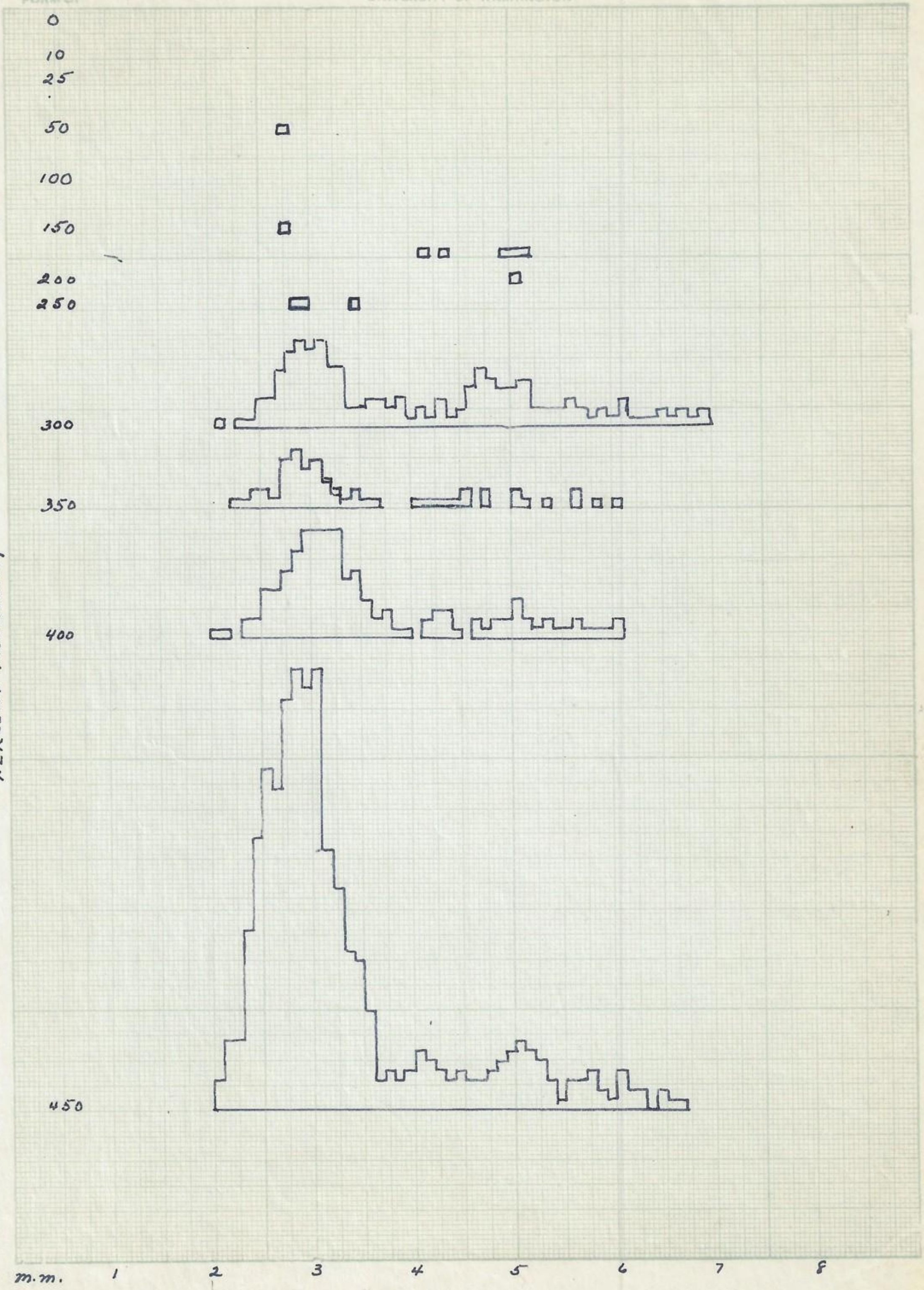


Growth curve of young Transennella tantilla (Gould) held within body of adult which measured 6.5 m.m in Length. Largest specimen measures .7 m.m.

