p.626 Bone cutters { Shears. 310A381 5.00
82 6.25
83 3.00

large skinning knives —

p.626 small skinning knives —

p.626 bone saws { large 310 A 38 5.50
small 310 A 80 @ 1.50; 2 = 3.00

main book

✓ cutting pliers for wire 2 pr.

flat files for taxidermist use coarse, med., + fine 3 =

3 cornered files, " " " fine,

✓ tape measures —

oil stones a carborundum for knives + scalpels coarse fine

assorted needles —

assorted thread —

sacks + canvas needles 3 corner assorted

✓ flash lights 3 cell — 6

Head lights — 6

✓ geological hammers 1 doz

✓ Hatchets (small hand) 3 (4)

✓ machetes — (over) 2 doz — [illegible]

p. Egg drills

Blow pipe to use with

Machete

Collins & Co.
Hartford Conn.

"Legitimus" No. 222
19 inch long blade
2 1/8 inch wide
with leather scabbard

p.624 Forceps. 310 A 355 11 1/4 inch.	6 doz @ 2.50 ea.		180.00
Collin for forceps (dental) @ 1.00	2 doz		24.00
p.623 310 A30	doz	@	5.50
302	"	"	6.50
31	"	"	5.50
311	"	"	5.50
p. 622 Scalpels			
310 A 202	doz @ 2.00 ea		48.00
p. 620 Scalpel. 309 A 11	doz @	"	7.20
309 A 12	doz @		6.50
p. 623 Scalpel invalid 310 A 29	3 handles @ 1.25 ea.		3.75
Blades for 310 A 392 6 each style @ 1.00 the package.			8.00
p. 622 Hooks & chains 310 A 23	4 @ 35		1.40

~~Scissors~~

Shears, paper 10 inch 3 =

6 inch 3 =

p. 625 Scissors

310 A 372	~~doz~~ 6 ea:		5.50 ~~11.00~~
36	~~"~~ 6 ea:		4.20 ~~8.40~~
61	6	"	5.20 ~~10.40~~
62	6	"	6.00
(Schedule) 79	6	"	13.20

Glass dishes

~~Stender~~

pp. 353, 354 Stender (high.)

320 A 60 A 3 doz. = 16.50

61 (low) "C" 3 doz = 12.00

Syracuse watch glass → 320 A 631 3 doz 9.00

Embryologica → 320 A 636 3 doz 21.60

LeFever dish → 320 A 66 1 doz 5.00

get this in addition to ordinary watch glasses on Stempson list.

p. 636 Funnels size E, 315 A 16 @ 85; 3 = 2.55

p. 650 Staining dishes 320 A 36 3 doz = 15.75

p. 641 Battery jars 315 A 65 "B" = 6 inch 2 doz = 33.60

"E" = 9 inch 2 doz = 65.00

p. 637 Culture dishes Size A. @ 1.50 / 1 doz = 18.00

p. 637 Finger bowls

Size A. @ .35; 3 doz = 12.60

B @ 1.00 2 doz = 24.00

Petri dishes

(?) Size A 50 mm 1 doz prs. = 3.25 2 doz = 6.50

C 100 mm. 1 doz = 3.75 2 doz = 7.50

D " 1 doz. 3.75 " = 7.50

E " 1 doz 11.00 = 11.00

in addition to type list.

p. 637 Glass cylinders 100 cc 3 @ 85 = 2.55

1000 cc 4 @ 2.25 = 9.00

p. 275 50 drills

130 A 86

single A 1.75

B 1.75

C 1.75

D 1.75

E 1.40

F 1.40

gear 2 ea

Reamer

130 A 83

A 1.25

B 1.10

130 A 821

p. 627 Spinner each. 1.35

Instruments, Field lenses etc.

* Sextant 150
* Telescope for bird observation 55
  extra eyepiece 19
* Chronometer (at least one good one) — Call Naval Obs. re this
* Stop watches ~~2 or~~ 3
* Hand compass 3 or 4

p.661 Interval timers 2 @ 6.25 12.50
~~p.661.~~ (get in addition [illegible])

Alcohol meter 10 or dozen
p.634 Injecting syringe 31 0 A 701 40 cc. @ 3.45 3 = 10.35
Needles for above size 18 1 doz. size 19 1 doz 2.40
p.681 Triple balance 375 A 11 10.00
weights ? ~~16 24~~ ~~16.50~~

p.662 Hand magnifiers, triple aplanat
Folding 3 of (10X) @ 7.50 22.50
2 of 14X @ 7.50 15.00
Spencer 3 of 7X

* order now because of possible delays due emergency

NOTICE FOR AMERICAN YACHT CLUBS

The American Committee for International Wild Life Protection wishes to call your attention to recent mandates of the Government of Ecuador concerning hunting and collecting on the Galapagos Islands.

This decree sets aside various islands as National Parks and Nature Reserves and forbids visitors to destroy or carry away in a living state the peculiar and interesting mammals, birds, and reptiles of the Archipelago.

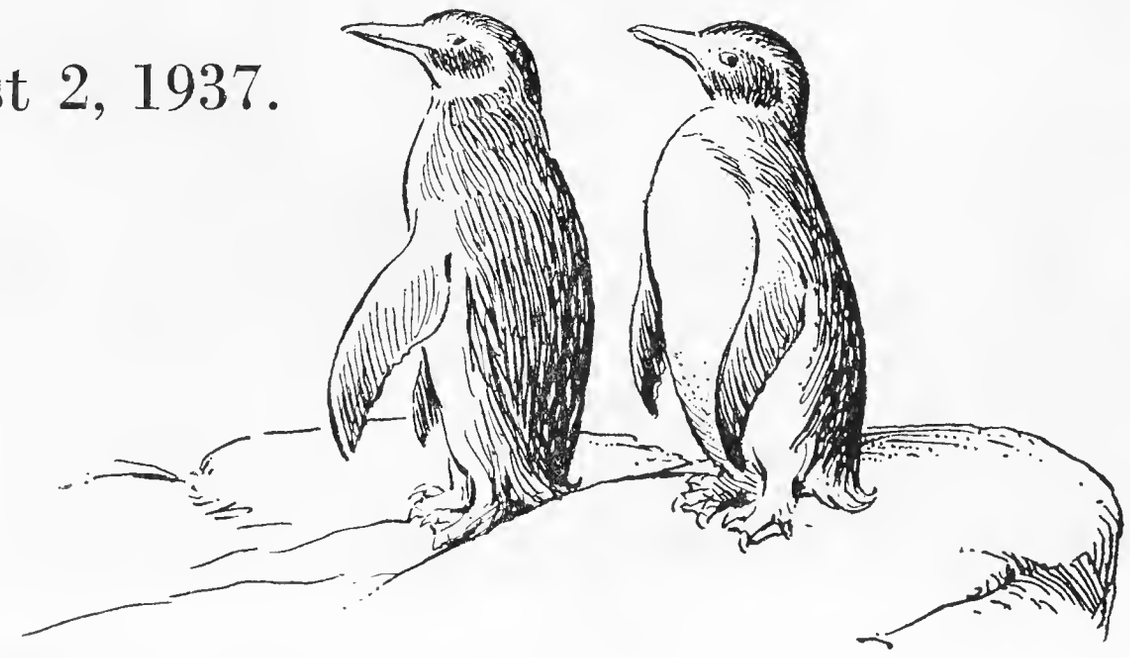
Excerpts from the Official Ecuadorian Register of August 31, 1934, and the Supreme Mandate of May, 1936, define the intention of the Ecuadorian Government to protect the unique fauna of these islands, made famous since the time of Darwin on his Beagle Voyage.

