The Conservation Agency

Exploration, Education, and Research

President
James D. Lazell, Ph.D.
401-423-2652

6 Swinburne Street
Conanicut Island
R.I. 02885 U.S.A.

15 December 1988

Dr. Henry Jarecki
Byewood, Timber Trail
Rye, NY 10580

Dear Henry:

A works and progress report for 1988 herewith. It is earlier this year than usual because I am off to Brasil on 27 December and will not be back till 4 February.

I have received a first Draft MS from Dr. Robert Chipley on the bridled quail dove. I should have copied it prior to returning it, but thought he would get a revision to me before now. I will send it along later. It was very good, but rather long-winded.

Dr. George Proctor is endeavoring to find a publisher for his plant list and paper. Dr. Michael Gibbons is preparing an MS for publication. Greg Mayer continues to be finishing his Ph.D. thesis. If he fails this year he is out of the game, we are told by Harvard. He says he will not fail, and Guana data figure considerably in the work.

Of special note this year are three reports by field assistants: Kathy Kavanagh on birds, Tom Sinclair on burrowing reptiles, and Chris Henderson on porcellain crabs. Lianna prepared a fine report on the Necker slat ponds, but the Guana pond is much larger and more complicated: that report will take longer.

I believe our strategy of moderate austerity is working and people are working on getting material ready for publication. I know I am ready to go with the new Guana Guide as soon as I have the cover photo of pink flamingos. The BBC Wildlife Magazine article is in press.

CONTENTS

Smithsonian Institution Press

955 L'ENFANT PLAZA, SUITE 2100, WASHINGTON, D.C. 20560 202/287-3738 TELEX 264729 SMTHSN

20 November 1988

James Lazell
The Conservation Agency
6 Swinburne Street
Conanicut Island, Rhode Island 02835

Dear Dr. Lazell:

I am still very interested in your manuscript on the wildlife of China, and hope that I get to see some material soon. I realize that your very full schedule of fieldwork makes this less than likely, but I will continue to hope.

I have written to Dr. Gibbons at the University of Massachusetts about the population biology manuscript, and will pursue that with him. Please give me a call when you are back in this country so we can discuss Anolis and other issues.

Sincerely,

Theresa S. Slowik
Science Editor

* * * * * * * * * * * * * * * *

Note of 15 December, 1988:

I do not know any other approach to the problem of getting our book published except to just keep trying. The previous Smithsonian editor was not interested, but this one is very different. Also, the book is quite different too, owing to Gibbons' contributions.

Skip

College of William and Mary
School of Marine Science
Gloucester Point, VA 23062

August 22, 1988

Dear Skip,

I finally got these birding notes organized. I used the criteria for establishing "possible", "probable", or "confirmed" breeders from the national Breeding Bird Atlas Project, I didn't write a code for every behavior I noticed, but only gave them the highest status, i.e, if I saw a pair and a fledgling and a nest with young, I only wrote NY in the summary. There is nothing extraordinary, but I guess it is a start (or continuation?) of a breeding bird list which can be added to on future Guana trips, especially in different seasons. There are probably breeding notes from other ornithologists that can be combined into a master list.

Thanks so much for letting me work on Guana. I had a fantastic time, even learned a couple things. I learned that if you eat like a horse for 30 days straight, yes you do get much fatter. Mostly, I was inspired from being around people actually interested and working in conservation; I have lived in a tourist- and military-driven economy for 4 1/2 years and conservation-minded people are few and far between. Even at the lab, the scientists seem mostly interested in personal gain.

I really appreciated the opportunity to get to do some work in the Caribbean. I'd love to come back, especially if it's in October because I could get a list of migrants that use the island.

Thanks again – hope this list is useful.

Cheers,

Kathy Kavanagh

SUMMARY OF BREEDING BIRD SURVEY NOTES FROM B.V.I., JULY 1988

BREEDING CRITERIA:

Possible:

Species observed, not in breeding habitat	.... O
Species heard or seen in breeding habitat	 X

Probable:

Agitated behavior or anxiety calls	.... A
Pair seen	.... P
Bird holding territory	.... T
Courtship or copulation	 C
Visiting probable nest site	.... N

Confirmed:

Nest building	.... NB
Distraction display	.... DD
Used Nest	.... UN
Recentily fledged young	.... FL
Parent with fecal sac	.... FS
Parent with food for young	.... FY
Adult leaving/entering nest site	.... ON
Nest with eggs	.... NE
Nest with young	.... NY

SPECIES LIST:

Brown Pelican
Pelicanus occidentalis
Guana: ON (Pelican Pt.)
George Dog: O
Virgin Gorda: O
Necker: O

Brown Booby
Sula leucogaster
Guana: O
George Dog: O
Virgin Gorda: O
Necker: O
Tortola: O

Magnificent Frigatebird
Fregata magnificens
Guana: P
George Dog: P
Virgin Gorda: O
Necker: O

Green Heron
Butorides virescens
Virgin Gorda: X
Necker: X

Cattle Egret
Bubulcus ibis
Beef island: O

Little blue Heron
Egretta caerulea
Guana: X
juveniles seen

Snowy Egret
Egretta thula
Guana: X

Yellow-crowned Night Heron
Nyctanassa violacea
Necker: O

Roseate Flamingo
Phoenicopterus ruber
Guana: O (still 7!)

Bahama Duck
Anas bahamensis
Guana: P
Necker: P

Red-tailed Hawk
Buteo jamaicensis
Guana: O
juvenile seen

American Kestrel
Falco sparverius
Guana: O
Necker: O
abundant, "tame"

Oystercatcher
Haematopus palliatus
Necker: O

Black-necked Stilt
Himantopus himantopus
Necker: X
Guana: X

Lesser Yellowlegs
Tringa flavipes
Guana: X
Necker: X

Laughing Gull
Larus atricilla
Guana: O
George Dog: O
Virgin Gorda: O
Necker: NY (colony)

Roseata Tern
Sterna dougalli
Guana: X
colonies of 20-30 birds
Virgin Gorda: O
seen on rocks of the other
(unidentified) island

Bridled Tern
Sterna anaethetus
Necker: NY

Least Tern
Sterna albifrons
Open Water: O

Brown Noddy
Anous stolidus
Open Water: O

Red-necked Pigeon
Columba squamosa
Guana: X
George Dog: O

Zenaida Dove
Zenaida aurita
Guana: ON
George Dog: ON
Necker: C

Ground Dove
Columbia passerina
Guana: NE
George Dog: ON
Necker: O

Bridled Quail Dove
Geotrygon mystacea
Guana: X
seen in Quail Dove Ghut; North Beach;
no bands seen

Mangrove Cuckoo
Coccyzus minor
Guana: X

Smooth-billed Ani
Crotophaga ani
Guana: O
Virgin Gorda: O
Necker: O
Tortola:O

Puerto Rican Sreech Owl
Otus nudipes (subspecies?)
Guana: ?
Pellets and droppings
found in shelter cave
white bay

Green-throated Carib
Sericotes holosericeus
Guana: ON
Virgin Gorda: O
Necker: T

Antillean Crested Hummingbird
Orthothynchus cristatus
Guana: O
Virgin Gorda: O
Necker: O

Gray Kingbird
Tyrannus dominicensis
Guana: O
Virgin Gorda: O
Necker: O

Caribbean Elaenia Flycatcher
Elaenia martinica
Guana: O
Necker: O

Northern Mockingbird
Minus polyglottus
Guana: ON
Necker: O

Pearly-eyed Thrasher
Margarops fuscatus
Guana: FL + eggshells
Virgin Gorda: O
Tortola (Sage Mtn.): O
Note: none were seen in 3 days on Necker.

Yellow Warbler
Dendroica petechia
Virgin Gorda: O
Necker: FL

Bananaquit
Coereba flaveola
Guana: FL
Virgin Gorda: P
Necker: FL
Tortola (Sage Mtn.): O

Black-faced Grassquit
Tiaris bicolor
Guana: FL
Virgin Gorda: O
Necker: FL

DEPARTMENT OF ZOOLOGY

☐ ZOOLOGY RESEARCH BUILDING ☑ BIRGE HALL ☐ LOWELL E. NOLAND HALL

UNIVERSITY OF WISCONSIN — MADISON

October 24, 1988

Dr. James D. Lazell
Director, The Conservation Agency
6 Swinburne St.
Jamestown, RI 02835

Dear Skip,

I enclose the final report by myself and Kathy Kavanagh on Guana Island bird work for 1988. In addition to compiling the bird list, we made several intriguing observations on Guana Island's hummingbirds. We observed ecological segregation of the age/sex classes of the Carib; immatures appeared to restrict their nectar-feeding activities to large flowering trees whereas adults established feeding territories around non-arborescent flowering plants. In addition, we were able to observe inter-island movements by hummingbirds between Guana Island and Tortola. We would like to return next year, probably in July, to pursue these lines of research in more detail.

As I mentioned to you this summer, our work would be greatly aided if we could collect some hummingbird on Guana Island. During the Scientific Conference on Tortola this past summer, I discussed this possibility with Mr. Robert Norton of the Ministry of Natural Resources. At that time I gave him a written request for such a permit. I sent another request to Mr. Norton on September 6th. He has not yet responded to either letter. What should we try next?

Sincerely,

Rob

Robert Bleiweiss

MADISON, WI 53706 TELEPHONE 608 262-1051

Preliminary Report on the Avifauna of Guana Island:

Field Studies Conducted from July 15 to July 25, 1988

By:

Dr. Robert E. Bleiweiss
Dept. of Zoology
Birge Hall
University of Wisconsin
Madison, WI 53706

Kathy Kavanagh
College of William and Mary
Virginia Institute of Marine Science
Gloucester Point, VA 23062

INTRODUCTION

Our principal objective was to gather data on the biology of Guana Island's hummingbirds. However, we censused all birds on the island and gathered information on their breeding status when possible. Kavanagh conducted bird surveys on islands other than Guana, including George Dog, Virgin Gorda, Necker and Tortola; her notes have been submitted separately.

HUMMINGBIRDS

Diversity.- Two species of hummingbird are common on Guana Island, the Green-throated Carib (Sericotes holosericeus) and the Antillean Crested Hummingbird (Orthorhynchus cristatus). Although neither species is restricted to Guana Island, both are Antillean endemics. We were unable to verify the presence of a third species purported to occur on Guana, the Antillean Mango (Anthracothorax dominicensis). Previous reports of the Mango here (Lazell pers. comm.) may be of misidentified immature Caribs; adult female Mangos and immature Caribs both have extensive white underparts, and they could be confused in the field. Only immatures Caribs, however, have a prominent black stripe on the throat and breast. Indeed, Bleiweiss observed one immature Carib feeding on Delonix regia around the Guana Island Club.

Feeding Ecology.- Sericotes and Orthorhynchus exploited a broad spectrum of nectar-providing plants (Table 1). Both species fed at many of the same plant taxa, but some interspecific differences in their diets are suggested by the preliminary data. Behavioral interactions at nectar sources visited by both species indicated that Sericotes is dominant to Orthorhynchus.

We found that male Sericotes defend feeding territories that encompass several nectar sources (in the garden around the Guana Island Club, and along the trail to Muskmelon Bay). We never observed feeding territoriality in either sex of Orthorhynchus. These observations agree with the results of previous studies of the two species on other islands (Ingles 1975; Kodric-Brown et al. 1985).

Our preliminary data also suggest a striking ecological segregation among the age/sex classes of both hummingbird species. We encountered adults only in habitats where several potential nectar sources were available in a circumscribed area. In contrast, we found immatures feeding mostly at flowering trees, a more seasonal and patchy resource. These differences may reflect contrasting ecological strategies of the age/sex classes. Adults may exploit areas that provide year-round sources of nectar, whereas immatures may depend on less predictable nectar sources (trees).

Behavior.- In interactions around nectar sources, Sericotes was clearly dominant to Orthorhynchus. Adults (data for males only) and immatures (both sexes) of Sericotes dominated male-plumaged Orthorhynchus at all feeding sites where the two species overlapped. Dominance relations between age/sex classes within species are unknown. But ecological segregation of the age/sex classes (e.g. adults in the garden, immatures at forest trees) could be the result of dominance interactions.

Although Bananaquits and hummingbirds utilize many of the same nectar sources on Guana Island, the hummingbirds ignored Bananaquits that gathered in numbers at large flowering trees visited by (immature) hummingbirds. This lack of aggressive competition between hummingbirds and other nectarivores is unusual and warrants further investigation.

Reproduction and Molt.- Field observations and data from netted birds indicate that both species were breeding during the time of our stay. We observed one female Sericotes building a nest in a tree in White Bay Flat.

Dispersal.- Remarkably, on the boat trip to Beef Island Airport, Bleiweiss and Geary observed a male Orthorhynchus flying over the ocean. We first detected the bird flying approximately one meter above the water, at about eight meters to port. The bird continued to fly parallel to the boat for about 30 seconds, after which time he headed over to Tortola.