TRANSENNELLA TANTILLA 490813-57

($\frac{6}{10}$ sq meter 2.5 cm in depth) (GOULD)

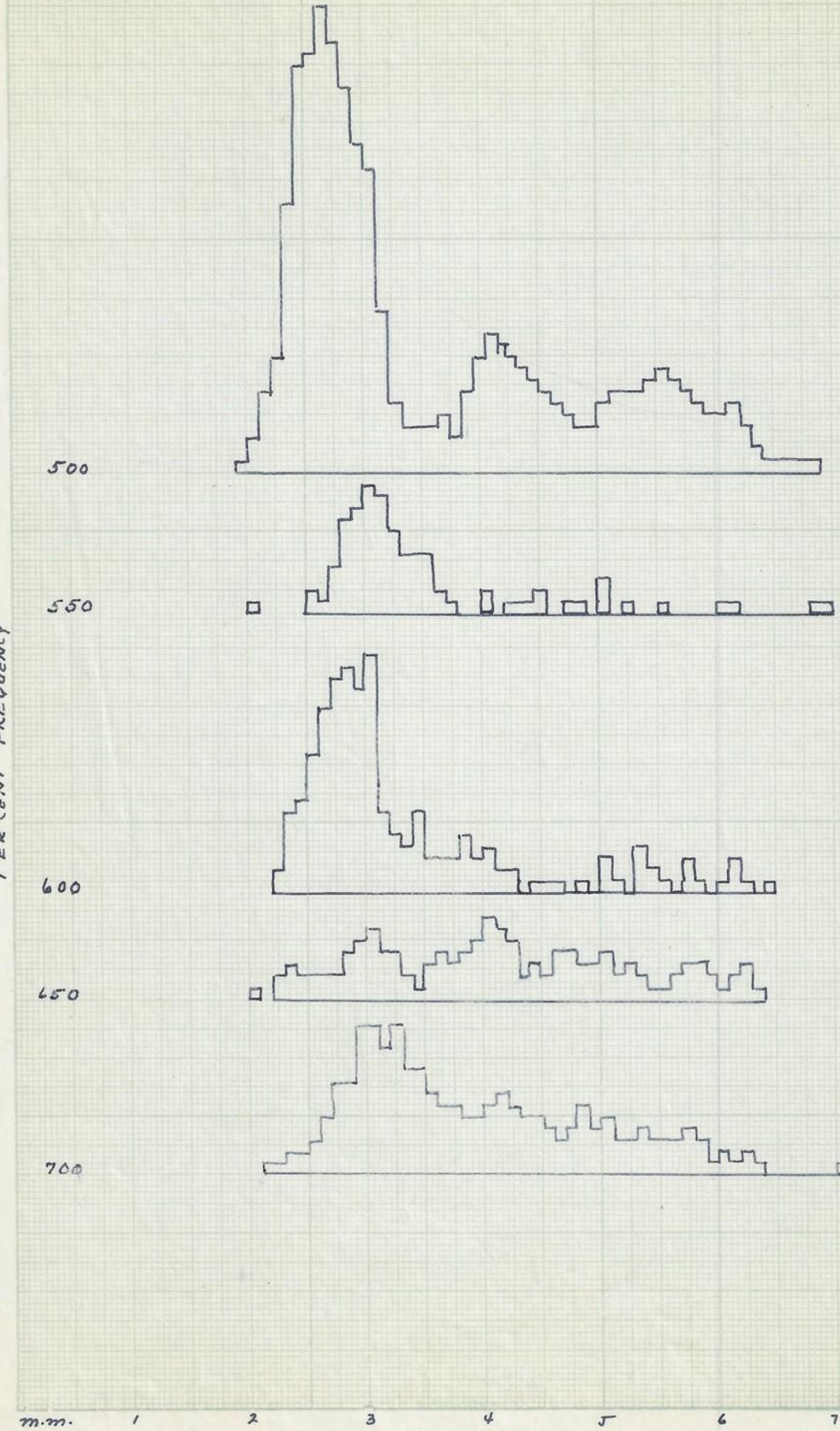
· Stations



TRANSENNELLA TANTILLA (GOULD) 490813-58

Station

FORM C1

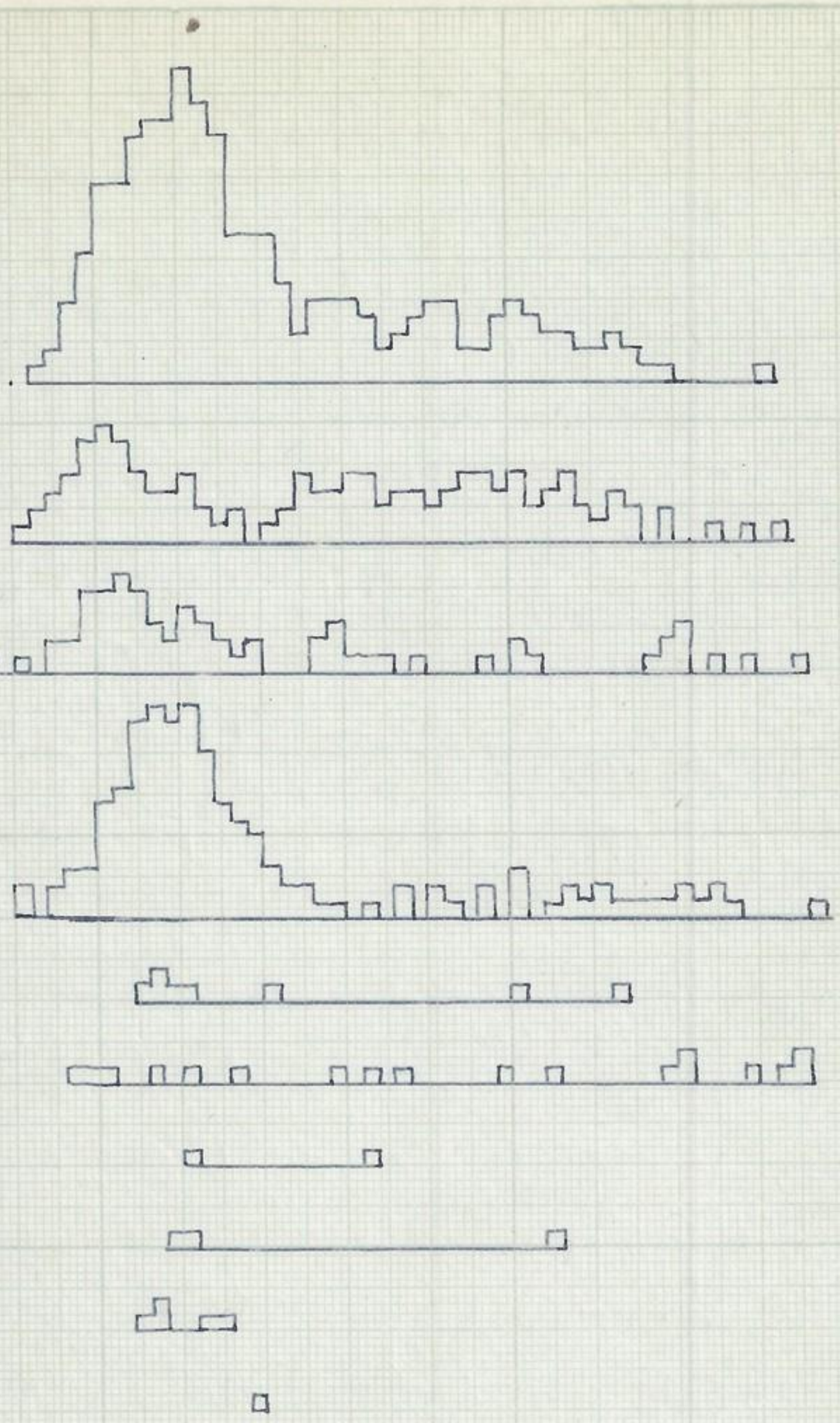


TRANSENNELLA TANTILLA (GOULD) 490813-58

Station

FORM C1

UNIVERSITY OF WASHINGTON



490813-59

The following molluscs were collected in and around the San Juan Islands, Washington from June 22 to Sept 1, 1949, some by deep dredging. All deposited at Friday Harbor Laboratory. Arranged according to family sequence.

Acila castrensis Hinds 1843
Yoldia scissurata Dall 1897
" ensifera Dall 1897
" seminuda Dall 1871
Glycymeris subobsoleta Carpenter 1864
Pecten hericius Gould 1850
" hindsii, Carpenter 1864
" hindsuus Gould 1850
Hinnites giganteus Gray 1825
Pododesmus macroschisma (Deshayes) 1839
Mytilis edulis Linne, 1758
" Californianus Conrad 1837
Volsella modiolus (Linne) 1758
modiolaria
Pandora filosa Carpenter, 1864