Depredations by thoughtless persons, some of them yachtsmen, have made this action necessary. The U. S. Tariff Act of 1930 (Section 527 a) reinforced by customs order T.D. 48173, of February 20th, 1936, makes it mandatory to confiscate at our borders all examples of Galapagos fauna, alive or dead, that are taken contrary to Ecuadorian Law.

More detailed information can be supplied by the American Committee for International Wild Life Protection, Cambridge, Mass.

J. C. PHILLIPS,
Chairman.

August 2, 1937.



REGISTRO OFICIAL,
No. 463,
April 13, 1937,
Quito, Ecuador.

(Translation)

No. 192--B

FEDERICO PAEZ

In Charge of the Supreme Power of the Republic

CONSIDERING:

That lately explorations of all kinds have increased in the territory of the Republic by individuals from other countries who are carrying out botanical, zoological, mineral and other investigations without the control of or permission by the State;

That the State, as the owner of all territorial wealth which has not yet been adjudicated, has the duty to regulate and protect it,

DECREES:

Article 1.--Every person desiring to explore the botanical, zoological, mineral and every other kind of wealth in the public lands of the State must obtain previously a certificate of exploration in the General Direction of the Oriente.

Article 2.--For the said certificate a fee of one hundred dollars for six months will be paid. Expeditions of more than one person shall pay, in addition, twenty-five dollars for each explorer.

Article 3.--The Government may grant a certificate of exploration without the payment of the respective fee to expeditions sent by legally constituted museums, universities or scientific societies.

Article 4.--The State when it deems it expedient shall designate special agents to accompany the expeditions in the capacity of observers.

Article 5.--The authorities shall have the right to demand from each explorer the presentation of the respective certificate and in the event of not having the same, they will send him under custody to the interior of the country to be placed at the orders of the Police authorities.

Article 6.--The Ministers of Government and of the Oriente are charged with the enforcement of present Decree.

Done in the National Palace at Quito, November 27, 1935.

(signed) FEDERICO PAEZ.

The Minister of Government,

(signed) A. A. BAYAS.

The Minister of National Defence,

(signed) G. A. ENRIQUEZ.

EJS/wbs.

COPY

EXCERPTS FROM THE REGISTRO OFFICIAL

Quito, August 31, 1934

ANO 1 No. 257

PODER EJECUTIVO
No. 607
ABELARDO MONTALVO,
Encargo del Poder Ejecutivo,
Arts. 74-90-91-92-93-94-95 & 99

PARTE TERCERA
Cacería en el Archipielago de Colón
Asilos reservados o parques Nacionales

Art. 74o.-Las Islas del Archipiélago de Colón que se nombran en este artículo podrán ser declaradas por un período ilimitado de tiempo como ASILOS RESERVADOS o PARQUES NACIONALES para toda clase de aves, animales, reptiles, tortugas terrestres (Galápagos), tortugas marinas (largartos) o cualquiera otra especie de vida zoológica. Dichos Asilos Reservados o Parques Nacionales podrán ser declarados como refugios invioables para toda clase de vida zoológica, ya sea residente o migratoria.

Las Islas o regiones isleñas de que aquí se habla son les siguientes: Isla Española (Hood), Isla San Salvador (James), Pinzón (Duncan), Santa Fé (Barrington), Rábida (Jervis), Las Islas Seymour, Daphne, Tower, Marchena (Bindloe), Pinta (Abingdon), Wenman y Culpepper y una parte de la Isla Isabela (Albemarle) que principia de la Punta Albemarle y se extiende hasta dos millas más allá de Tagus Cove (Ancón de Tagus) y comprende la zona de una milla hacia el interior de la isla desde la playa en baja marea.

Prohibici ones para cojer, perturbar o matar ciertas especies, de la fauna del Archipiélago.

Art. 90.-Nadie podrá cojer, perturbar, hacer daño, capturar o matar las siguientes especies en ninguna parte de las Islas del Archipiélage de Colón,

ni tampoco turbar la tranquilidad de los nidos o huevos de las especies que en detalle son: la foca de piel peluda (Arctocephalus galapágoensis), el León Marino (Otaria byronia), la Iguana marina (Amblyrhynchus cristatus), la Iguana Terrestre (Conolophus subcristatus y Conolophus pallidus), la Tortuga Terrestre (Testudo abingdoni, Testudo darwini, Testudo wallacei, Testudo Ephippium, Testudo porteri, Testudo chathamensis, Testudo hoodensis, Testudo elephantopus, Testudo phantastica, Testudo güntheri, Testudo vicina, Testudo microphyes, Testudo becki). Tampoco se podrá coger, perturbar, hacer dano, capturar o matar como se ha dicho, ni turbar la tranquilidad de los nidos o huevos de las especies de aves que se indican: El Alcatraz (Diomedea irrorata), El Penguin Galápagos (Sheniscus mendiculos), El Corvejón sin vuelo (Nannopterum harrisi), El Flamengo (Phoni-copterus ruber), La Cerceta, Galápagos (Paesilonitta galapagoensis), Las Palomas Galapagos (Nesopelia galapagoensis y Nesopedia galapagoensis Exul).

Prohibición para saltar sin previo documento de permiso.