Our observation adds to the growing number of sightings of hummingbirds flying between islands in the Caribbean.Unfortunately, we cannot be sure which island our bird came from. However, these data suggest that there is considerable movement of hummingbirds among different islands. The causes of such movements, and their effects on the dynamics of hummingbird populations on islands are unknown. However, inter-island movements no doubt contribute to gene flow among representative populations of hummingbirds on different islands, and therefore, probably retard divergence between hummingbird populations on different islands.

Future Research.- The ecological data obtained so far suggest several avenues for future research with Guana Island hummingbirds. The two most important results to date are a) evidence for ecological differences among the age/sex class of the two species; b) evidence for inter-island movements by hummingbirds, no doubt involving Guana Island birds. Both of these phenomena are essential for understanding the dynamics of hummingbird populations on islands. The ecology of age/sex classes is particularly intriguing; similar patterns of intraspecific niche divergence are known for Caribbean Anolis lizards, but the hummingbird data suggest that such differences may be a general phenomenon among island animals.

Additional information on feeding and breeding ecology is also of particular interest; unlike many hummingbirds, which are sexually dichromatic in plumage, male and female Sericotes have

similar iridescent plumage. The significance of this monochromatic plumage in Sericotes is unknown.

Table 1. Nectar sources of Guana Island Hummingbirds.

Plant	Hummingbird	
	Sericotes	Orthorhychus
Myrtaceae		
Eugenia sp.		X
Leguminosiae		
Caesaldinia pulcherrima		X
Tamarind sp.	X	X
Delonix regia	X	
Apocynaceae		
Allamanda cathartica		X
Plumeria acutifolia		X
Malvaceae		
Hibiscus sp.	X	X
Nyctaginaceae		
Bougainvillea sp.		X
Bignoniaceae		
Tabebuia pentaphylla	X	X
Bignone red trumpet	X	X
Cactaceae		
Turk's cap	X	

GENERAL SPECIES ACCOUNTS

Brown Pelican (Pelecanus occidentalis).- Common over White and Muskmelon Bays.

Brown Booby (Sula leucogaster).- Single individuals seen over Muskmelon Bay on two separate days.

Magnificent Frigatebird (Fregata magnificens).- Common over White and Muskmelon Bays. Females outnumbered males.

Little Blue Heron (Florida caerulea).- Common in Salt Pond and White Bay Flats. Once on boat moorings on White Bay. We observed immature (white), molting (white and blue-grey) and adult (entirely blue-grey) birds, so the species is probably reproducing successfully on Guana Island.

Flamingo (Phoenicopterus ruber).- Six birds, restricted to the Salt Pond. Of course there are seven!

White-cheeked Pintail (Anas bahamensis).- Eight to ten birds, restricted to the Salt Pond.

Red-tailed Hawk (Buteo jamaicensis).- One bird seen flying along coastline of Muskmelon Bay.

American Kestrel (Falco sparverius).- Parents with two fledged young seen daily in White Bay Flats.

Black-necked Stilt (Himantopus).- Restricted to Salt Pond.

Spotted Sandpiper (Actitus macularia).- Two birds at the Salt Pond.

Laughing Gull (Larus atricilla).- The most numerous marine bird around the Guana Island Club.

Royal Tern (Thalasseus maximus). One immature bird seen flying in White Bay.

Red-necked Pigeon (Columba squamosa).- Common in all habitats; in forest, more conspicuous or more numerous than Zenaida Dove.

Zenaida Dove (Zenaida aurita).- Common in all habitats.

Common Ground Dove (Columbina passerina).- Common in all habitats. Many birds nesting (incubating) in the grassy areas of White Bay Flats.

Bridled Quail Dove (Geotrygon mystacea).- Single bird(s) sighted in Lower Quail Dove Ghut. Birds were unmarked and unbanded.
Mangrove Cuckoo (Coccyzus minor).- Two or three birds observed along the lower portion of the trail to Muskmelon Bay, one individual seen on 7/15 and two individuals seen on 7/24.

Smooth-billed Ani (Crotophaga ani).- Common in White Bay Flats, just below Lower Quail Dove Ghut, and around the Guana Island Club.

Green-throated Carib (Sericotes holosericeus).- Common in all habitats. Appears to outnumber Crested Antillean hummingbird in the forest. One female nest-building in a tree in White Bay Flat.

Crested Antillean Hummingbird (Orthorhynchus cristatus).- Common in all habitats.

Grey Kingbird (Tyrannus dominicensis).- Common in all habitats.

Caribbean Elaenia (Elania martinica).- Fairly common. More often heard than seen. Seemingly more common on the trail to Muskmelon Bay than elsewhere, where four were caught in mist nets.

Northern Mockingbird (Mimus polyglottus).- Single bird(s) sighted twice on White Bay Flats.

Pearly-eyed Thrasher (Margarops fuscatus).- Abundant in all habitats. Adults feeding unfledged young at the Guana Island Club.

Bananaquit (Coereba flaveola).- Fairly common. Most numerous around flowering forest trees (Leguminosae, Bignoniaceae). Abundant immature birds and a fresh but unoccupied nest found near White Bay Flat suggest that the species recently completed breeding.

Black-faced Grassquit (Tiaris bicolor).- Common, especially around the Guana Island Club and just below Lower Quail Dove Ghut.

Table 2. Birds seen on Guana Island 7/15/88 - 7/25/88.

Species	Sites	Nesting
Brown Pelican	S	
Brown Booby	S	
Magnificent Frigatebird	S	
Little Blue Heron	S,P,F	
Flamingo	P	
White-cheeked Pintail	P	
Red-tailed Hawk	S	
American Kestrel	F	fledged young
Black-necked Stilt	P	
Spotted Sandpiper	P	
Laughing Gull	S	
Royal Tern	S	
Red-necked Pigeon	C,Q,MM,R	
Zenaida Dove	F,C.Q,MM,R	
Common Ground Dove	F,Q,MM,R	incubating
Bridled Quail Dove	Q	
Mangrove Cuckoo	MM	
Smooth-billed Ani	C,F,Q	
Green-throated Carib	F,C,Q,MM,R	nest-building
Antillean Crested Hummingbird	F,C,Q,MM	
Grey Kingbird	F,C,Q,MM,R	
Caribbean Elania	C,MM,R	
Northern Mockingbird	F	
Pearly-eyed Thrasher	F,C,Q,MM,R	young in nest
Bananaquit	F,C.Q,MM,R	
Black-faced Grassquit	C,Q,MM	

S=seacoast; P=salt pond; F=White Bay Flats; C=Guana Island Club; Q=Lower Quail Dove Ghut; MM=trail to Muskmelon Bay; R=Ridge Trail.

REPTILES and AMPHIBIANS

Greg Mayer and I continue our long-term study of population biology and evolution in Anolis lizards. This involves mark-recapture of hundreds of individuals in delineated plots on White Bay flat, lower Quail Dove Ghut, and upper Quail Dove Ghut. It will be extremely interesting and useful to get October-November data in 1989, but we cannot fail to also get July data comparable to that of previous years. Then, we can either switch completely to October-November or go back to July (which Greg favors because this project needs so many field assistants, usually students).

Joe Walsh will be graduating from field assistant to thesis writing investigator next year. He hopes to work on either snakes or ground lizards, on Guana, for the University of Rhode Island.

Numi Goodyear, finishing her Ph.D at URI now, hopes to come in October-November and assay our iguana population in its early stages. This will help document the only apparently successful attempt ever to reestablish a population of iguanas in the world, and certainly the only one involving a critically endangered species.

The big news this year was the collection of three more of the weird slipperbacks, a new species of Mabuya, on Carrot Rock. Now there are four, and lots more were seen. Greg Mayer will get to work on these right after completing his thesis.

Tom Sinclair's dramatic work on the "rare" burrowers, Amphisbaena and Typhlops, follows: he found out how to find them. The Amphisbaena may turn out to be an undescribed form. We are still trying to get the mites collected from our several Amphisbaenas identified and named (see first letter under Insects, below).

We should do more about sea turtles. Enclosed my letter to Bert Lettsome and Nancy Linsley's letter to me. More on this under Proposal for Future Work, below.

September 12, 1988

Dr. Skip Lazell
The Conservation Agency
6 Swinburne Street
Jamestown, RI 02835

Dear Skip,

It's hard to believe that it has been two months since I arrived at Guana Island! Before my memory fades completely I think I had better put down my recollections and observations regarding Typhlops and Amphisbaenas.

Below you will find a table showing the dates and locations where we found the animals. Additionally I have attached marked maps of the island to pinpoint the spots where we found the animals.

Amphisbaenas

Number	Date	Location	Elevation
1	07/06/88	Upper Quail Dove	160 to 185M on left Slope
2	07/07/88	Upper Quail Dove	160 to 185M on left Slope
3	07/08/88	Palm Ghut	160 to 185M
4	07/10/88	Upper Quail Dove	160 to 185M on right Slope
5	07/10/88	Upper Quail Dove	160 to 185M on right Slope
6	07/11/88	Palm Ghut	160 to 185M
7	07/11/88	Palm Ghut	160 to 185M
8	07/12/88	Grand Ghut	160 to 185M

All of the Amphisbaenas were under rock slabs in areas where the forest opened up to expose them to the suns' rays. I suppose it is to give them an opportunity to thermoregulate. The soil at the elevation where they were found was not the loose scrabbly soil like lower elevations but well compacted to enable the walls of the worm and termite galleries to hold.

When uncovered the Amphisbaenas moved slowly and deliberately in an effort to escape into the galleries. When picked up they all probed with their heads and then turned side to side and tried to bite.

In addition to the animal I found in Grand Ghut I also found a shed skin under a rock slab. In every case where Amphisbaenas were found Typhlops were found in close association. I have included a list of the Typhlops wthat I found this year.

Typhloos

Number	Date	Location	Elevation
1	07/05/88	Upper Quail Dove	160 to 185M on left Slope
2	07/07/88	Bottom of Ridge Trail	30 to 50M
3	07/07/88	Upper Quail Dove	160 to 185M on left Slope
4	07/08/88	Palm Ghut	160 to 185M
5	07/08/88	Palm Ghut	160 to 185M
6	07/10/88	Upper Quail Dove	160 to 185M on right Slope
7	07/11/88	Upper Quail Dove	135M in Lizard Plot
8	07/12/88	Grand Ghut	160 to 185M

All of the Typhloos were under rock slabs under the same conditions as the Amphisbaenas with the exception of numbers 2 and 7.

Number two was under a thin slab approximately .5 meters by 1.5 meters and 25-30 millimeters thick. The slab was flat on dry parched earth. Number seven was under a slab in the shaded area of the Upper Quail Dove Ghut lizard plot. Specimen number seven contained three well developed eggs which were visible through the ventral surface. I suppose this sheds some light as to the timing of the reproductive cycles of these animals.

The reaction of the Typhloos to being exposed was in marked contrast to that of the Amphisbaenas. They thrashed around wildly and made a dash for the galleries. When picked up they probed about with both their heads and their tails.