" grandis Dall, 1877
Lyonsia pugetensis Dall 1913
Astartes compacta Carpenter 1864
Cardita sp.
Rochefortia tumida Carpenter 1864
Serripes groenlandicus Gmelin 1792
Clinocardium nuttallii (Conrad) 1837
" fucanum (Dall), 1907
" blandum (Gould), 1850
Humilaria kennerleyi (Carpenter), 1863
Protothaca staminea (Conrad), 1837
" tenerrima (Carpenter), 1858
Compsomyax subdiaphana ("), 1864
Psephidia lordi (Baird) 1863
Transonnella tantilla (Gould), 1852
Saxidomus giganteus (Deshayes), 1839
Tellina
Macoma nasuta (Conrad) 1837
" secta (Conrad) 1869
" carlottensis (Whiteaves), 1880
Semile rubropicta Dall 1871

Cari Californica (Conrad) 1858
Solen sicarius Gould 1850
Schizothaerus nuttallii (Conrad) 1837
Panope generosa Gould 1850
Saxicava sp.
Mya arenaria Linne 1758
" truncata " 1758
Bankia setacea (Tryon), 1863
Zirfaea gabbi Tryon 1863
Pholadidea penita (Conrad), 1837
Dentalium pretiosum Sowerby 1860
Pteropoda
Monadenia fidelis (Gray)