Art. 91.-Queda además prohibido que los Yates, vapores of buques de turista, vapores o buques comerciales o pescadores, botes o aeroplanos de cualquier descripcion, medida, capacidad o poder permitan saltar a tierra a ninguna persona en ninguna de las Islas del Archipiélago de Colón sin haber entrado antes de obtener el permiso legal en el Puerto Baquerizo Moreno, oficialmente abierto y establecido en la Isla Chatam. Este permiso legalserá escrito y otorgado por las Autoridades del mencionado Puerto tan sólo después de haber firmado los correspondientes documentos comprometiendose el solicitante a respetar las leyes de la República del Ecuador y explicitamente las leyes que gobiernan la protección de las especies zoológicas.

Castigos y multas para los que violaren lo establecido por este Capitulo.

Art. 92.-La persona, asociación, organizasión o compañía que violare de algún modo, o no cumpliera con lo establecido en el presente Reglamento cometerá un

acto punible que sera condenado por los tribunales comunes con la multa comprendida entre cincuenta sucres por lo menos y dos mil quinientos sucres o con prisión de seis meses o con ambos castigos segun la gravedad del caso. ¶ Explicacion de la palabra "cojer."

Art. 93.-Para la mejor comprensión de este Reglamento, la palabra "cojer" que se usa repetidamente en el texto a de entenderse en el sentido de cazar, perseguir, tirar, capturar, aprisionar, pescar, colectar, matar, or atentar la caza, persecución, herida, captura, pesca, toma, prisión, colección o muerte a menos que el contexto no sufriera otra interpretación.

El Ejecutivo podrá dictar Reglamentos cientificos de caza y pesca en todo tiempo.

Art. 94.-El Ejecutivo podrá, en todo tiempo, dicta disposiciones y Reglamentos cientificos de caza y pesca en las Islas del Archipiélago de Colón proveyendo siempre para que quien deseare cazar o pescar obtenga previamente el respectivo permiso de las Autoridades correspondientes y segun lo estúido y las prohibiciones establecidas por este Reglamento.

Contratos de Gobierno con Instituciones Cientificas; aporte de gastos de las mismas; finalidad científica y no comercial.

Art. 95.-La institución científica o instituciones científicas que firmaren un contrato con el Gobierno del Ecuador para establecer los Asilos Reservados enunciados en los lugares señalados en el Art. 72 o laboratorios zoológicos en cualquier otro lugar del Archipiélago de Colón pagaran todos los gastos para la erección de los edivicios que necesiten lo mismo que todo el equipo para su estudio y trabajos y ademas los sueldos y jornales que se fijaren para los guardapescas y técnicos incluyendo todo gasto adicional implicado. Especificamente se establece aquí qué ninguna de las actividades de los miembros que pertenezean

a la Institución Cientifica o de alguno de sus subalternos a de tener carácter lucrativo o comerical sino, por el contrario, que ha de ser todo dentro del carácter netamente científico.

A quién se debe pedir authorización para capturar ejemplares prohibidos.

Art. 99o.-Cuando una sociedad cientifica o de conservacíon de especies vivas cuya caza o pesca está prohibida, desea conservar en Jardines Zoologicos especies vivas podrá solicitar al Departmento del ramo autorizacíon para la captura, siempre de un numero muy limitado, tres como máximo, y solamente para fines cientificcs.

TRANSLATION

Part III
Hunting in the Archipelago of Colon.
Special refuges or National Parks.

Art. 74o.-The islands of the Archipelago of Colon which are named in this article can be declared for an unlimited period of time to be used for special refuges or National Parks for animals, reptiles, land tortoises, marine tortoises, lizards, or any other species of zoological life. The referred to refuges or National Parks may be declared inviolable refuges for all classes of zoological life whether it be resident or migratory.

Prohibition to collect, disturb or kill certain species of the fauna of the Archipelago.

Art. 90.-No one may collect, disturb, harm, capture or kill the following species in any part of the islands of the Archipelago of Colon, nor may they disturb ghe tranquility of the nests or eggs of the species which are herewith detailed:

(Not translated)

Prohibition to land without having previously secured permission.

Art. 91.-It is moreover prohibited that yachts, tourist ships, commercial ships, or fishing ships, boats or aeroplanes of any description, measurement, capacity, or power, allow any person to land in any of the islands of the Archipelago of Colon without having entered beforehand to obtain legal permission in the Port Baquerizo Moreno, officially opened and established in Chatham Island. This legal permission may be written and authorized by the authorities of the above-mentioned port only after the corresponding documents have been signed wherein the person requesting permission has undertaken to obey the laws of the Republic of Ecuador, particularly those laws which cover the protection of zoological specimens.

Punishments and fines for those who violate the laws established by this legislation.

Art. 92.-The person, association, organization or company that violates in any manner, or does not comply with the regulations herewith established, commits a punishable act which shall be condemned by the Common Tribunals with a fine by them of 50 sucres for the least offense and 2500 sucres or prison for six months, or both, may be the punishment according to the seriousness of the case.

The explanation of the word "cojer."

Art. 93.-For the better understanding of this rule, the word "cojer" which is used repeatedly in the text, is to be understood as meaning hunt, persecute, shoot, capture, imprison, fish, collect, kill, or attempt to hunt, persecute, wound, capture, fish, catch, imprison, collection or death in all situations where the context does not admit of another interpretation.

The Executive may dictate rules governing scientific hunting and fishing at any time.

Art. 94.-The Executive may at any time dictate dispositions and scientific rulings for hunting or fishing in the islands of the Archipelago of Colon always providing that he who wishes to hunt or fish shall first obtain the respective permission of the proper authorities in accordance with this statute and the prohibitions established by this rule.

Contracts of the Government with scientific institutions; apportionment of expenses of the same, scientific and not commercial aims.

Art. 95.-A scientific institution or scientific institutions shall sign a contract with the Government of Ecuador to establish protected refuges in the places

listed in Article 72 or Zoological laboratories in any other place in the Archipelago of Colon shall pay all the expenses for the erection of the buildings that are necessary, and also all the equipment for study and work, and also the salaries and daily expenses that are fixed for the fishing wardens and technical employees, including all additional expenses made necessary. It is specifically set forth here that none of the activities of the members belonging to the scientific institution, or to any of its subsidiaries, shall be of a commercial moneymaking character. Indeed they must all be of a definitely scientific character.

To whomever wishes to ask authority to capture forbidden specimens.