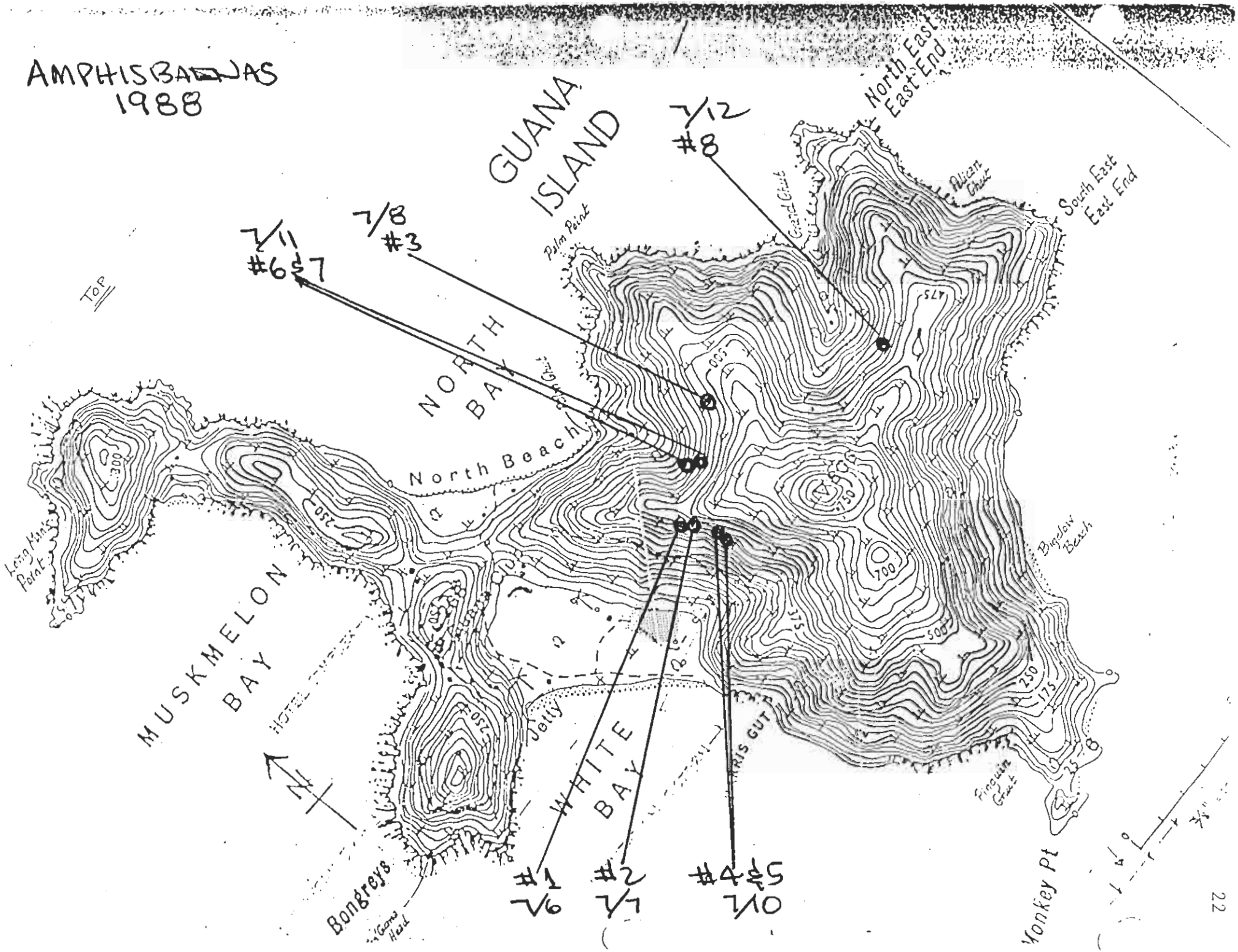
For next year we would like to return to Guana and do a more detailed study on these animals. I feel that we found the optimal habitat for both these animals and were rewarded with three specimens for every two hours of collecting. We spent equivalent time in so-called unsuitable habitat and found only the two typhloos mentioned above.

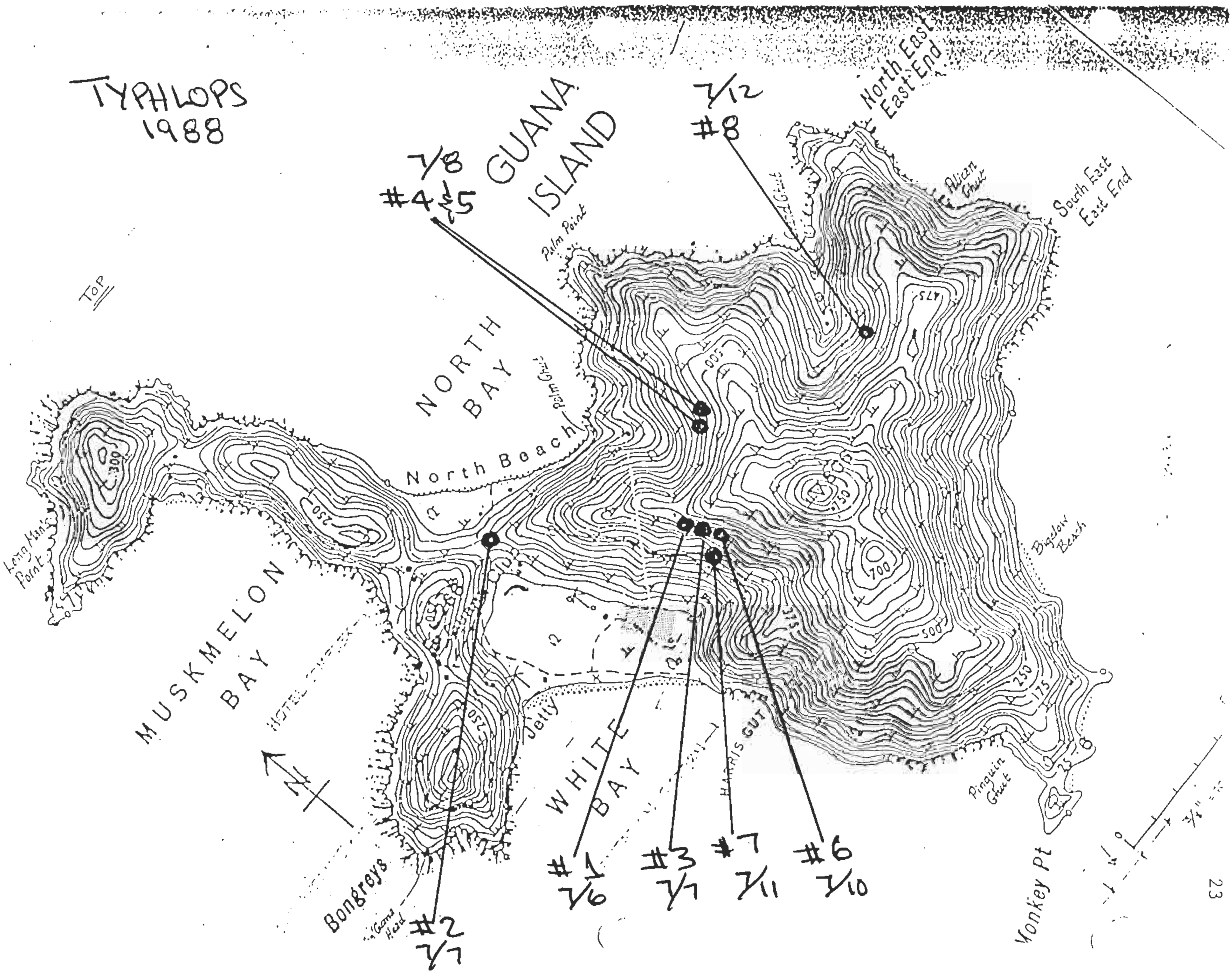
Next year we would like to confirm this hypothesis by bringing along a good altimeter as well as thermometers to measure the ground temperature both under and next to the rock slabs. We would also measure the slabs and mark them for future reference. Additionally, we would weigh and measure all the specimens to eliminate the need for preserving them.

Do you feel that we have enough information to publish a paper at this point? I assume you are going to do some taxonomic comparisons of these animals to those from other islands. Is there something more that you would like me to provide? I have several things written by Gans regarding Amphisbaenas coming in the mail if you need other reference material.

Best Regards,

Tom Sinclair


AMPHISBAENAS
1988
GUANA ISLAND
North East East End
South East East End
Palm Point
Grand Gut
Alicen Gut
7/12 #8
7/8 #3
7/11 #6&7
TOP
NORTH BAY
North Beach
Long Haul Point
MUSKMELON BAY
HOTEL
Jetty
WHITE BAY
IRIS GUT
Bogdon Beach
Fingum Gut
Monkey Pt
Bongreys
Gang Hall
#1 7/6
#2 7/7
#4&5 7/10
N
22



TYPHLOPS
1988
GUANA ISLAND
NORTH BAY
North Beach
Palm Point
MUSKMELON BAY
HOTEL COMPLEX
WHITE BAY
Jetty
HARRIS GUT
Long Man's Point
Bigelow Beach
South East End
North East End
Pinguin Ghut
Monkey Pt
Bongreys
TOP
N
7/8
#4 & 5
7/12
#8
#1
7/6
#2
7/7
#3
7/7
#7
7/11
#6
7/10
300
250
500
475
750
700
175

The Conservation Agency

Exploration, Education, and Research

President
James D. Lazell, Ph.D.
401-423-2652

6 Swinburne Street
Conanicut Island
R.I. 02835 U.S.A.

October 13, 1988

Bertrand Lettsome, Conservation Officer
National Parks Trust
Ministry of Natural Resources
BVI Government, Road Town,
TORTOLA, BRITISH VIRGIN ISLANDS

Dear Bert:

Thanks for the marine turtle report. I have been remiss in not sending you our data, as follows, for Guana Island:

Hawksbill: False crawl 93 cm wide. North Beach, 6.vii.87. Same, apparently real nest, same place, 7.vii.87.

Green: Apparently real nest, 91 cm wide symmetrical crawl. North Beach, 22.vii.87.

Hawksbill: Juvenile,? female, 24 cm carapace. Caught, photographed, released, 28.vii.87, Crab Cove, Muskmelon Bay.

Hawksbill: Probable real nest, crawl width not measured. North Beach, 6.vii.88

Hawksbill: Juvenile, ? female, 40 cm carapace. Caught and released, White Bay, 25.vii.88.

Keep up the good work!

Best,

Skip

James D. Lazell, Ph.D.

JDL/js

NANCY B. LINSLEY

310 Valley Drive
Watchung, New Jersey
07060-6434
201/668-5347

17 November, 1988

Dr. James D. Lazell
The Conservation Agency
6 Swinburne Street
Conanicut Island, RI 02835

Dear Skip:

I just finished re-reading "The Guana Guide" -- your booklet describing the flora and fauna of Guana Island, which you had sent me a year or so ago. In it, you mention finding evidence of sea turtle nesting activity on Guana's beaches, and mention needing people to observe and gather more data about these turtles.

Since participating on your Earthwatch expedition to Hainan Dao in spring of 1986, I have become, shall we say, "enamored" of sea turtle work, and would love to volunteer to do some of this research for you!

In August of 1987 I participated in an EW project on Culebra Island which involved netting, measuring and tagging adolescent greens and hawksbills, and some leatherback nest excavations. In August of this year I participated in a green and loggerhead nesting, egg relocation (due to heavy poaching) and tagging project on the Yucatan Peninsula, also sponsored by Earthwatch. Late next May, I am signed up for yet another EW turtle project, again to Culebra Island, this time for leatherback (and probably hawksbill) nest monitoring, tagging, etc.

I thoroughly enjoy the nightly beach walking, really love working with the turtles themselves, and am familiar with the different stages of their nesting behavior. I know how to take measurements with both tape and calipers, relocate eggs if necessary, note identifying characteristics if any, tag, and locate and excavate hatched nests. All I need is a place to eat and sleep, tagging equipment and tags, and information from you as to what data you want on the turtles.

I will be finished with the nearby Culebra project on June 7, '89, and will be free for the rest of June and probably the first 5-7 days of July, so I could give you a good month's worth of observation. At that time I could also monitor hatching activity from nesting done in April. With enough notice, I could almost certainly be available for the month of May instead of June, if that time better suited your needs, but would have to leave for the Culebra project on the 28th.

I look forward to hearing from you.

Nancy

B I S H O P M U S E U M

1525 BERNICE STREET • P.O. BOX 19000A • HONOLULU, HAWAI'I • 96817-0916 • (808) 847-3511

24 June 1988

Dr. K.E. Hyland
Dept. of Zoology
University of Rhode Island
Kingston, RI 02881-0816

Dear Dr. Hyland:

In December 1986, we sent you two lots of mites from Amphisbaena fenestrata from the British Virgin Islands. Have you been able to work up this material? Skip Lazell is quite eager to learn what the mites are.

Sincerely,

Scott E. Miller
Chairman
Dept. of Entomology

CC: J. Lazell
S. Swift, BPBM

* * * * * * * * * * * * * * * *

Note of 15 December, 1988

I have been over to URI to see my old friend Kerv Hyland and find out about these mites. He remains enthusiastic about working on them and assures me it is just a problem of lab assistants, graduate students, and time - all to be solved soon. Anyway, we know of no one better to send them to.

Skip

B I S H O P M U S E U M

1525 BERNICE STREET • P.O. BOX 19000A • HONOLULU, HAWAI'I • 96817-0916 • (808) 847-3511

September 28, 1988

Dr. James Lazell
The Conservation Agency
6 Swinburne Street
Conanicut Island, RI 02835

Dear Skip:

My formal report on this summer's Guana Island work will be sent in a month or so. We are currently processing the specimens and do not yet have counts, etc. I have also requested an update from Mike Ivie on his activities with the BVI beetles.

As you know, I found a new earthworm specialist (Sam James), and have sent our accumulated earthworms to him.

I am enclosing the results of Vitor Becker's recent efforts at the British Museum: a list of 198 butterflies and moths that we collected in 1987. Note that we collected some 300 species, but we have only been able to identify 198. The remainder are mostly in difficult groups where the taxonomy is sufficiently poorly known that it may be impossible to identify them without revision of the species groups throughout the Neotropical region. Remember how poorly known most insect groups are!

Anyway, this list is a significant start. It is now out for review with various moth specialists, and we hope to gain additional identifications. We also will incorporate species collected in other years. We are not sure how to publish these results given the gaps that cannot be filled with reasonable effort.

My manuscript (with Marc Epstein) reviewing the limacodid moth genus Heuretes is now ready for submission (waiting only for final photographic prints). This is a case where working on the BVI species required us to borrow types from Europe, revise the genus, evaluate the relationships of the genus, describe a new related species, etc. The project just kept growing outward from its nucleus of BVI specimens!

Thanks again for the opportunity to work on Guana. We shall continue to work on producing results, albeit slowly!