Searlesia dira (Reeve) 1846
Neptunia lyrata (Gmelin)
" tabulata
Amphissa columbiana (Dall) 1911
Purpura foliata Martyn
Thais lamellosa (Gmelin) 1792
" Canaliculata Duclos 1832
" emarginata Deshayes 1839
Trichotropis sp.
Argobuccinum (Fusitriton) oregonense Redfield, 1848
Bittium (Glyptidium) eschrichtii Middendorff, 1849
Littorina scutulata Gould 1849
" sitchana Philippi, 1845
Lacuna porrecta Carpenter, 1864
Crepidula adunca Sowerby, 1825
" rumiana Gould, 1846
" nivea C.B. Adams, 1852
Calyptraea fastigiata Gould, 1846
Natica (Tectonatica) aleutica Dall, 1919
Polinices lewisii (Gould) 1847
" pallida Broderip & Sowerby
Velutina laevigata (Linne) Mueller, 1776
Acmaea mitra Eschscholtz, 1833
" digitalis " 1833
" testudinalis scutum Eschscholtz, 1833
" persona Eschscholtz, 1833
Margarites pupillus Gould 1849

Collisostoma annulatum Martyn 1784
" variegatum Carpenter, 1865
" Costatum Martyn, 1784
Fissurella sp.
Diadora aspera Eschscholtz 1833
Puncturella sp.