Art. 99o.-When a scientific association or an association for capturing specimens alive whose hunting and fishing has been forbidden, wishes to preserve in zoological parks living specimens, it may ask the Department authorization for the capture, it being always understood that this would be an exceedingly limited number, three at most, and only for definite scientific ends.

- For 5 men for one year -

Medical Supplies - Galapagos Islands.

48 x 1 lb. Chloride of Lime
16 x 1/4 lb. Anesthesia Ether
1 x 5000 Tablets Halazone (1 tablet per 1 pint of water)
1000 cc. sterile solution 1% novocaine in ampoules.
1 x 100 0.1 gms Tab. Atabrine.
1 x 3000 Vitamin B complex tablets. (moisture proof) (International Vitamin Corp.)
8 x 4 oz. 3½ % Tincture of Iodine
10 x 2 oz. Comp. Tincture of Benzoin.
3 x 30 cc. 10% sola. Silver nitrate (crystals)
4 x 1 oz Tr. opium
2 x 1 oz Soln. Cocaine hydrochloride.
2 x 1 oz. Soln. atropine sulfate
1 x 1 oz. 1/2% soln. Zinc sulfate.
4 x 4 oz. Elixir Iron quinine & strychnine.
2 x 2 oz. Aromatic Spirits of Ammonia.
1 x 4 oz. Tr. Belladonna.
8 x 4 oz. Boric Acid crystals.
1 x 1 lb. talcum powder.
1 x 1000 cc. 5% sola. Tannic Acid (powder) and atomizer.
4 x 1000 cc. (medicated) alcohol, 70%
5 x 16 oz. liquid petrolatum
2 x 16 oz. cotton seed oil.
1 x 16 oz. oline oil.
1 x 480 cc. 24 cc. Tinct. Belladonna.
and q.s. Elixir phenobarbital.
4 x 8 oz. Camphorated Tr. opium. (Paregoric)

4 x 8 oz. Mix. Rhubarb & soda.
1 x 200 Tab. Soppy # 1
1 x 200 " # 2
1 x 1000 Tab. Vit. A & D.
1 x 300 0.5 gms. Tab. sulfathiazole
1 x 2000 0.3 gms Tab. sodium bicarbonate.
1 x 1000 0.3 gms Tab. sulfanilamide.
1 x 200 0.3 gms " sulfapyridine
1 x 2000 0.3 gms Tab. acetyl salicylic acid.
1 x 1000 0.3 gms Tab. Bismuth subcarbonate.
1 x 180 2.125 gms Tab. Sod. chloride
1 x 400 0.3 gms Tab. Cascara sagrada Ext.
5 lbs. magnesium sulfate crystals.
4 x 16 oz. calamine lotion.
1 x 8 oz. sodium perborate powder.
2 x 16 oz. Saponated soln. cresol full strength.
1 x 200 0.5 gms. Tab. Bichloride of mercury
8 oz. tannic acid jelly. 5%.
8 oz. lubricating jelly.
4 x 4 oz. 5% tannic acid ointment.
8 x 4 oz Ammon. mercury ointment 5% 10% } aa 4
2 x 4 oz white petrolatum.
1 x 4 oz. Blue ointment.
1 x 4 oz. Boric Acid ointment.
1 x 4 oz Dekthyl ointment 10%.

Head lice

---

1 x 4 oz. cold cream
1 x 4 oz Zinc oxide & castor oil ointment.
4 x 4 oz whitfield's ointment ½ strength
1 x 4 oz calomel ointment
2 x 4 oz sulphur ointment (scabies)

(also Potasium permanganate tablets 0.1 gms to make Soln. 1:5000)

10 x 50 Tab. Quinine sulphate 0.3 gms. (malaria)
5 x 1 pearls amyl nitrate. —
1 x 200 Tab. Ascorbic Acid. (Vitamin C)
1 x 100 0.1 gm. tab. phenobarbital.
1 x 100 0.03 gms. " "
20 x 1 Capsules carbarsone 3 3/4 grains.
12 x 1 Suppositories Ethyl aminobenzoate (Painful hemorrhoids)
1 x 100 0.1 gm. tablets digitalis.
2 x 100 0.5 gm. capsules reduced iron.
1 x 100 gms. Ethyl chloride.
40 x 1 0.03 gms. 1 c.c. ampoules Emetine HCl.
4 x 1 oz Liquified phenol 90%.
2 x 1 oz mixed silver proteinate 25% soln. (crystals) (Argyrol)
4 x 1 oz. Comp. soln. iodine (Lugol's)
2 x 1 oz 2% soln. analine gentian violet.
5 x 1 0.5 gms. 2 c.c. Ampoules Caffeine Sodium Benzoate.
5 x 1 2.2 c.c. Ampoules Mercuphurin.
2 x 10 c.c. Insulin U - 40
10 x 150 gms. Procaine HCl (Spinal)
1 x 1 drachm Ophthalmic ointment yellow oxide of mercury.
10 x 1 0.05 gms. 1 c.c. ampoules ephedrine sulfate
5 x 1 0.13 gm. 1 c.c. ampoules phenobarbital sodium
1 x 100 0.065 gms. T.T. codeine sulfate.
1 x 25 0.065 gms H.T. " phosphate
1 x 25 0.032 gms. H.T. Codeine phosphate
1 x 50 0.015 gm. H.T. morphine sulfate.

1 x ~~20~~ 30 0.0004 gms. H.T. Nitroglycerin

~~1 x 3a 0.0003 gms.~~

1 x 8 oz castor oil.

Vermifuges:

Thymol
Santonin.
Carbon tetrachloride. } q.s.
Guaiacol
Male fern

Common worms encountered are Ascaris lumbricoides and necator Americanus — Both very prevalent.

Elixir terpine hydrate & codeine ℥ 10 x 8 oz.

Surgical instruments -

Hot water bottle
Absorbent cotton
Medicine droppers.
Basswood splints.
Enema can
Rectal catheters
Urethral catheters *
Plaster of paris.
Thermometers, mouth & rectal
Rubber tubing.
Adhesive tape - Assorted sizes.
Gauze & flannel bandages, assorted sizes. Dressings
Tongue depressors.
Catgut & silk.

Urinal
Bedpan

Edward W. Douglas
Pvt. Dr. R. Gordon Douglas
10 21 Secor Lane
Pelham Manor
New York

Mr. Leap has smooth original and carbon of this memo

Graf has

MEMORANDUM

March 26, 1941

The idea of a field laboratory in the Galapagos Islands for the study of their remarkable plant and animal life and their environment, as well as the biology and physical oceanography of adjacent waters, is not a new one. It has been discussed many times by scientific workers in this and other countries, including the Republic of Ecuador. With the support of the United States government, the Smithsonian Institution seeks the sympathetic and active cooperation of the Republic of Ecuador for the establishment of such a research laboratory.