Two questions: (1) What is your current travel schedule, and (2) What is Louis Potter's address?

Best Regards,

Scott E. Miller
Chairman, Department of Entomology,
and Acting Assistant Director
for Research and Scholarly Studies

cc: Dr. Henry Jarecki (with list)
Dr. Vitor Becker (without list)

Enclosure: list

SEM:jlf

DRAFT for correction, September 1988

LEPIDOPTERA OF GUANA ISLAND, BRITISH VIRGIN ISLANDS

A Preliminary List

Vitor O. Becker
Scott E. Miller

This list is based upon the material collected by both authors 9-23 July 1987. Over 2200 specimens were collected during this trip, representing about 300 morphospecies, 198 of which have been identified and are listed here. A synoptic collection, containing at least one specimen representing each form was taken to the Smithsonian Institution (USNM), Cornell University, and most importantly, the British Museum (Natural History) (BMNH), by the first author. The list below is a result of the identifications made by comparing this synoptic collection with identified material, especially type specimens (including important voucher specimens and types from Forbes 1930, 1937 and Walsingham 1892, 1897 for Microlepidoptera). All groups are arranged alphabetically by family, subfamily, genera and species.

Guana Island is a small (340 hectares, maximum elevation 246 m) island on the north side of Tortola in the British Virgin Islands. While it is small, it has a relatively rich vegetation, and has sustained less damage by feral animals than many adjacent islands. It has most of the floristic associations of the larger Virgin Islands, with the notable exception of the "aridulate rain forest" of Tortola (D'Arcy, 1967).

This list is based on the 1987 collection, but is supplemented by specimens collected in July of 1984 (S.E. & P.M. Miller), 1985 (S.E. & P.M. Miller), 1986 (S.E. Miller & M.G. Pogue), and 1988 (S.E. Miller & C. O'Connell). Collections from 1984-1986 are at USNM 1987 are split between VOB & Bishop Museum (BPBM), and 1988 are at BPBM.

Except for Davis (1986), these are the first records for Lepidoptera from Guana Island. J.F.G. Clarke was on Guana briefly in 1956 and 1958 (see Schmitt, 1959), but was not able to collect at lights there.

Most of the species here are previously known from Puerto Rico (e.g., Forbes, 1930, 1931), but most have not been recorded from the British Virgin Islands due to lack of previous sampling. The principal islands of the Virgin Islands (except Saint Croix) lost their connection with each other and with Puerto Rico only about 8,000 to 10,000 years ago, due to eustatic rise in sea level (Heatwole et al., 1981).

Collections from Guana Island were supported by the Conservation Agency, through a grant from the Mocatta Corporation. We thank...for assistance with identifications, and the Smithsonian Institution and British Museum (Natural History) for providing research facilities.

BUTTERFLIES
HESPERIIDAE

Choranthus vitellius (Fabricius)
Cymaenes tripunctus (Herrich-Schäffer)
Euphyrides zephodes (Hübner)
Panoquina sylvicola (Herrich-Schäffer)
Polygonus leo (Gmelin)
Pyrgus oileus (Linnaeus)
Urbanus dorantes (Stoll)
Urbanus proteus (Linnaeus)
Wallengrenia otho (J.E. Smith)

LYCAENIDAE

Chlorostrymon maesites (Herrich-Schäffer)
Leptotes cassius (Cramer)
Strymon bubastus (Cramer)

NYMPHALIDAE

Agraulis vanillae (Linnaeus)
Biblis hyperia (Cramer)
Danaus plexippus (Linnaeus)
Heliconius charitonius (Linnaeus)

PIERIDAE

Ascia monuste (Linnaeus)
Eurema elathea elathea (Cramer)
Eurema lisa euterpe (Ménétriés)
Phoebis sennae (Linnaeus)

PAPILIONIDAE

Battus polydamas (Linnaeus)

MOTHS
ARCTIIDAE
Arctiinae

Calidota strigosa (Walker)
Eupseudosoma involutum (Sepp)
Hypercompe simplex (Walker)
Utetheisa ornatrix (Linnaeus)

Ctenuchinae

Empyreuma pugione (Linnaeus)
Horama pretus (Cramer)

Pericopinae

Composia credula (Fabricius)

Lithosiinae

Afrida charientissima Dyar
Lomuna nigripuncta (Hampson)
Progona pallida (Möschler)

BLASTOBASIDAE

Auximobasis brevipalpella Walsingham
Auximobasis insularis Walsingham
Blastobasis argillacea Walsingham
Blastobasis subolivacea Walsingham

CHOREUTIDAE

Hemerophila biferana (Walker)
Tortyra ignita (Zeller)

COLEOPHORIDAE

Coleophora picticornis Walsingham

COSMOPTERIGIDAE

Cosmopterix similis Walsingham
Ithome curvipunctella (Walsingham)

COSSIDAE

Psychonoctua personalis Grote

GELECHIIDAE

Anacampsis quinquepunctella Walsingham
Aristotelia crassicornis Walsingham
Aristotelia pulicella Walsingham
   Recurvaria hippurista Meyrick, n. syn.
Aristotelia rubidella (sensu Walsingham); paralectotypes of
     rubidella at the BMNH represent a different species).
Brachyacma palpigera (Walsingham)
Commatica bifuscella (Forbes)
Compsolechia angulifera (Walsingham), n. comb.
   Anacampsis succincta Walsingham, n. syn.
   Compsolechia salebrosa Meyrick, n. syn.
Compsolechia melanophaea (Forbes)
Compsolechia plumbeolata (Walsingham)
Cymotricha trigonella (Walsingham)
Evippe evipella (Forbes)
Gelechia flammulella Walsingham
Polyhymno luteostrigella Chambers
Prostomeus brunneus Busck
Recurvaria ostariella (Walsingham)
Stegasta bosqueella (Chambers)
Stegasta capitella (Fabricius)
Symmetrischema capsica (Bradley & Povolny)

Taygete parvella (Fabricius)
Telphusa translucida (Walsingham)
Tildenia gudmanella (Walsingham)

GEOMETRIDAE
Ennominae

Erastria decrepitaria (Hübner)
Oxydia vesulia (Cramer)
Pero rectisectaria (Herrich-Schäffer)
Semiothisa acidaliata Guenée
Xanthotype sospeta (Drury)

Geometrinae

Synchlora cupedinaria (Grote)
Synchlora frondaria (Guenée)

Larentiinae

Pterocypha floridata (Walker)

Sterrhinae

Acratodes noctuata Guenée
Acratodes suavata (Hulst)
Idaea amnesta Prout
Idaea curtaria Warren
Leptostales oblinataria Möschler
   Leptostales bifasciata Prout, n. syn.
Lobocleta nataria (Walker)

GRACILLARIIDAE

Acrocercops attenuata (Walsingham)
Dialectica sanctaecrucis Walsingham

MOMPHIDAE

Mompha piperatella (Walsingham)

NOCTUIDAE
Acontiinae

Bagisara repanda (Fabricius)
Cobubatha semipallida Hampson
Eumicremma minima (Guenée)
Spragueia margana (Fabricius)
Tripudia quadrifera (Zeller)

Amphipyrinae

Elaphria agrotina (Guenée)
Micrathetis triplex (Walker)
Spodoptera frugiperda (J.E. Smith)

Catocalinae

Mocis megas Guenée
Ophisma tropicalis Guenée
Phuris immunis Guenée

Cuculliinae

Neogalea esula (Druce)

Euteliinae

Paectes abrotunda (Guenée)

Heliothinae

Heliothis subflexus Guenée

Herminiinae

Lascoria orneodalis (Guenée)

Hypeninae

Bleptina araealis Hampson
Bleptina menalcasalis Walker
Drepanopalpia latipennis (Herrich-Schäffer)

Ophiderinae

Ascalapha odorata (Linnaeus)
Baniana relaspa (Walker)
Cecharismena abarusalis (Walker)
Chabora versicolor (Fabricius)
Diphthera festiva (Fabricius)
Eulepidotis addens Walker
Kakopoda progenies (Guenée), n. comb.
Lesmone formularis (Geyer)
Melipotis famelica Guenée
Melipotis januaris Guenée
Metallata absumens (Walker)
Plusiodonta clavifera Walker
Sylectra ericata (Cramer)

Sarrhothripinae

Characoma nilotica (Rogenhofer)

NOTODONTIDAE

Nystalea n. sp.

OECOPHORIDAE
Autostichinae

Schistonoea fulvidella (Walsingham)

Ethmiinae

Ethmia confusella (Walker)
Ethmia julia Powell

PYRALIDAE
Chrysauginae

Bonchis munitalis (Lederer)
Murgisca subductella (Möschler)
Streptopalpia minusculalis (Möschler)

Crambinae

Argyria diplomochalis Dyar
Fissicrambus minuellus (Walker)
Fissicrambus haytiellus (Zinken)
Microcrambus atristrigellus (Hampson)
Microcrambus discludellus (Möschler)

Evergestiinae

Evergestella evincalis (Möschler)

Galleriinae

Pogrima palmasalis Schaus

Glaphyriinae

Chalcoela pegasalis (Walker)
Galphyria badierana (Fabricius)

Odontiinae

Alatuncusia bergii (Möschler)
Cliniodes nomadalis Dyar
Dichogama amabilis Möschler
Dichogama gudmani Hedeman
Dichogama redtenbacheri Lederer

Phycitinae

Anabasis ochrodesma (Zeller)
Atheloca subrufella (Hulst)
Crocidomera fissuralis (Walker)
Ectomyelois decolor (Zeller)
Ephestiodes infimella Ragonot
Fundella argentina Dyar
Hypargyria definitella (Zeller)
Oryctometopia fossulatella Ragonot

Ozamia lucidalis (Walker)
Sarasota furculella (Dyar)

Pyraustinae

Asciodes gordialis Guenée
Condylorrhiza vestigialis (Guenée)
Desmia ufeus (Cramer)
Diaphania elegans (Möschler)
Ercta vittata (Fabricius)
Hydropionea basalis Hampson
Lamprosema atrirenalis Hampson
Loxomorpha cambogialis (Walker)
Marasmia cochrusalis (Walker)
Mesocondyla gastralis (Guenée)
Microthyris anormalis (Guenée)
Omiodes indicata (Fabricius)
Palpita costata (Fabricius)
Palpita quadristigmalis (Guenée)
Pilocrocis eurypalpis Hampson
Pseudopyrausta acutangulalis (Snellen)
Spoladea recurvalis (Fabricius)
Steniodes gelliasalis (Walker)
Syllepte ceresalis (Walker)
Syllepte onophasalis (Walker)
Synclera traducalis (Zeller)
Syngamia florella (Stoll)
Tyspenodes santiagalis Schaus
Uresiphita reversalis (Guenée)
Zellerina serpentifera (Hampson), n. comb.

SPHINGIDAE
Sphinginae

Manduca rustica (Fabricius)
Manduca sexta (Linnaeus)

Macroglossinae

Callionima parce (Fabricius)
Cauthetia sp.
Erinnyis ello (Linnaeus)
Erinnyis obscura (Fabricius)
Eumorpha vitis (Linnaeus)
Pachylia ficus (Linnaeus)
Perigonia lusca (Fabricius)
Pseudosphinx tetrio (Linnaeus)
Xylophanes chiron (Drury)
Xylophanes pluto (Fabricius)
Xylophanes tersa (Linnaeus)

TINEIDAE

Acrolophus noctuina (Walsingham)
Acrolophus parva (Walsingham)
Acrolophus poeyi Walsingham
Acrolophus triatomellus (Walsingham) (See Davis, 1986)
Lepyrotica brevistrigata (Walsingham)
Lepyrotica diluticornis (Walsingham)
Lepyrotica reduplicata (Walsingham)
Protodarcia tetraonella (Walsingham)
Oenoe pumiliella (Walsingham)

TISCHERIIDAE

Tischeria pulverea Walsingham

TORTRICIDAE
Cochylinae

Saphenista bunteodes Forbes

Olethreutinae

Ancylis viridiidorsana (Möschler)
Crocidosema plebejana Zeller
Episimus nesiotes (Walsingham)

Tortricinae

Apotoforma rotundipennis (Walsingham)
Coelostathma parallelana Walsingham
Platynota rostrana (Walker)
Platynota ichthyochroa Walsingham

YPONOMEUTIDAE

Yponomeuta triangularis Möschler

Literature Cited

D'Arcy, W.G. 1967. Annotated checklist of the dicotyledons of Tortola, Virgin Islands. Rhodora 69: 385-450.

Davis, D.R. 1986. Neotropical Tineidae, I: The types of H.B. Möschler (Lepidoptera: Tineoidea). Proc. Ent. Soc. Wash. 88: 83-92.

Forbes, W.T.M. 1930. Insects of Porto Rico and the Virgin Islands-Heterocera or moths (excepting the Noctuidae, Geometridae and Pyralidae). Sci. Surv. Porto Rico Virgin Islands 12: 1-171.