Chitons

Callistochiton	2 species
Mopalia	10 species
Nuttalina	1 species
Placiphorella	1 species
Katharina	1 species
Cryptochiton	1 species
Leptopleurues	2 species
Leptochitona	9 species
Ischnochiton	7 species

Catologue list of chiton specimens collected in the San Juan Island area in the summer of 1949. (specimens sent to S. Stillman Berry, Redlands, Calif. for identification)

False Bay, San Juan Island, San Juan County, Washington. (Tidal)

4-6-27-49
21-6-27-49
22-6-27-49
24-6-27-49
25-6-27-49
32-6-27-49
33-6-27-49
35-6-27-49
36-6-27-49
38-6-27-49
41-6-27-49
42-6-27-49
43-6-27-49
45-6-27-49
62-6-27-49
66-6-27-49
68-6-27-49
69-6-27-49
78-6-27-49
8-7-2-49
10-7-2-49
11-7-2-49
12-7-2-49
13-7-2-49
14-7-2-49
15-7-2-49
17-7-2-49
18-7-2-49
22-7-2-49
26-7-2-49
27-7-2-49
28-7-2-49
31-7-2-49
33-7-2-49
35-7-2-49
39-7-2-49
42-7-2-49
44-7-2-49
50-7-2-49
65-7-2-49
72-7-2-49
73-7-2-49
83-7-2-49
84-7-2-49
85-7-2-49
87-7-2-49
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90-7-2-49
93-7-2-49
94-7-2-49
95-7-2-49
96-7-2-49
97-7-2-49
98-7-2-49

99-7-2-49
100-7-2-49
101-7-2-49
102-7-2-49
104-7-2-49
108-7-2-49
109-7-2-49
1-7-5-49
3-7-5-49
6-7-5-49
7-7-5-49
10-7-5-49
110-7-13-49
112-7-13-49
113-7-13-49
114-7-13-49
115-7-13-49
119-7-13-49
120-7-13-49
122-7-13-49

Minnesota Reef, San Juan Islands, San Juan County, Washington. (Tidal)

5-6-25-49
10-6-25-49
11-6-25-49
16-6-25-49
20-6-25-49
23-6-25-49
1-7-7-49
2-7-7-49
4-7-7-49
6-7-7-49
8-7-7-49
11-7-7-49
12-7-7-49
19-7-7-49
20-7-7-49
21-7-7-49
22-7-7-49
23-7-7-49
24-7-7-49
26-7-7-49
29-7-7-49
1(1)-7-13-49
1(2)-7-13-49
1(3)-7-13-49
1(4)-7-13-49
3-7-13-49
21-7-13-49
23-7-13-49
24-7-13-49
25-7-13-49
28-7-13-49
29-7-13-49
30-7-13-49
31-7-13-49
32-7-13-49

36-7-13-49
37-7-13-49
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64-7-13-49
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67-7-13-49
69-7-13-49
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73-7-13-49
74-7-13-49
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79-7-13-49
80-7-13-49
81-7-13-49
82-7-13-49
84-7-13-49
85-7-13-49
86-7-13-49
94-7-13-49
97-7-13-49
98-7-13-49
99-7-13-49
100-7-13-49
103-7-13-49
104-7-13-49

Paevine Pass, San Juan Islands, San Juan Co., Washington. (9 fathoms)

31-7-7-49
34-7-7-49
35-7-7-49
37-7-7-49
38-7-7-49
41-7-7-49
42-7-7-49
43-7-7-49
44-7-7-49
46-7-7-49
47-7-7-49
48-7-7-49

Paevine Pass, San Juan Islands, San Juan Co., Washington. (17 fathoms)

1-7-14-49
2-7-14-49

3/10 mi. S Parker Reef, San Juan Islands, San Juan Co., Washington (10 fathoms).