The Smithsonian Institution will provide the necessary laboratory, its resident personnel and accessory buildings, provide for their maintenance and equipment, and provide such boats as may be needed for the proper conduct of the projected studies. Beyond the necessary resident staff, paid for and furnished by the Smithsonian Institution, it is contemplated that a limited number of properly accredited scientists from both countries will be enabled by their respective governments to undertake approved scientific investigations in the Galapagos Islands as the laboratory became better established and its facilities adequate for the purpose.

In any case, free accommodations (food and lodging) will be provided at the laboratory for one scientific investigator from Ecuador, whose personal compensation or emoluments would, however, be provided from Ecuadorian sources. This investigator is to be designated by a committee composed of representatives of the scientific faculties of the several universities of Ecuador or such other scientific organization as may be set up for the purpose ~~designated~~ by the government of Ecuador.

Fundamental to any study of the organic life of the Islands is a thorough understanding of the environment in which it exists, the physical substratum and the atmosphere surrounding it, the geology and meteorology of the islands, and, in the case of the marine life, the oceanography of the water about the Islands. A qualitative and quantitative census of the existing animal populations would be attempted and plans at least laid to restore as many of the islands to their former natural condition as possible by the protection of the remaining native fauna and flora and the elimination of inimical introduced rodents, carnivores, and perhaps even herbivores on certain islands where they may enter into serious competition with the endemic species. In this connection, studies in plant, as well as animal, ecology would be undertaken.

The data accruing from the several studies--meteorological, biological, geological, and oceanographic--mentioned here and planned as future undertakings would be made available to the Ecuadorian government, to whom they might prove to be of some economic value aside from their purely scientific worth.

In view of the foregoing proposals and the future benefits, scientific and economic, it is believed that the government of Ecuador may be encouraged to extend its full and unqualified cooperation to the project here outlined and yield the necessary permissions and authorizations to the Smithsonian Institution for the construction of the laboratory and the conduct of scientific studies on the Islands and in the adjacent waters.

In order that the proposed laboratory be best located with regard to central location, proper harbor and docking facilities for small boats and the handling of supplies, accessibility to locally produced fresh food, vegetable and animal, it is highly desirable that a thorough-going

reconnaissance of all suitable places in the Islands be undertaken at an early opportunity jointly with a representative to be designated by the Ecuadorian government. The most practical method for carrying out this recommendation would be to enlist the aid of a suitably equipped naval vessel from the Canal Zone, the nearest available United States base where such ships can be obtained. Whatever vessel is secured for the purpose would take the designated Ecuadorian and United States representatives to the islands and places to be investigated, or else would set them down in the Islands with a suitable power tender and all equipment necessary to properly carry on the reconnaissance.

In view of the known rough terrain characteristic of the islands of the archipelago as a whole and the fact that the survey is to be made as searching and complete as possible, it is hoped that the Ecuadorian government will approve the use of an airplane to guide the ground parties to desired objectives, the principal one of which would be apparent water supplies, and for the purpose of taking such photographs as may be needed to make a visual record of the reconnaissance.

Given the consent of the Ecuadorian government to the foregoing proposals, the Smithsonian will, at the earliest practicable date, dispatch its representative to Quito to confer with the Ecuadorian government officials and to meet the designated Ecuadorian representative for the purpose of accompanying him to Panama to join the vessel that will be made available for the reconnaissance. The expenses of the transporation of the Ecuadorian representative to and from Quito and the Galapagos Islands will be borne by the Smithsonian Institution.

In short, with the consent, approval, and cooperation of the Ecuadorian government, the Smithsonian Institution, with the aid of the United States government would:

1. Establish a scientific research laboratory in the Galapagos Island and provide and maintain the necessary buildings, equipment, boats, and resident personnel.

2. Make available facilities for a limited number of properly accredited scientific workers from each country as the laboratory became better established and its facilities adequate for the purpose.

3. Provide free accommodations (food and lodging) for one scientific worker designated by such scientific commission as the Ecuadorian government may appoint for the purpose; the personal compensation or emoluments of this worker to be provided from Ecuadorian sources.

4. Undertake, within reason and as practicable, scientific investigations of weather and climate (meteorology); tides, currents, temperatures, and the chemical constitution of the waters in and about the Islands (hydrography and oceanography); the geology, palaeontology, and biology (in the widest sense) of land and marine and fresh waters, as well as of ocean bottoms of the Galapagos area.

5. Make these findings public, with the consent and approval of the Ecuadorian government, in the form of published reports suitably illustrated.

6. With the cooperation of the Ecuadorian government, in the person of a designated representative, make a reconnaissance of the Islands for the purpose of locating a suitable site for the laboratory.

Brief résumé of scientific studies that could be profitably undertaken in the Galapagos Islands.

- - - - - -

1. Meteorological observations. These are at present wholly lacking. Little is known about the amount and variation of rainfall on any of the Islands. Stations with recording instruments should be established at strategic points.

2. Ocean currents. It is highly desirable to have tidal movements recorded over considerable periods of time by means of tide gauges. The strength, fluctuation, salinity, chemical, and biological constituents of the ocean currents in the vicinity of, and ~~possibly~~ through, the Islands constitute data of great scientific importance. These studies may throw light on the movements of marine mammals and fishes in the Galapagos region and perhaps make possible future regulations looking toward the conservation and perpetuation of economically important species ~~fishes~~.

3. Photographing and mapping the Islands from the air. The Galapagos Islands need to be accurately mapped and to have their individual positions more exactly determined. It is not necessary to discuss the value of good maps or charts from the point of view of navigation. The only means of carefully, expeditiously, and economically mapping islands such as the Galapagos is from the air. These photographic maps would show the extent and nature of the respective land masses forming the archipelago, and, if taken from proper altitudes, would reveal shoals, submerged rocks, and the configuration of the ocean bottom about the shores of the Islands. The physiographic features

of the Islands would be shown in natural relief. Springs or other permanent bodies of fresh water, which are of utmost importance in these generally arid islands, might be discovered in such photographs, as well as other natural resources. Such aerial photographs would show the zonation of the vegetation and the abundance and distribution of the larger forms of animal life, cattle, in particular, and, of even greater scientific interest in this connection, the giant tortoises. If the latter are still in existence on islands on which they are believed to be extinct, their presence might be revealed and further the study of those rare species under natural conditions.

b. Geological investigations:

a. Studies on certain phases of volcanic activity and quiescence might be profitably carried out in several localities.

b. The determination of the relative ages of the several islands and their major lava flows by means of radio-active constituents, helium, or uranium content is of considerable interest and may yield important data.

c. A further search for other fossil deposits should be instituted and more intensive investigations made of the known deposits.