Forbes, W.T.M. 1931. Supplementary report on the Heterocera or moths of Porto Rico. J. Dept. Agr. Porto Rico 4: 339-394, pl. xlii-xlvii.

Heatwole, H., R. Levins, and M.D. Byer. 1981. Biogeography of the Puerto Rican Bank. Atoll. Res. Bull. 251: 1-55.

Schmitt, W.L. 1959. Narrative of the 1958 Smithsonian-Bredin Caribbean Expedition. Smithsonian Report for 1958, pp. 419-430.

Walsingham, Lord. 1892. On the Microlepidoptera of the West Indies. Proc. Zool. Soc. Lond. for 1891: 491-549, pl. 41.

Walsingham, Lord. 1987. Revision of the West-Indian Micro-Lepidoptera, with descriptions of new species. Proc. Zool. Soc. Lond. for 1897: 54-183.

B I S H O P M U S E U M
1525 BERNICE STREET • P.O. BOX 19000A • HONOLULU, HAWAI'I • 96817 0916 • (808) 847-3511

24 October 1988

Dr. Lee D. Miller
Allyn Museum of Entomology
3621 Bay Shore Road
Sarasota, FL 34234

Dear Lee:

Here is the information that I promised about the Calisto sp. in USNM that I collected at Bones Bight, Anegada Island, 17 July 1985. My field notes reveal only that I was at Bones Bight (which is on the NW side) in the morning of 17 July.

Tony, the Anegada taxi driver, could certainly take you there. The place to stay is the Anegada Reefs Hotel (at Setting Point; phone 809-4943425, via marine operator).

For more information on the island, see D'Arcy, W.G. 1975. Anegada Island: Vegetation and flora. Atoll Research Bulletin 188:1-40.

If you do publish on the Calisto I collected, I would appreciate it if you could acknowledge that fieldwork was "supported by the Conservation Agency through a grant from the Mocatta Corporation."

As I mentioned on the phone, you may wish to contact Dr. Walter Knausenberger, Virgin Islands Cooperative Extension Service, College of the Virgin Islands, College of the Virgin Islands, PO Box L, Kingshill, St. Croix, USVI 00850. He was writing some kind of popular guide to Virgin Islands butterflies.

I am enclosing a list of butterflies collected by Vitor Becker and I in July 1987 on Guana Island (north of Tortola). We would appreciate any comments. The only additional Guana Island record at hand is Electrostrymon angelia (Hewitson) (July 1986, det. R. Robbins, in USNM).

The 1984, 1985, 1986 BVI material is at USNM; the 1988 material is here (but not labelled yet). Our surveys have centered on Guana Island, but have reached most of the other BVI as well. We have not concentrated on butterflies, but have picked them up when possible. Please let me know if I can be of further assistance.

I hope the above information is useful. Happy Calisto hunting!

Sincerely,

Scott E. Miller
Chairman
Department of Entomology

SEM:tmk

Enclosure

cc: Vitor Becker
James Lazell

* * * * * * * * * * * * * * * * * * * *

Note of 15 December, 1988:

The members of Calisto are satyrs: small butterflies of the family Satyridae. It is not clear whether Scott has a new species or just a major range extension. The only species I know, from Hispaniola, has big brown "eyes" on the wings. Those on the forewing are round eyes, but those on the hindwing are spectacular Oriental eyes.

The Graduate School and University Center
of The City University of New York

Ph.D. Program in Biology / Box 350
Graduate Center: 33 West 42 Street, New York, N.Y. 10036-8099
212 642-2457

November 16, 1988

Dr. James D. Lazell
The Conservation Agency
6 Swinburne Street
Coanicut Island, RI 02835

Dear Dr. Lazell,

I have had the opportunity to meet Dr. George R. Proctor and discuss various entomological projects with which I have been involved. He told me of the research possibilities available on Guana Island and suggested that I write to you for information.

For nine years I have been involved in administrative duties, both as department chairman, and for the past five years as Executive Officer of the CUNY Ph.D. program in Biology. During this time I have been mainitaining my research at low levels through a part time lab assistant, but this past sunner I once again established an active research profile. I expect to remain fully active and desire reestablishing my major projects.

My research is in the area of insect parasitoid-host relationships with a specific interest in the reproductive ecology and coevolutionary adaptations between cynipid and braconid wasps attacking Drosophila of the melanogaster and willistoni groups. I have recently submitted two proposals for funding to reestablish my work in Guadeloupe and Puerto Rico. Because it is important for me to examine populations collected on other islands, particularly smaller out islands (as I do on Desirade, Marie Galante, and Les Saints off Guadeloupe), the situation described by Dr. Proctor on Guana seems ideal. Also, I have recently begun experiments with a colleague on the courtship and mating behavior of these parasitoids. We expect that this research will lead to what we believe are the first field studies of these groups involving their reproductive patterns. The implications to the broad general theory of sex ratio mechanisms and the evolution of male longevity are enticing.

I would appreciate your sending me information regarding research possiblilities on Guana Island, and what forms of information would be required to pursue the possibility of studies at that location.

Sincerely yours,

Peter C. Chabora
Executive Officer

B I S H O P M U S E U M

1525 BERNICE STREET • P.O. BOX 19000A • HONOLULU, HAWAI'I • 96817 0916 • (808) 847-3511

September 2, 1988

Dr. James Lazell
The Conservation Agency
6 Swinburne Street
Conanicut Island, RI 02835

Dear Skip:

I am forwarding Margaret Collins' report on her July 1988 Guana Island research. The report consists of three parts:

1. Termite biology studies, chiefly on Nasutitermes nigriceps including determination of frequently- and rarely- attacked woods; combat studies aimed at establishing limits of colony foraging ranges; determination of nest structure and dimensions, with extraction of a sample permitting a rough estimation of population size; collecting a primary queen and observing that the colony was probably monogynous.

2. Contribution to the Guana Island program and through it, the instructional program on Tortola.

3. Descriptions of proposed new studies.

My own report will follow when the specimens are mounted and labelled.

Best Regards,

Scott E. Miller
Chairman
Department of Entomology

cc: Dr. Henry Jarecki

SEM:jlf

National Museum of Natural History · Smithsonian Institution
WASHINGTON, D.C. 20560 · TEL. 202- 382-8982
Entomology
MS- 105

Received 14.x.88

Dr. James D. Lazell, President
The Conservation Agency
6 Swinburne Street
Conanicut Island, R.I. 02835

Dear Dr. Lazell :

This letter comes to describe a research project to be pursued on Guana Island during the coming season, July and October-November 1989.

The carton-nest building termite Nasutitermes nigriceps proved to be highly polycalic, sometimes filling a rather large area with satellite nests subsidiary to a primary nest. Very large nests of this species in the Caribbean, Central America and Mexico , may contain elaborate mushroom-shaped bodies composed of comminuted wood and perhaps other material somewhat resembling the frass produced and packed in tunnels inhabited by wood-boring beetles of family Cerambycidae. These bodies may be loose or physically continuous with the dark brown carton comprising the bulk of the nest.

Some of the "mushroom bodies" are solid ; others appear to have been excavated, with the tunnels containing large numbers of eggs and the minute first instar young of the termites (called "larvae" by agreement).

These bodies were first reported by Adamson in the early 1900's; Barbara Thorne, then of Harvard University, found and photographed them in nests in Panama. The general suspicion is that these are food storage bodies; as such, they would be unique among carton-nest building termites.

Several questions should be answered about these bodies :
1) What is the chemical composition , source, method of processing, and function within the colony ?
2) What factors influence the production and number of these bodies ?
3) Are these bodies limited to primary nests with queens or are they constructed in subsidiary calies with or without functional reproductives ?
4) What castes and ages of termites build the "mushroom bodies " ?

Answers to these questions could possibly be obtained by performing the tasks to follow:

1) Re-sampling the nests on White Bay Beach and the vicinity of the main reservoir; sampling nests on North Beach and other areas of Guana and on other islands (Beef, George Dog)
2) Sketching and measuring sampled nests with or without the mushroom bodies for use in estimates of volume and colony size

3) Determining the presence, number and state of development of functional reproductives, with estimates of egg number for nests with or without the mushroom bodies
4) If cooperation with Space Biospheres Ventures can be obtained, and a technique devised to prevent termites from plastering over the lenses of a fiber optics/camera set-up, it should be possible to film events within the nest, hopefully clarifying the role of the mushroom bodies in the economy of the nest
5) Chemical analyses of the mushroom bodies and carton of the nest are now being conducted by Dr. Karen Bjorndal, of the University of Florida in Gainesville; these should be expanded as necessary

To carry out these studies, the collaboration of Dr. Barbara Thorne, currently at Northeastern University in Boston, will be critical in performing the tasks of measuring, sketching, sampling, searching for reproductives, and performing the behavioral studies necessary to differentiate between subsidiary calies of a single nest or neighboring nests with different parentage. Her schedule would permit work during July and possibly early October, but November is probably not available. Dr. Thorne has secured the services of a chemist, who is analyzing the mushroom bodies in her laboratory.

Additional needs would include help from Ralph and permission for him to use the tractor to facilitate sampling from high nests; accomodation for me at a period other than the July one so I can re-check nests previously sampled; and accomodation for the SBV camera man and at least one Biospherean.

This project will lend itself to accomodation of internes from Tortola, if desired.

It is my hope that we will be able to learn more about the ecology of this interesting and important termite.

Sincerely yours,

Margaret S. Collins

Margaret S. Collins

Introduction

Nasutitermes nigriceps is the abundant arboreal carton-nest building termite of Guana and adjacent islands. A widely-distributed species, it is successful on both islands and tropical continental areas, being found on many of the Caribbean islands, in Mexico, Central America, and South America as far south as Brazil . Colonies and their nests become enormous, and in a relatively-undisturbed habitat such as Guana, the nests are impressive features of the landscape. Damage to buildings and structures such as cisterns and fence posts may result from their activities. This damage may be lessened by transferring the nests to other areas further from structures to be protected. The benefits accruing from termite activity resulting in increased soil fertility and support of insect-eating animals such as birds and lizards should be balanced against their destructive activities.

Practical utilization of termites, treating them as a renewable resource, would involve feeding them to the birds in the Salt Pond, using them to reduce scrap wood where it can be recycled and used as fertilizer, and using portions of abandoned nests as an incense-like insect repellent. Carton nest material could be crushed and ground with water to form a slurry, which could be extruded in strips and dried to give an even more convenient insect repellent smoke.

Attempts to determine foraging area of individual colonies

To determine the approximate foraging range of a termite colony, samples of foraging groups in the covered trails leading to the main nest were removed and kept shaded and moist until they could be returned to the "arena" (the beach house). Samples of foraging groups from different nest-trail complexes were mixed and the behavior observed for signs of agonistic exchanges. Workers of this species have been shown to participate fully and effectively in inter-colony intra- and inter-specific combats, biting and pushing vigorously, complementing the glue-squirting activities of the defending soldiers (Thorne 1982). However, the experimental design originally employed on Guana involved a large amount of disturbance to samples from all the sources, and when fighting did not take place following mixtures of termites from trails associated with different nests along the entire length of White Bay beach, the procedure was modified, and samples sought from other parts of Guana Island as well as from the nearby islands of George Dog and Beef. The new procedure involved placing a group of termites from one area near an intact foraging trail belonging to a different nest, then breaking into the trail , and observing the response given by the defending soldiers that fanned out of the break and contacted the challenging termites. Using this procedure, agonistic behavior was observed between the White Bay beach termites and samples from North Beach (Guana), George Dog and Beef Island.

The lack of agonistic behavior shown when samples of the different nests on White Bay beach were mixed suggests that this area is occupied by an enormous, multi-nest (polycalic) colony. If this is correct, then it should be of great interest to determine the number

and placement of reproductives. The species is typically monogynous, with a single, frequently greatly-enlarged queen. However, when individuals capable of developing into functional reproductives are removed from the hormonal influences of functioning reproductives, they may develop into one or more kinds of replacement reproductives. This condition has not been studied in N. nigriceps. Recent studies have been directed toward describing the arrangement of reproductive types and associating these types with the monocaly/polycaly alternatives in Nasutitermes species in New Guinea,Africa, Panama ; and some attention has been given to termites of family Termitidae other than Nasutitermes. In the higher termites, there may be an association between polycaly and polygyny, study of which could lead to increased understanding of caste differentiation. Further information can be obtained by sampling of carton nests shown to share a common origin, and determining the types of reproductives, if any, present in the satellite nests.

Determination of Most Frequently Exploited Food Source

An analysis of distribution of N. nigriceps nests, trails, and evidence of attack on the several tree species in the flats between White Bay beach and the Salt Pond was made, with the able assistance of the two internes from Tortola. In this effort, we scored trees by giving them two numbers : the first indicated the species (e.g. 1 = Coconut, 2 = Casuarina, 3 = Tabebuia, 4 = Sea Grape etc), while the second indicated the presence or absence, and degree of utilization of the particular food plant (e.g. 1 = neither trails, nests or evident damage , 2 = trails and/or observable damage, 3 = nest and trails present). Thus 4-3 would represent a Sea Grape tree with trails and a nest, while 3-1 would be a Tabebuia without trails or nest. We attempted to score each tree in the study site, a total of 578.