1-7-19-49

Smith Island, San Juan Islands, San Juan County, Washington. (Tidal)

1(1)-7-28-49
1(2)-7-28-49
1(3)-7-28-49
1(6)-7-28-49
1(8)-7-28-49
1(11)-7-28-49
1(12)-7-28-49
1(13)-7-28-49

1/2 mi. NW Smith Island, San Juan Islands, San Juan County, Washington. (60 fathoms)

2(1)-7-28-49
2(2)-7-28-49
2(4)-7-28-49
2(5)-7-28-49
2(6)-7-28-49
2(8)-7-28-49
2(9)-7-28-49
2(10)-7-28-49
2(11)-7-28-49
3-7-28-49

Iceberg Point, south end of Lopez Island, San Juan Islands, San Juan County, Washington. (Tidal)

1-6-28-49

Parker Reef, San Juan Islands, San Juan County, Washington. (Tidal)

1(1)-8-5-49
1(2)-8-5-49
1(3)-8-5-49
1(4)-8-5-49
1(5)-8-5-49
1(7)-8-5-49
1(8)-8-5-49
1(10)-8-5-49
1(11)-8-5-49
1(13)-8-5-49
1(14)-8-5-49
1(15)-8-5-49
1(16)-8-5-49
1(18)-8-5-49
1(19)-8-5-49
1(20)-8-5-49

65

490815-65

Oceanographic Laboratories, San Juan Island
San Juan County Washington.

Aug 15, 1949

A large Moroteuthis robusta. was taken dead from the Univ. of Wash. Oceanographic Laboratories this A.M. It measured 123 cm fm eye to tip of tail and 117 fm edge of mantle to tip of tail. This squid compares in size with the one Mr Gunchi mentions fm Monterey Bay.

Aug. 20, 1949

Departed Oceanographic Laboratories today. Dr. Sevan missed ferry by one car. He was anxious to get early start on his vacation to California. Arrived Orcas Island and after mailing Chitons to Dr. S. Stillman Berry of Redlands, California, drove to top of mt. Constitution. Day lazy and cared not see to Cascades, but new an eastern edge of mountain. Camped at Cold Springs just a short distance fm the top. Many small ponds just filling in. This mountain supported several thousand of feet of Continental glaciers. Weather too poor for photographs.

Cold Spring, Orcas Island, Mt. Constitution, San Juan Co., Washington

August 21, 1949

Departed Cold springs camp at 5:30 A.M. Beautiful view of islands to the west below at 6:00 A.M. just before sun arrived. 21 deer between Cold Spring and the north end of the island. Arrived at Orcas and had breakfast at dock while waiting for the ferry. First car in line. Photo (2-8-21-49) of Orcas Pier with the Nisqually Ferry just pulling in. This photo shows partial damage of fire which wiped out the general store, part of lumber store and a service station. Helped put this fire out earlier in the season. Interesting display of white sea anemones on piling of pier. Clams continually forcing water into the air at beach edge. Left for Sidney, Vancouver Island at 8:00 A.M.
From Sidney drove down to Victoria where we remained over night until the next day. In the afternoon drove to City Gardens south east of town. Photographed Annette and Jay in Park. (3-8-21-49). This country excells in beautiful flower gardens and parks. Some homes are one mass of flowers surrounding the house. In the evening drove down to the Ferry docks and photographed the Victoria Parliament building. This building reminds me of the Victoria parliament building by Calcutta, India.

Victoria, Canada.

Aug. 22, 1949

Departed Victoria early this A.M. for Port Angeles across the straits of Juan de Fuca. And continued house west toward

the Pacific Ocean. Made first contact with Pacific Ocean at Rudy Beach near Cedar Creek where Annette and Jay had a chance to see the Pacific for the first time. Made the following photographs at this point.

(1-8-22-49) Annette & Jay at mouth of Cedar Creek.

(2-8-22-49) Annette looking for pirate ships. The accumulation of large logs is characteristic of the beaches of the N.W and no doubt accounts for the accentuated erosion of the beaches.