5. Biological investigations (in part):

a. A qualitative and quantitative ~~census~~ study of the animal populations.

b. Restoration of natural conditions in the Islands and, where practicable, the elimination of introduced noxious animals.

c. Among the birds, the ground finches, Geospizas, offer the most intriguing problem. Extremely little is known about their life, habits, and especially of the variation in the offspring of any

one pair of parents. The raising of various known clutches of eggs and genetic studies are called for.

d. The species of these ground finches, which approximate about forty in number, distributed into one or five genera according to the authority followed, should be carefully studied. The various species tend to be more or less repeated on the several islands. The origin of this family itself is shrouded in obscurity. Precipitin tests on the blood of the several species of Geospizas and on the supposed mainland or other island relatives might yield significant results.

e. Similar blood tests should be made on the geckos, lizards, snakes, and tortoises inhabiting the islands and on related species on the mainland or elsewhere in the world where closely related forms are known to occur. As with the Geospizas, these precipitin tests might throw some light on the relationships and the relative age or descent trends of the various species or varieties and, through them, perhaps also on the relative age of the various islands.

f. Botanists could suggest a whole host of similar and other problems crying for investigation. In this connection, it might be mentioned that the most northerly island of the group, Culpepper, which is about a mile in diameter and a sheer, precipitous rock, approximately five hundred feet in height, has never been scaled. The at present inaccessible plateau which forms this island is the one virgin bit of unexplored land yet remaining in the Islands.

Notes on this agreement appended

AGREEMENT BETWEEN THE UNITED STATES AND ECUADOR FOR THE CONSERVATION OF THE INDIGENOUS WILD LIFE AND THE STUDY OF THE NATURAL HISTORY* OF THE GALAPAGOS ISLANDS.

The Government of the United States of America and the Government of the Republic of Ecuador,

Considering that it is highly desirable, of inestimable value to science, and in their mutual interest that the existing indigenous animal and plant life be carefully conserved, and that they cooperate in the establishing of a laboratory in the Galapagos Islands for the study of all phases of the natural history of the Islands; and

Considering the active interest that the Government of Ecuador has had in the protection of the ~~indigenous~~ wild life of the Galapagos Islands and in the possible future development of those Islands; and that the Smithsonian Institution is authorized by an Act of Congress of the United States of America approved (June 27, 1940 ?), making appropriations for certain purposes, to undertake scientific investigations of various kinds in various parts of the world to establish and operate research laboratories, to acquire land, and acquire or construct and equip necessary buildings and vessels, and take certain other necessary measures for such purposes;

Have concluded this agreement for the establishment of a ~~scientific research~~ Conservation laboratory in the Galapagos Islands with a view to defining their respective interests in the project and the facilities, services, and other contributions which they shall make available for the purpose:

*The term "natural History" is used here and elsewhere in the text of this cooperative agreement in its most comprehensive sense, embracing in its scope all physical and natural sciences.

Article I

The Government of Ecuador, seeking to protect the native wild life of the Galapagos Islands, and to obtain further knowledge of the economic resources, natural history, and meteorology of the Islands and the oceanography of their contiguous waters,

(a) ~~shall~~ without charge or other restriction (excepting only such prior commitments as may already have been made by the Government of Ecuador to the Government of the United States of America) grant the Smithsonian Institution the use of the entire island of South Seymour in the Galapagos, or at least a sufficiently extensive site for the construction of a research laboratory, lodgings, outbuildings, storage tanks for fuel and water, watershed or catchment basin, if necessary, communication system, and dock and harbor facilities on the southern shore of South Seymour Island near its western end, unless some other site be mutually agreed upon subsequent to the ratification of this cooperative agreement; in any case the site finally selected is to be defined as to metes and bounds, and laid out, by the Smithsonian Institution or its representatives;

(b) shall grant the Smithsonian Institution free access to all parts of all at present uninhabited, as well as at present inhabited islands in the archipelago, with necessary personnel, equipment, ~~[illegible]~~ and apparatus for the purpose of carrying on the proposed scientific studies and investigations, and the right to collect such specimens and material as may be needed for those such studies and investigations; and shall grant the Smithsonian Institution the permission to erect, if need be, temporary branch laboratories, temporary living quarters and necessary outbuildings, communications and landing facilities on any island should the studies and investigations require such installations, provided that private property or holdings existing on the

Islands and antedating this agreement are not damaged in the exercise of the privileges here conferred on the Smithsonian Institution;

(c) shall permit the Smithsonian to employ or make use of an airplane for the purpose of studying and mapping the distribution of animals and plants in the Islands by means of photographs and direct observation ~~and, if necessary, for the purpose of improving existing topographic maps and navigational charts of the Islands;~~

(d) shall authorize the Smithsonian Institution to take such steps as it may desire toward restoring selected islands to their former natural condition, and, in this connection, to eliminate or destroy, as it may see fit, introduced rodents, carnivores, and other animals, and plants that may be inimical to the native fauna and flora, inclusive of herbivores, goats, and cattle on certain islands where they may enter into serious competition with the indigenous species, provided that where cattle are held in private ownership due compensation must be made to the owner thereof at prices prevailing in the Islands;

(e) shall, ~~prohibit all further colonization~~ while this agreement is in force, prohibit all further colonization and the introduction of all animals and plants of whatever description on each and all of the Galapagos Islands except in the case of the already inhabited islands of Chatham, Charles, and southern Albemarle south of the Perry isthmus only (Indefatigable Island is not included among the excepted islands because it is separately dealt with below, see (f); however, the prohibition of further colonization and the introduction of animals and plants is to be considered binding in the case of Indefatigable as it is on all the islands except those specifically excepted);