90% of the Sea Grapes of the area were attacked, having trails and one or more nests on it ; about 53 % of the Tabebuias showed trails or trails and nests, but no multiple nests were seen on this species, which was the most abundant type of tree in the flats. Pisonia sp. showed lesser degrees of utilization. Of the attacked trees, Gumbo Limbo, the Turpentine tree,had the smallest number of trails and nests, and the few trails observed were always superficial, not being cut into the bark of the tree. This observation led to a consideration of possible toxicity or repellency of the wood of this tree, a soft wood used only for fence posts and popular because it takes root readily and may form a living fence post.

Choice Experiments, Sea Grape vs Gumbo Limbo

Nasutitermes nigriceps soldiers produce a defensive glue with a distinct turpentine-like odor. This glue also serves as an alarm substance, promoting assembly of soldiers and workers at points where the nest is being damaged, followed by agonistic behavior appropriate to the disturbance. The glue smells very much like the sap of the Gumbo Limbo, commonly referred to as the Turpentine tree, and if this similarity is perceived by the termites, it would be difficult for groups of workers and soldiers of this species to come to rest in or on the wood long enough to construct galleries or feed.

Preliminary experiments were designed and conducted using discs

of Sea Grape and Turpentine tree placed in plastic juice bottles with a pledget of soft paper moistened with water, one of each type of wood in each jar. Groups of 50 termites were added , and the arrangement of termites on the discs observed over a period of several days. 6 replicates yielded the information that Nasutitermes soldiers and workers gathered on and excavated in Sea Grape (5 groups), or gathered on but did not tunnel in, Turpentine tree (1 group). The discs were unsecured, and the set-up could not be moved without risk of injury to the termites, so a different design was adopted, and a slightly different question asked. In the second set of experiments, half twigs of the two sources were trimmed to fit tightly in plastic boxes, a twig at each end of the oblong box, with the cut surface of the twig in contact with the floor of the box. Groups of Nasutitermes were placed in 3 of the boxes, groups of Procryptotermes corniceps in the other 3 boxes. Procryptotermes is a member of family Kalotermitidae, a primitive dry-wood termite that does not produce a defense secretion, that had been observed attacking dead branches or injured areas of Turpentine tree stumps. Groups of nymphs approaching metamorphosis, alates, soldiers and larvae were used here, while the nasute groups consisted of 40 workers and 10 soldiers. The colonies are much smaller in dry-wood termites, and a sample size of 25 had to be employed for them. After 3 days, 37 of the original 150 N. nigriceps were dead, 4 on the Turpentine twig, 1 living soldier was on that twig, but all the rest (112) were aggregated on the Sea Grape twigs. Procryptotermes showed a very different picture : after 3 days, 17 were dead, 5 of which died attempting to eclose, a difficult procedure on the flat plastic surface. Of the living specimens that could be seen, 26 were gathered on Sea Grape, with extensive feeding and layering of pellets beside the twig, and 25 had burrowed into, or collected on the Turpentine tree. These findings suggest that the Turpentine Tree is not toxic to termites in general, but is is not a suitable food for Nasutitermes nigriceps.
Critique : Thinner twigs should be used so termites could not disappear into the wood.

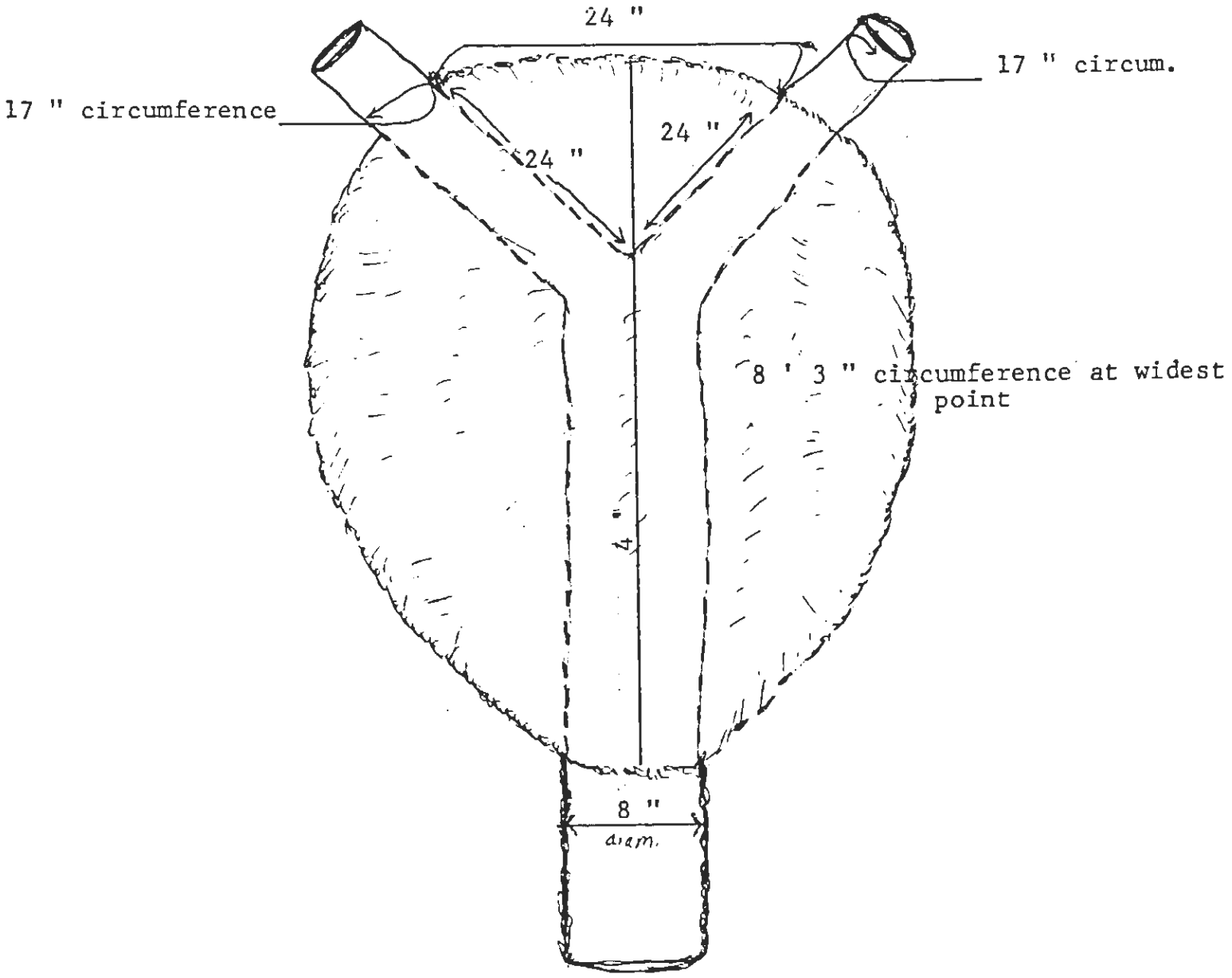
Sea Grape was not the most abundant tree in the associaton inland from White Bay, but showed a 90% infestation with Nasutitermes nigriceps. Further, Sea Grape was the only species of tree showing multiple nests (as many as 3 on the same tree). These trees were tunneled into extensively, in addition to serving as foundations for nests. Sea Grape is therefore recommended for inclusion in the dead wood supply for SBV.

Colony Organization and Nest structure in Nasutitermes nigriceps

A large nest was freed from the supporting tree (a Tamarind) near the new cistern, and dissected, with appropriate measurements. A sample of nest material was taken, refrigerated, and the termites removed from the material and preserved for subsequent counting, A diagram was prepared for computing the nest volume. The sample size, multiplied by 3 or 4, per gallon of nest material will give a rough estimate of the colony size. Several GALLONS of termite bodies were fed to the flamingos. A large primary queen was present, along with all stages from eggs to adult workers and soldiers. No secondary sexuals were found, as would be expected in this monogynous species. Samples were brought back to the Smithsonian for observation under culture. As with a previous

nest, survival in a plastic bag was good for 24 hours, and the specimens did not cut through the plastic bag.

Mushroom-shaped bodies composed of a woody material resembling compacted beetle frass were formed in a ring around the area of maximum diameter of the nest, about 3 inches inside of the outer layer of the nest, surrounding the much harder inner portion of the nest. Some of these bodies were solid, others showed tunnels with eggs and babies inside. This material may represent stored food. These bodies were observed by Thorne in Panama, who photographed them. Neither she nor I have been able to find published material relating to these bodies ; if they are stored food, this is unique among carton-nest builders. The nature of these bodies and their role in the economy of the colony should be ascertained. Dr. Thorne is contacting a potential analyzer, a chemist in Florida. I plan to determine if these bodies are present in other nests of this species, and secure samples to be frozen for subsequent study.



CISTERN NEST, Nasutitermes nigriceps , picked July, 1988

Guana Island Community Service Program

1. The interns from Tortola provided able assistance in determining the most heavily utilized species of wood in the study of the biology of Nasutitermes nigriceps. They showed skill, competence, and ready understanding of the project, and were able to make helpful alterations in the tabulating procedure, speeding up the data collection considerably. They prepared independent summaries of the project, and deserve high marks for communication skills and grasp of experimental procedures.

2. Background information on termites and other insects was provided, readings recommended, and questions invited. One of the interns, Miss Lettsome, showed a marked interest in continuing some type of scientific study.

3. The interns were invited to summarize their experiences, the development of new understandings, and the over-all value of the internship experience apparent at this time. Copies of their evaluations will be made available upon request. The primary conclusion coming from their responses is that this internship is so valuable that it should be made more widely available to interested students on Tortola.

4. Public presentations were made at the High School, the Governor's Residence, and to the Garden Club.

Proposed New Studies

1. The distribution of reproductives in satellite nests of *N. nigriceps* should be determined.
2. The "mushroom bodies" should be scrutinized with respect to nature, origin and function.
3. The value of abandoned termite nests in soil enrichment should be tested, along with the feasibility of luring colonies away from buildings using Sea Grape for bait.
4. The juvenile crabs found in the algal turf on the rocks near the jetty may well be *Mithrax* ; if so, providing rafts to trap algae and an enclosure to protect the crabs may prove to be a feasible way to obtain edible and delicious crabmeat.
5. If expansion of the instructional program is desired, marine forms could be incorporated into the study by creating a beach-house type building near the edge of the water, provided with a pump for circulating sea water and observation vessels for housing marine animals for temporary maintenance. This would obviate the problems associated with deep diving, but permit observation of a beautiful and interesting fauna.

The Conservation Agency

Exploration, Education, and Research

President
James D. Lazell, Ph.D.
401-423-2652

6 Swinburne Street
Conanicut Island
R.I. 02835 U.S.A.

December 13, 1988

Dr. Margaret Collins
1642 Primrose N.W.
Washington, DC 20012

Dear Margaret:

I am solidifying plans for the July session on Guana. I have you and Bambi Thorn listed for 14 days each, 28 days total.

Henry wants to keep total bed-nights (=days) to 425, our 1987 figure. Last year we went over 500. Trimming the October-November session down to 270 leaves 155 for July. Greg needs at least four assistants to do his annual July lizard triple-catch on three plots. This is important because if we switch to October-November we must have comparable July data in the same year.

I've trimmed Greg and his crew, therefore, to 97 days total. (Liao counts a full 30). If you feel you need more time, call Greg and wheedle: 617-492-1872 (home).

If you feel you could make do with less time, call Greg anyway: he'll be overjoyed because he has a really high-pressure schedule as things stand.

I'm gone to Brasil and Vitor on 27 December. I'll be back 4 February at 1140 Monroe Street, Jackson, MS 39202 (601-355-4243).

Have a great Holiday Season ....

Love,

Skip

EARTHWORMS

The ongoing saga of Guana's remarkable earthworms continues here apace. The story of the earthworms is getting good enough to consider whipping into a short story for a literary review. I anxiously await the word from my first colleague at Maharishi U.

BERNICE PAUAHI BISHOP MUSEUM 1889

B I S H O P M U S E U M

1525 BERNICE STREET • P.O. BOX 19000A • HONOLULU, HAWAI'I • 96817 0916 • (808) 847-3511

1 August 1988

Dr. Donald P. Schwert
Department of Geology
North Dakota State University
Fargo, ND 58105

Dear Don:

Did you have any comments on the 3 Guana Island earthworms I sent you in June 1987?

I have just returned from another trip to Guana Island, and it was a good season for earthworms. We have a fair series, (hopefully) well preserved. Would you like to see them?

Skip Lazell is still eager to learn the identity of the Guana Island earthworm(s).

We look forward to any comments.