(3-8-22-49) General shot of Rudy Beach showing remnent erosional island.

(4-8-22-49) Annette and Jay on beach near eroded cliffs at Rudy beach. It would be interesting to take this scene 10 years hence and see if there is erosional change in these rocks. Jay was thrilled at this new experience.

(5-8-22-49) Annette & Jay along beach at Rudy Beach.

(6-8-22-49) Erosional remenants of coast line at mouth of Cedar Creek, Jefferson Co., Washington.

(7-8-22-49) Ibid. There is a noticable lack of marine life on the exposed shore line at this site, as compared to those of the protected inland sound areas around San Juan Islands. The erosion of the coast line must have proceeded with an accentuated speed.

Continued south along the ocean. This section of the trip was interesting and worthwhile but cannot compare with the section along the coast in Oregon. The road in general passes thru second growth timber and is not worth the trip as such. At no time could we see the Olympic Mountains. Continued south and stopped for nite at 3 mi. E. Aberdeen, Grays Harbor Co., Washington.

3 mi. E. Aberdeen, Grays Harbor Co. Washington.

23 Aug 1949

Departed early this a.m for Rainier. Left our air mattress at a tourist camp at 3 mi. E. Aberdeen. Made direct trip to Sunrise Park in the Rainier National Park. Took one photograph (1-8-23-49) and (2-8-23-49) showing range to the south. Sunrise Park shows signs of poor management. Viewed glacier from brink of Park. Continued on to Tipsoo Lakes where the following photograph was taken (2-8-23-49) showing Mt. Rainier in the background. Lighting effects perfect for recording. Continued east to a point in the main Canyon near Naches. where were camped.

Canyon west of Naches, Yakima Co. Washington

24 Aug 1949

Departed from this National Forest Camp early and continued

east. Arrived at Dry Falls for dinner. Took photo (1-8-24-49) showing the lake vegetation succession and the general physiography of the Dry Falls area. Considerable reclamation going on in this Coulee canyon. Photo (2-8-24-49) of Coulee dam. Continued east to Spokane where we remained for the night.

Spokane, Spokane Co. Washington

25 Aug. 1949

Left early and journeyed east toward Glacier National Park. Stopped at Kalispell for the evening.

Kalispell, Montana

26 Aug 1949

Departed early and arrived at Glacier National Park. Recorded the following in this area.

(1-8-26-49) McDonald Lake, Glacier National Park. Montana

(2-8-26-49) west side approach, " " " "

Jay in foreground.

(3-8-26-49) west side approach, " " " "

Distant pass destination.

(4-8-26-49) Logan Pass, Glacier national Park, Montana. Jay points toward Logan Pass proper.

(5-8-26-49) Canyon descent south & east of Logan Pass, Glacier national Park. Montana, showing interesting edaphic effect of avalanche tracts on left side of canyon. A typical glaciated canyon.

(6-8-26-49) St Mary's Lake, Glacier Natl Park, Montana. Jay and Annette view the lake below. Left the National Park area and just before turning to the south took photo (7-8-26-49) back west up the St. Mary's valley. Stopped that night at Cascade, Cascade Co., Montana enroute to Yellowstone Natl Park.

Cascade, Cascade Co. Montana

27 Aug. 1949

Left Cascade this A.M. and arrived Yellowstone Natl Park this afternoon. David Condon not at museum at mammoth today so, after looking over the museum and hot springs drove east to Roosevelt Camp. The presentation of these hot springs at Mammoth is, from my point of view, undesirable.