(f) shall set aside all of Indefatigable Island not actually occupied or cultivated with the consent of the Government of Ecuador by colonists, settlers, or other human inhabitants, as a wild life refuge (asilo reservado), and shall not permit any extension of the present private land holdings whatsoever on this particular island while this agreement is in force; and, furthermore, if it can be legally accomplished, the Government of Ecuador shall enable and assist the Smithsonian Institution so far as possible in turning the whole of the island of Indefatibable into an asilo reservado by the removal or the transportation of the present and actual inhabitants of this island to Chathem Island, southern Albemarle south of the Perry Isthmus, or to Guayaquil on the mainland, provided that the Smithsonian Institution should desire that this be done and undertakes to pay the cost of transportation, or transport these specified inhabitants and their personal belongings not to exceed ____ kilos in weight free of cost to any one of the three designated places which they may individually elect, provided further that if they are legally entitled to a land grant by virtue of their present tenure of land on Indefatigable Island the Government of Ecuador will guarantee to give them under like conditions of tenure a fully equivalent grant of land elsehwere--on Chatham Island, southern Albemarle, or on the mainland of Ecuador (Charles Island is not mentioned as an island to which any of the present inhabitants of Indefatigable might be transported, as it has as much and probably more of a population at this minute than it can adequately support in an average dry season);

(g) shall, if it be desired by the Smithsonian Institution, make it possible to fence off a sufficient area in the present tortoise country near Villamil on southern Albemarle, and also in the general vicinity of Iguana Cove of the same Island to insure or provide for the natural reproduction and propagation of the native tortoises of this island free from

interference by man or beast;

(h) shall, during the life of this agreement only, invest the Smithsonian Institution with full power and authority at its option to enforce the existing laws and license requirements governing the Galapagos Islands wild life should occasion arise; and shall agree that the right of any individual or group of individuals, institution, or organization to collect in the Galapagos Islands under license from the Government of Ecuador must also have, during the life of this agreement, the approval of the Smithsonian Institution before it is effective or valid;

(i) shall permit or have permitted, through proper authorization whenever necessary from other departments of the Government of Ecuador, the importation into the Galapagos Islands, free of duty or fee whatsoever, of all material or property of the Smithsonian Institution (Government of the United States of America) which may be required for the construction, operation, and maintenance of the aforementioned research and branch laboratories, vessels, boats, and other equipment, apparatus, and appurtenances thereof; and this exemption from duties or fees upon importation shall extend to the personal property of employees and their immediate families of such laboratories, vessels, boats, and other equipment upon their entry into the ports of Ecuador for work in carrying out the purposes of this cooperative agreement, provided that such personal property of such employees and their families is not imported for resale.

Article II

The Smithsonian Institution of the United States of America, under authority granted by the Congress of the United States of America,

(a) shall establish in the Galapagos Islands, Republic of Ecuador, a scientific research laboratory, upon conditions specified above, and shall provide and maintain the necessary buildings, equipment, boats, and other appurtenances of the establishment and its resident personnel;

(b) shall, so far as practicable, conduct laboratory and field investigations of the natural history of the islands, including the weather and climate (meteorology); tides, currents, temperatures, and the chemical constitution of the waters in and about the islands (hydrography and oceanography); geology, palaeontology, and biology (in the widest sense) of the animal and plant life of land, and marine and fresh waters, and the ocean bottoms of the Galapagos Island area; and shall make the results of the various investigations undertaken public, with the consent and approval of the Government of Ecuador, in the form of published reports suitably illustrated;

(c) shall, so far as practicable, take steps to conserve the existing indigenous wild life of the islands, including the elimination of introduced species that are inimical to the welfare and reproduction of the indigenous species, and, as deemed practical, to endeavor to restore one or more of the islands to its or their former natural conditions;

(d) shall provide out of funds available to it the personnel necessary for the proper upkeep and maintenance of the laboratory and vessels and boats attached to it, and for the proper conduct of the scientific investigations that may be undertaken;

(e) shall provide free accommodations (food, lodging, and laboratory space and facilities on the basis of equality with the scientific workers appointed by the Smithsonian Institution) for one scientist designated by such methods or means as may be set up for the purpose by the Government of Ecuador; the personal compensation or emoluments of such an investigator, however, to be provided from Ecuadorian sources; [alternative (e) next page]

[alternative (e)]

(e) shall provide free of charge necessary office space and laboratory facilities at the central or base laboratory establishment for two scientists to be designated at its option by the Government of Ecuador for conducting investigations on a basis of equality with the scientific workers designated by the Smithsonian Institution; provided that the salaries and living accommodations (board and lodging on a pro rata basis) for such scientists shall be furnished by the Government of Ecuador.

Article III

The lands, facilities, and services furnished by the Government of Ecuador shall be suitable and adequate for the purposes of this agreement.

Exclusive of the salaries of the scientists and resident personnel designated by the Smithsonian Institution, the Institution shall not be obligated to expend an amount in excess of five thousand dollars ($5,000) during any one year. The first year shall begin on the day of the entry into effect of this agreement.

Article IV

This Agreement shall come into effect on the day on which it is signed, and shall remain in force until six months from the day on which either contracting government shall have given notice in writing to the other contracting government of its intention to terminate the agreement; provided, however, that the agreement shall not remain in force after June 30, 1942, except at the option of the Smithsonian Institution of the United States of America, which option shall be notified to the Government of Ecuador by the Government of the United States of America at least one month prior to that date.

Article V

Upon the termination of this agreement, the Smithsonian Institution of the United States of America shall be permitted to remove, sell, or otherwise dispose of the improvements mentioned in the foregoing Article II, including all buildings and facilities belonging to it; ~~xxx~~ provided, however, that in the event of any sale of such improvements, the Government of Ecuador shall have priority in the ~~xxxx~~ purchase thereof. The price at which any such improvements may be sold shall be established in accordance with regulations made by the Smithsonian Institution of the United States of America.

Notes on Agreement

Art. I (first paragraph). Scarcely need add meteorology and oceanography in view of definition of natural history, but have put them in because Ecuadorian Government seemed particularly interested in the weather conditions prevailing in the Islands.

Art. I (a). Prior obligations are mentioned because I understand the Ecuddorian government has made some commitments to the U. S. Navy regarding South Seymour Island. Navy (Admiral F. E. Sadler and Captain S. Picking) is agreeable to our locating on South Seymour provided that we do not spread all over the place and keep to one or the other end of the most suitable terrain located at the western end of the south shore of South Seymour. In this connection, I wish to urge that we locate, so far as possible or practicable, in the vicinity of whatever base the Navy may establish on South Seymour Island. It would react to our great advantage in many ways rather than otherwise. There is to be considered the matter of the hauling in of heavy and perhaps all supplies, medical services, communications, water, fuel, light and power, repairs of all kinds, and possibly also the loan of boats and other equipment, and maybe even personnel.