Best regards,

Scott E. Miller
Chairman
Department of Entomology

SEM/tmk

cc: J. Lazell

B I S H O P M U S E U M

1525 BERNICE STREET • P.O. BOX 19000A • HONOLULU, HAWAI'I • 96817-0916 • (808) 847-3511

August 23, 1988

Dr. Donald P. Schwert
Geology Department
North Dakota State University
Fargo, ND 58105-5517

Dear Don:

Thanks for your letter of 17 August. I'm sorry you've left the earthworm business, but I guess that leaves more time for fossil insects!

I am writing Sam James about the worms.

Please keep me on your mailing list for fossil insect papers!

Best Regards,

Scott E. Miller
Chairman
Department of Entomology

cc: James Lazell

SEM:jlf

B I S H O P M U S E U M

1525 BERNICE STREET • P.O. BOX 19000A • HONOLULU, HAWAI'I • 96817-0916 • (808) 847-3511

August 23, 1988

Dr. Samuel James
Department of Biology
Maharishi International University
Fairfield, Iowa 52556

Dear Dr. James:

For several years, I have been working with Dr. James Lazell of the Conservation Agency on a biological survey project in the British Virgin Islands. During this time we have accumulated several lots of earthworms.

Don Schwert looked at the early lots and had trouble identifying them, due largely to poor preservation. We now have better samples, but he is out of the earthworm business and suggested that I contact you.

The worms are all from Guana Island, a small but well vegetated island near Tortola. The basic question is are these worms native or introduced? The island is now well covered with native vegetation, but was used long ago for sugar and other agriculture.

Would you like to see these specimens?

Sincerely,

Scott E. Miller
Chairman
Department of Entomology

cc: James Lazell

SEM;jlf

BISHOP MUSEUM
1525 BERNICE STREET • P.O. BOX 19000A • HONOLULU, HAWAI'I • 96817-0916 • (808) 847-3511

September 14, 1988

Dr. Samuel W. James
Department of Biology
Maharishi International University
Fairfield, Iowa 52556

Dear Dr. James:

Thank you for your letter of 30 August. Under separate cover, I am sending two lots of earthworms from Guana Island. Three (numbered 30692-30694) are from July 1986 (the tags are MCZ herpetology field tags, the specimens do not belong to the MCZ). The others were collected in July 1988.

Thank you for your interest in these worms. We are looking forward to your comments.

Sincerely,

Scott E. Miller
Chairman, Department of Entomology,
and Acting Assistant Director
for Research and Scholarly Studies

cc: J. Lazell

SEM:jlf

B I S H O P M U S E U M

1525 BERNICE STREET • P.O. BOX 19000A • HONOLULU, HAWAI'I • 96817 0916 • (808) 847-3511

October 19, 1988

Dr. Samuel W. James
Department of Biology
Maharishi International University
Fairfield, Iowa 52556

Dear Dr. James

Thank you for your prompt response.

The Hawaiian earthworm discussion was exactly what I had in mind. Thank you for preparing it for us. I am enclosing copies of the two Beddard papers. If they change your conclusions, please let me know. Presumably we have one third of Perkins' specimens in the Invertebrate Zoology Department here.

On the Guana Island earthworms, are you interested in publishing anything on these worms? Or would that require more material? James Lazell, the project coordinator, is eager to see publications on the Guana collections.

Thanks again for your help.

Sincerely,

Scott E. Miller
Chairman
Department of Entomology

cc: Allen Allison, Bishop Museum
James Lazell, The Conservation Agency

Enclosure: Beddard, 1896, 1900

SEM:jlf

Samuel W. James
Department of Biology
Maharishi International
University,
Fairfield, Iowa 52556 USA
515-472-5031 x3335
-1200 111 3335

October 29, 1988

Dear Dr. Lazell:

Recently Scott Miller sent me some earthworm specimens collected by you, Bush, and Jenkins on Guana Island. These include #Z30692-4 and some labelled 5-15 July 1988. I would like to have the information from your field notes on these worms, and any other solid impressions you may have on the vegetation, the climate, and the degree of disturbance of the site(s). I identified them as *Trigaster intermedia*, a species endemic to the Virgin Islands. Species of this genus are known from other of the Greater Antilles and Central America. It is my goal to make collecting trips to the region and work up the biogeography of Caribbean earthworms.

For the present, I hope to be writing a note about the Guana worms, since I was able to detect some previously unknown details of the structure of the excretory and circulatory systems. If you have a suggestion for a place of publication, I would be grateful.

I will be happy to look at any further earthworm collections you might make. However, please take the trouble to kill the worms in alcohol and harden them in 5% formalin. Then they can be stored in alcohol. The July 1988 lot is very soft and hard to work with. Details are not visible, in stark contrast to the excellent state of preservation of the Z30692-4 series. Whatever you did to them would be fine for future collections.

Sincerely,

Sam James
Assistant Professor

The Conservation Agency

Exploration, Education, and Research

President
James D. Lazell, Ph.D.
401-423-2652

6 Swinburne Street
Conanicut Island
R.I. 02835 U.S.A.

November 7, 1988

Dr. Samuel W. James
Department of Biology
Maharishi International University
Fairfield, IA 52556

Dear Sam:

Delighted to hear from you! We've been puzzling over those worms for years. We have been told all sorts of ways to preserve them, accounting for the mixed results. We will hereafter follow your directions, or, better, come to Guana next October and collect your own.

I enclose a Guide describing the Island. We find the worms only in the wooded areas of the Island, especially in ravines (called "ghuts" in the BVI). I enclose Tom Sinclair's map of Amphisbaena localities. He collected all the 1988 worms, always in close association with Amphisbaena fenestrata (a limbless "worm" lizard).

My first encounter with a Guana worm was 8 April, 1984. Dr. William MacLean unearthed it in Quail Dove Ghut at ca 100 m (indicated on map). It was tightly balled and quite hard. I pickled it as was in CH 2 0, so it apparently can never be unwound. It went to Dr. Donald D. Schwert, Dept. Geology, North Dakota State U., Fargo, ND 58105. In a letter dated 31 May, 1984, Schwert says he is returning the specimen to Scott Miller. He says "I have never seen anything quite like this worm. It certainly is not normal for a worm to assume such a perfectly-coiled position upon death." Of course, the worm was presumed alive when pickled.

Guana worms apparently assume the coiled, "ball" condition to avoid desiccation. We often find them this way, but now put them in damp paper towels until they uncoil.

I have no field notes on Z30691, collected by Jenifer Bush, 7 July, 1986. We were working at various places on Guana that day, but I neglected to note just where she got the worm.

The other two, Z30693-4, were collected by me and Robert Jenkins, respectively, in Pinguin Ghut (see map) near sea level. Both were in compact soil riddled

with tunnels. We turned over rocks and dug beneath them. We got termites and one Amphisbaena.

Guana Island is remarkable for its fine, old-growth woodlands. It was never clear-cut. The worms, like the otherwise rare Amphisbaena fenestrata, seem to reflect the good soil conditions within these woodlands. In November, 1985, after Hurricane Klaus, we found dozens of worms washed out in ravine beds. We preserved some for Schwert, but they were in poor condition. I believe that in the rainy season, September to November, you could collect hundreds of these worms.

I cannot imagine where one might publish on them. A remote possibility would be Breviora, Museum of Comparative Zoology. To do this, we would have to coauthor, because I am on staff (a requirement for publication). You would be senior author, describing the worms; I would be junior author, describing their habitat. We would have to deposit the specimens at MCZ (at least most of them). I think it is better if you do the whole thing and publish in a regular journal - if there is one appropriate!

The Z30692-4 series were preserved in ice-cold 70% ethanol in a refrigerator. The 1988 worms were just dropped into 70% at room temperature. For some reason, Schwert said not to use formalin.

Best wishes,

Slip Lazell

James D. Lazell, Ph.D.

jsc

CRUSTACEANS

My enthusiasm for land and fresh water crabs, shrimps, etc. continues, and I would very much like to find a student interested in these. Dr. Chace, at Smithsonian, is retired. No one else is coming along there. He remains interested, and we have built up a fine basic collection there.

This year Chris Henderson, assistant to Dr. Karen Koltes, had spare time and initiated a mark-recapture study of the porcellain crab, Petrolistes quadratus. This small species has a very hard, thick shell and is quite brittle - thus its name. It was described from Ponce, Puerto Rico and is known from three or four other localities, including Dominica, but had never previously been recorded in the Virgin Islands.

Chris's report herewith. She didn't know what to do with numbers, so the scribblings are all mine. Her recapture data are poor, but not useless. She found a point estimator of 81 crabs, 95% confidence interval 34 - 196, in 128 m^2 sampled. Density estimate, therefore, is 0.6 crabs per m^2. This accords well with her original catch data, assuming she could not catch all in the original 48 m^2 searched: she got 26 initially, 0.5 per m^2.

Small studies of this sort are rarely done, but are easy and fun and produce facts quite unknown. Of course I encouraged her to write it up better and try to get it published.

National Museum of Natural History · Smithsonian Institution
WASHINGTON, D.C. 20560 · TEL. 202-357-2637
NHB Stop 163

377416
380031

October 18, 1988

Dr. James D. Lazell
The Conservation Agency
6 Swinburne Street
Conanicut Island, Rhode Island 02835

Dear Skip:

Thank you for your letter of September 16. The three additional lots of specimens mentioned therein arrived just as I returned from a week's "leave" in Tiverton. I had delayed working up the 1988 BVI material delivered by Scott Miller until the collection data arrived, in order to avoid the chore of a double-labeling session. My identifications are as follows:

Z-36381-2. Gecarcinus ruricola (Linnaeus, 1758): 1♂ 1♀

Z-36397. Grapsus grapsus (Linnaeus, 1758): 1♂

Z-36398. Gecarcinus lateralis (Freminville, 1835): 1♂

Z-36403. Coenobita clypeatus (Fabricius, 1787): 1♂

Z-3640-5. Geograpsus lividus (H. Milne Edwards, 1837): 2♀ (1 ovig)

Z-36406. Gecarcinus lateralis (Freminville, 1835): 1♂

Z-36407. Uca burgersi Holthuis, 1967: 5♂ 2♀

Z-36408. Cyclograpsus integer H. Milne Edwards, 1837: 2♂ 2♀ (1 ovig)

Z-36409. Sesarma (Holometopus) roberti H. Milne Edwards, 1853 ?: 1 juv.

BVI: Guana I.; C. Henderson, 29.vii, 88: Petrolisthes quadratus Benedict, 1901: 4♂ 1♀

" " " " " " " " : Ozius reticulatus (Desbonne & Schramm):1867): 1♂

Ditto : Sesarma (Holometopus) roberti ? H. Milne Edwards, 1853: 1 juv

I am assuming that Specimen Z-36382 (not included in your list) was found at Marina Cay, like the male of Gecarcinus

ruricola (Z-36381). If I am wrong, please let me know at your convenience.

There appears to be a good reason why you have been unable to find my letter on Specimen Z-28393 that you collected on Guana last year. After a considerable search, we finally found the female that I had identified as Geograpsus lividus, but there is no evidence that I ever reported the determination to you. That specimen has a carapace length of 24.8 mm--the exact maximum size of the species reported in the literature. Specimen Z-36404--the nonovigerous female in the above list--is slightly larger, with a carapace length of 26.0 mm. The Dominica specimens covered in Chace and Hobbs (1969:159) were all quite small, which justifies your query about conspecificity.

You did answer my inquiry (which followed you to China) about South Cockroach in your letter of April 2, 1987. I had some trouble with Marina Cay and South Carrot Rock, in the current list, neither of which is in the NIS Gazeteer that we rely on for geographic names, but I finally found them both in the Sailing Directions.

Thank you for permitting us to keep this collection. Most of your welcome donations consist of relatively common species, but even those are not always represented in study collections by such carefully preserved material.

Sincerely,

Fenner

Fenner A. Chace, Jr.
Zoologist Emeritus
Department of Invertebrate Zoology

STUDY OF THE POPULATION AND TRAVEL DISTANCE OF AN INTERTIDAL DECAPOD, *Petrolisthes quadratus*.

This study of an intertidal crab, *Petrolisthes quadratus*, was done in an attempt to determine the population size and travel distance associated with a particular rocky shore habitat. A mark-recapture technique was used with the results being computed by the Lincoln index. At the time of the study this was an unidentified species in the Porcellanidae family. Very little was known of the natural history of the study subject.

A workable number of crab individuals was located on a northeast facing shore of North Bay on Guana Island, British Virgin Islands. This is a rocky shore of eight meters depth at low tide and several hundred meters long. The rocks consisted of coral rubble, granite and volcanic stone. The range of rock size was from a few millimeters to 1.5 meters in diameter. The majority were less than 1.0 meters. During mild weather conditions the wave action was minimal.