Roosevelt Camp, Yellowstone National Park, Wyoming

28. Aug 1949

After looking at the petrified tree returned to camp and after eating breakfast journey south thru the park. First photo (1-8-28-49)

of a black bear and two cubs about 5 miles and of Roosevelt Camp. This first view of the bears was good as it was a natural scene of a family of bears going about their own business of getting their food in the forest. At a point near mt. Washburn had another exceptional view of two large buck deer. They had crossed the road and were going down a ridge immediately in front of us and some 150 feet beyond. They continued down this ridge with the full early morning light emphasizing the splendid forms of these deer. They continued down the ridge and then cross over to another ridge directly below us. A movie shot of this ridge descent would have been an exceptional one indeed. Continued south to Inspiration Point on the Grand Canyon of the Yellowstone. Photo (2-8-28-49) of Annette & Jay at this point. Photo (3-8-28-49) of the Grand Canyon looking up the Canyon from Inspiration Point. Photos (4-8-28-49) and (5-8-28-49) of Upper Falls in the Grand Canyon. New road construction at Canyon Junction not in keeping with the principals of the park. Photo (6-8-28-49) of an interesting meandering creek course in the Hayden Valley. 5 swan were observed in this valley. After walking the fishermen at Fishing Bridge made a quick side trip over to Squaw Lake east of Fishing Bridge and at the N. End of the Yellowstone Lake. Took photo (7-8-28-49) of Squaw Lake. This same lake was recorded several years previously in black & white. Continued toward Thumb and made side trip over to Old Faithful geyser. Took photo (8-8-28-49) of this geyser. The road way from West Thumb to Old Faithful is continuously lined with paper and tin cans and off-road picnic stops. This should all be illuminated. Back to West Thumb. Photographed (9-8-28-49) the West Thumb lakes and hot springs at this point. Continued south and at Lewis Lake photographed a moose no (10-8-28-49) in field. It had been feeding in the fields of meadowgrass and when taking a drink from the creek made this photograph. Photo (11-8-28-49) also shows this moose feeding in the shadows of the conifers bordering the field. Photo of moose taken at a point just before Lewis River crosses the highway road going south. Continued south to the Grand Teton National Park and at Moran photographed Jackson Lake in the evening. The country east of the lake still remains in an unsettled condition as far as prescribing the natural primitive picture of the country. Camp this evening 5 mi S. Haback, Teton Co. Wyoming.

5 mi. S. Haback, Teton Co., Wyoming

29 Aug. 1949

Departed for Utah today. At south end of Bear Lake, recorded one photo of Jay (1-8-29-49). Bearlake in the background.

arrived in Provo in the evening at mother and dad home, where we remained for several days.

Provo, Utah Co. Utah

10 Sept. 1949

Took photo of mother & dad and their grandchildren. including dad, mother, Jay, Chris, Bob, David and Donnie. Purchase 1939 Chev.

Provo, Utah Co., Utah.

13 Sept. 1949

Departed for Lawrence, Kansas. At Deer Creek Reservoir in Provo Canyon took one last photo of Utah (1-9-13-49) Clouds streaming over Mt. Timpanogas as if from a volcano. Stopped tonite at maybell, Moffat Co., Colorado.

Maybell, Moffat Co. Colorado

14 Sept 1949

Today drove thru the Rocky Mt. national Park. From the Trail Ridge Road took Photo (1-9-14-49) of the upper Thompson River Forest Canyon showing the surface, in places, of the original Rocky Mt. Peneplain. Further down the road took a photo (2-9-14-49) of the Hayden Creek area. It is interesting to contrast the two side of the canyon at this point to see the effect of exposure and possibly avalanche and wind factors on ability of trees to grow in this canyon. Continued east today to Brush, morgan Co., Colorado.

Brush, morgan Co., Colorado.

15 Sept, 49

Continued east today and arrived at Topeka late this evening. Remained overnite at Mil's.

Lawrence, Douglas Co., Kansas.

16 Sept

Arrived today at Lawrence after a 26 day trip from Friday Harbor, Washington.

Lawrence, Douglas Co., Kansas

Oct 28, 1949

numerous large grasshoppers both alive and dead in the Lawrence area. Had not noticed them befor this date.

Lawrence, Douglas Co., Kansas

Nov. 1, 1949

Large grasshoppers flying west across Campus some 20 feet above the tops of the trees.