The crabs were never found exposed. They were located only when rocks were lifted and turned over. The crabs would either be clinging to the underside of the rock or among the smaller rocks underneath the one removed. All the crabs observed, whether tagged or their occurrence simply noted, were at or above the existing waterline. The highest point above the waterline was 340 centimeters. They could have been residing higher although this would have been unusual as their preference seemed to be damp substrate. These crabs were never observed in the dry areas sampled. The 340 cm mark was at the edge of the damp-dry boundry. The individual located at the waterline wasn't actually submerged. The rock it was under was in standing water. These crabs were never found submerged.

All work was conducted between 0810 and 1650 except the last survey which was from 1730-1900. No attempt was made to determine their nocturnal activity.

A transect line was utilized using a nylon rope. The ends were tied to rocks and the rope was stretched out parallel to the waterline at the high tide mark. The rope was marked in meters for a total of 24 usable meters. At every meter mark a meterstick was extended perpendicular to the rope on the high and low sides. All movable rocks along this two meter transect were lifted to check for crabs. Lifting and replacing the rocks was done carefully and as close to the original position as possible. As long as part of the rock was within the transect line it was considered potential habitat.

Attempts were made to capture all *Petrolisthes quadratus* with a carapace width of 3.5 mm or greater. Anything smaller than that was not workable.

If this study was to be repeated, the tagging method would have to be changed. It proved to be injurious to the specimens. The method used was to tie small pieces of colored thread to one or both chela. Ten different colors of thread were used in various combinations to tag each crab differently. Unfortunately, on several occasions the chela of a crab would break off while tagged. Also, although not proven, it is suspected some crabs

lost a chela after tagging and release.

The time span of this study was from July 19 through July 29, 1988. Mark-recapture sessions were done on three nonconsecutive days, July 19, 21, and 23. On July 27 a survey was conducted to measure the distance from waterline for any *Petrolisthes quadratus* found. Then on July 29 a general population count was taken and specimens were collected.

Data for marking and recapturing:

7-19 26 crabs tagged

7-21 3 tagged
1 recaptured, 1st capture at meter 20, 90cm high side
2nd capture at meter 22, 10cm high side TD = 212c

7-23 3 tagged

7-29 1 recaptured, 1st capture at meter 10, 20cm low side
2nd capture at meter 10, 85cm low side TD = 65cm

TABLE

	M	n	R
I	26	-	-
II	26	3	1
III	28	3	1

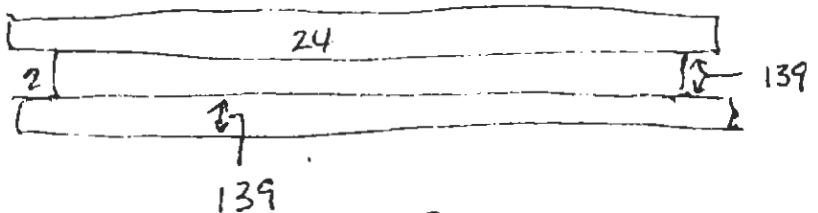
PE = 81; 34 ~ 196 = CI

Travel distances: 212 cm and 65 cm. Average 139.

Grid size: 24 x 2 = 48 m²

Long edges, $2 \times [(139 + 139 + 2400) \times 139] = 744484$ ~~cm²~~ m²

Ends, $2 \times [200 \times 139] = 55600$



48.00
74.45
5.56
128.01 m²

AREA SAMPLED: 128 m²

ARCHEOLOGY

Herewith Holly Righter's report. I am forced to admit a definite lack of enthusiasm for Guana archeology. This does not stem from lack of reverence for the human past. Quite the contrary, I have been brought up with a keen appreciation for antiquities. My experiences in Asia have focused my overview of human history and its relics.

My tastes are simply too refined. It is obvious to me that Guana's previous inhabitants - Arawaks, Caribs, and Quakers - were to a one dull, brutish dolts. It is simply not, in my opinion, worth the time it takes to dig up their thoroughly unattractive leavings. I have seen better fish bones in a can of sardines. The quality and patterns of their table ware are still readily available today at K-Mart, in the unbroken condition.

I have been very disappointed with the results so far. I had hoped for interesting bones: iguana, tortoise, large birds, or the porcupine-sized rodents which once lived in these islands. Not a splinter. They ate fish and sheep. What with the cutback in bednights for 1989, I have not included archeology in my proposal for future work. Should you want archeological work continued, let us switch it over to the arts until such time as it produces results worthy of the sciences - to wit, something of biological significance.

I happily leave it to you, Michael, and Holly to either fit archeology into a new scheme of funding or leave the rubbish in the ground. In all that digging, they have yet to find a Typhlops. Michael's work on bones - paleontology - is science and has real biological significance. I await his written submissions with interest.

The touted Chinese coin no doubt came from my desk top in Al, donated to the archeological cause by some blade in the lizard business, but not directly by me.

GOVERNMENT OF THE VIRGIN ISLANDS OF THE UNITED STATES

DEPARTMENT OF PLANNING AND NATURAL RESOURCES
#179 ALTONA AND WELGUNST
CHARLOTTE AMALIE, ST. THOMAS, V.I. 00802

November 9, 1988

Dr. James Lazell
The Conservation Agency
6 Swinburne Street
Conanicut Island, Rhode Island
02836

Dear Skip:

How are you? I heard that, following the July session on Guana Island, you were in St. Thomas briefly. I am sorry to have missed you.

Our Earthwatch project took a turn for the worse after Guana, and then a turn for the better with the last group. All in all, it was a successful experience and I feel that I learned a lot. In fact, I empathized with you during our sessions. The experience of being in charge and carrying responsibility for the logistics (fielding complaints and scheduling daily events) is quite different from being the happy scientist pursuing his research goals. I had not realized previously the sense of obligation that hangs over one constantly. Now that Earthwatch is over, though, I am glad we did it, and we certainly covered a lot of ground.

I would like to report on the work that Isabelle and I did at Guana Island between July 10, 1988 and July 18,1988, to wit:

Research consisted of five parts:

1. Careful excavation of a small portion of a known prehistoric archaeological midden identified during the 1987 systematic subsurface testing program. The purpose of such excavations was to carefully record and recover archaeological material which, with the assistance of Michael Gibbons at the University of Massachusetts, Boston, would be subjected to further detailed analyses. It was anticipated that information obtained from the analyses could be usefully integrated with other research underway on Guana Island.

Two one-meter square pits were opened in the vicinity of Test Pit 3 of the previous year. The first pit yielded very little cultural material and was discontinued at 10 centimeters below surface.

The second one-meter square pit opened a few meters northwest of the first was rich in materials which appeared to be in an undistrubed condition under the sod. Soils of the one-meter square were screened through three sizes of screen mesh. Materials collected included all bone fragments from the three grades of screen mesh; all marine shells except for unidentifiable bits of broken shell which could not contribute MNI (minimum number of individuals) statistical information; all ceramic sherds; all lithic

materials; organic plant remains; land snails and soil samples. Bone material was submitted to Michael Gibbons for analysis. Shells were catalogued by E. Righter and examined for evidence of alteration by human agents. Larger ceramic sherds were preliminarily catalogued. Some soil samples were floted with negative results. Other samples were retained for pollen and phytolithic analyses and for chemical analyses. It is hoped that such analyses may permit recognition of climatic changes, eustatic and tectonic changes, and environmental changes, both natural and man-induced. Also recovered in the top ten centimeters of soil was a Chinese coin of unkown provenance. This coin was the only indication of possible disturbance to the stratigraphy.

During 1987, charcoal samples were collected and radiocarbon dated, but there appeared to be an error in the date. It is hoped that further treatment of a charcoal sample recovered from Test Pit #1 during 1987 will provide either an explanation for why the date appears to be incorrect or will result in a date which will provide a date of occupation for the later component at the site.

2. Testing of a circular "feature" which appeared as an unvegetated area within the area of prehistoric occupation. With the assistance of Louis Potter and his wife, two trenches which bi-sected the circular area were opened. Few prehistoric artifacts were found and it was determined that the feature was the result of modern activity; probably an activity associated with use of the area as a golf course.

3. Mapping, recording and photography of two historic structures near the beach in the vicinity of the prehistoric site. Utilizing tapes and compasses, a reasonably accurate map was made of a limited section of the flat plain on the south beach area of Guana Island.

4. Investigation and preliminary recording of the ruins of the Lake House and outbuildings on a hill across from the Guana Island Club

5. Survey of other cays in the vicinity of Guana Island. The goal of such survey was to place the prehistoric site at Guana in the context of other sites in the area. Because no official prehistoric site survey has been conducted in the British Virgin Islands, the prehistory of the islands is poorly known and virtually unrecorded. A few ceramic sherds similar to those recovered from Saladoid series sites in St. Croix were recovered from the one-meter square excavation at Guana Island. The assemblage from a probable later component of the Guana Island site has not yet yielded material cultural remains similar to more elaborate sites known from St. Thomas or from West End, Tortola. The Guana Island site is, in this respect, unusual. Explanation of the deposits at Guana Island and their apparent "unusualness" can be assisted by a better knowledge of other sites in the area.

I will be waiting to hear from Michael Gibbons as to the results of his analyses. Guana Island contains a wealth of historic and prehistoric archaeological material which could contribute to an understanding of both prehistoric and historic settlement patterns, land use, economics and culture. Archaeological work that could and should be conducted in the near future at Guana Island includes the following:

1. Completion of the cataloguing, photography, and analyses of recovered materials stored at the Guana Island Club. Preparation of some of the artifacts for exhibit; and perhaps exploration of the possibility of establishing a permanent exhibit at the Club.

2. Additional accurate mapping of the prehistoric site and its environs. It might be possible to borrow a transit and stadia rod from someone on Tortola.

3. Testing and further recording of the remains at the Lake House. Collection of oral history accounts from Oscar.

4. Historical research locally in the Tortola archives.

5. Analysis of wood samples from posts in structures at the south beach

6. Additional data recovery from the prehistoric midden.

7. Additional survey of surrounding cays and sites (if possible).

This years' investigations on Guana Island went very well and it was nice to have Isabelle's help. Thank you for, once again, providing a means of pursuing archaeological research on Guana Island. I hope that the results will be of interest to the Jarecki family and to some of the natural scientists. I look forward to seeing you next year, if not sooner. If I am in your area of Rhode Island any time, I will look you up. Take care, and please let me know if you need more information.

Best wishes,

Elizabeth Righter

PROPOSALS FOR FUTURE WORK

As presently conceived, 1989 work will take place in two sessions: July and the month before Thanksgiving, ca 20 October to 20 November. The total number of bed nights will be held to 425, divided as 155 for July and 270 for October - November. The only projects for which definite proposals have been made are ornithology, herpetology, and entomology.

Ornithology so far involves only Liao for sure, and we count the 60 days he is with us in both sessions against our 425. We do not count the remaining ca 230 days (bed nights).

Herpetology involves me, Greg Mayer, and assorted field assistants - one of whom, in October - November, gets the traditional airfare as my official assistant: unpicked as yet. Our work will dominate both sessions in 1989.

Entomology involves Margaret Collins and Bambi Thorne in both sessions, but both pay their own airfares. In the October - November session, Scott Miller plans to return and we have one other entomology airfare. Scott will decide who to grant this to - we hope Vitor Becker will return.

Two proposals for new work have been received. Nancy Linsley wants to come and monitor sea turtle nesting. She can pay her own airfare. I think this is an excellent idea and have written Dr. Karen Eckert, of WIDESCAN, the Caribbean sea turtle project, for her views. We would need her cooperation to get calipers, taggers, and tags. I have not considered including Nancy in 1989 plans because I cannot afford the bed nights for her. I think this project will have to be reconsidered for 1990.

Dr. Peter Chabora's porposal for work on insect parasitoids looks very promising. He does not need airfare. I have forwarded his letter to Scott for an expert opinion. If Chabora comes, it would be in October - November.

July, 1989

The 155 bed nights are allocated as 30 for Liao, 14 for Margaret Collins, 14 for Bambi Thorne, and the remaining 97 to Greg Mayer to parcel out for himself and assistants. Greg's is the only airfare we pay in this session. I have planned not to be on Guana in July. If and when flamingos become available, that might change, but we have always regarded flamingo travel and financing as a separate matter.

October - November, 1989:

Ninety of the available 270 bed nights are claimed by me, my assistant, and Liao. In addition to these three airfares, we have traditionally awarded two for entomologists and one for ornithologist. We may have to use one of these for Greg Mayer, or he may be able to get his own through Smithsonian, where at that time, he will theoretically be a post-doctoral fellow. A total of seven airfares is as in previous years: Liao, Lazell, Lazell's assistant, Myer, two entomologists, and an ornithologist. (I count herein Mayer's July airfare only.)

The remaining 180 bednights for October - November are as yet unallocated. I assume Mayer, Miller, and the second entomologist will use at least 60 (20 each).

I have not totalled up my time yet, but will soon. I've been holding off, hoping to get going on the new Guana Guide, but won't be able to start that now until after Brasil in February. Mocatta has a credit balance with us at present resulting from your unconsumed Philippine grant and a few hundred over on the last Guana grant. That will predictably get eaten up.

More later .....

All the best,

James D. Lazell, Ph.D.