Insert p.2 of Notes

Art. I (f). Indefatigable Island is especially singled out, as it is a typical island, possessing a complete series of life zones. It still has a considerable stock of tortoises, even though they seldom if ever get a chance to reproduce because of the depredations of wild pigs, numerous on Indefatigable and particularly destructive to tortoise nests, eggs, and young. Moreover, Indefatigable seems to possess fewer introduced animals inimical to the native fauna and flora.

As the natural harbor facilities of South Seymour Island are considered the best in the Islands for smaller (laboratory) vessels, that site has been picked in preference to any on Indefatigable. This Island, however, is immediately adjacent to Indefatigable.

Art. I (g). Here, more important, is the right to pass on applications of other investigators or expeditions desiring to work in the Islands while this cooperative agreement is in force. It simply would not do to have other collectors operating in the Islands without being under our control; moreover, all scientific investigations should be under our auspices and direct control.

Art. I (k). (Suggested.) That no military detachment be detailed to the laboratory site or stationed on any of the uninhabited islands. If the Government of Ecuador should insist upon at least one soldier at the base laboratory in addition to the Ecuadorian scientists we are providing for, he should be required to have a health certificate guaranteeing him to be free of parasitic or infectious disease. We should also have the right to insist upon like certificates for any Ecuadorian labor we may employ or be asked to employ.

Art. II (b). See comment upon first paragraph of Art. I.

Art. I (b). The following should perhaps be added to the (b) section of Art. I:

. . . and, further, that the Smithsonian, if it so desires, may build a dam on the lower reaches of the stream entering Freshwater Bay, Chatham Island, for the purpose of impounding water, which is to be drawn off by a pipe or hose line extending to a properly marked, anchored buoy off shore for the purposes of taking water.

p. 4 S. Seymour is small id
and should have jurisdiction over
whole except what Navy might want
or already have

p. 6 cattle instead of
goats, or if preferred
cattle & goats but
~~number of our goats~~
~~held in private ownership,~~
~~all are~~ few if any
are held in private
~~ownership~~

better cattle only

p. 7 (f) omit mention
of people for independent

j. p. 9 OK. & necessary

Inner Ring I'd (not mentioned there)
like to see the dungled ~~[illegible]~~
privilege of moving
off dandyfied gents
residents
And restriction
of military establish
an idea we might
occupying do not
want to be saddled
with lot of Canadian
soldiers
~~[illegible]~~ unfounding note
Privilege at F. N. Bay, Chatham.

MEMORANDUM

April 27, 1942

In the present emergency, aside from our purely scientific interest, it is important to obtain all possible weather and oceanographic data in the Galapagos area at the earliest opportunity, besides initiating the conservation program which has been proposed for the Islands. Any large scale occupation, if not controlled or supervised, is bound to react unfavorably on the unique native wild life. Therefore the following investigations are recommended:

1. Weather observations. These are of extreme importance to aviation and are basic to any studies that we might undertake on the native life of the Islands, especially if we can obtain continuous records over a long period of time. Existing data are so meager as to be of little value and if we are to have any worth while weather information the sooner we start gathering it, the better. The Ecuadorian Government is particularly interested in the climate of the Islands, and desires meteorological information above all other.

In order to enhance the value of any observations that we might make, radiosonde observations should be included. If possible, the Weather Bureau should be persuaded to furnish two expert observers for the radiosonde work. Two are necessary, in order that one may at times relieve the other, because the work is very arduous. At the same time, these two observers could without difficulty also take care of the meteorological observations and instruments. The latter require a minimum of attention because they are automatic recording instruments. If such an arrangement cannot be made, the Weather Bureau should be asked to cooperate at least to the extent of providing some one who can supervise the installation of the weather recording

apparatus. After it is once installed, the staff of the proposed laboratory would be competent to look after the meteorological observations. For these we possess all apparatus except the electric sunshine, rain, and wind recorders. These recorder sets are on order and probably need a higher priority rating for delivery.

2. Oceanographic observations.

Physical. Are of importance to navigators of ships and are fundamental to any studies that might be undertaken on marine life, economic or otherwise. Oceanic conditions are also correlated with the meteorological ones.

The Navy is undertaking work of considerable magnitude along oceanographic lines and much work that we would like to see done may well be included in the present Navy program. In this connection, we possess a set of ten water bottles with necessary thermometers. The much desired fathometer is on order and requires a higher priority rating before delivery.

Biological. Marine biological investigations would be dependent upon available vessels, but some work at least could be carried on from a small motor boat, for which a winch would have to be provided.

3. Ornithological investigations. One of the great puzzles in the Galapagos is the origin of the Geospizidae and the status and relationship of the various species to one another. Serological studies would probably throw most light on this problem. For these particular studies a guest investigator is urged. Bird banding should also be undertaken and, along with it, the habits and life histories of the different species should be studied so far as practicable. These phases of the ornithological program could be carried out by the proposed staff.

4. Conservation. Measures should be taken to protect all of the fast vanishing wild life of the Islands. Especial attention should be given to the tortoises, penguins, iguanas, and snakes, as they are more nearly on the verge of extinction than any of the other animals. The protection of the tortoises can be best accomplished by preventing their use by man and by the elimination of their enemies, the introduced domestic animals which have run wild. Cattle, where present, to some extent are competitors; but dogs, cats, wild pigs, and introduced ship rats are their worst enemies, indiscriminately destroying young and eggs wherever laid. Fenced areas should be installed to protect hatching sites. In certain other fenced areas young tortoises could be raised to a size where they would be immune to attacks. Under favorable conditions tortoises seem to grow much more rapidly than has been believed in the past.

The following estimates are predicated on the assistance that could be gotten from the establishment that the Navy may have set up in the Islands. From this organization transportation, subsistence, medical services, and skilled and other help would be expected in caring for the laboratory's personnel and for erecting buildings and installing equipment, etc.

A further reconnaissance of the Islands is advisable at this time, if only to see what may have already been done by the Navy and to consult with those directly on the ground, in order to best promote the Institution's plans with regard to the Islands.

ESTIMATES

Housing, including base laboratory and perhaps secondary establishments on Indefatigable and James Islands $4,000.00

Furniture and fixtures 1,200.00

Shelters for meteorological instruments 1,200.00
Cheaper shelters could be constructed, but it is believed that these should be small cabins which would furnish shelter for the observers in case of necessity. This might be particularly desirable at the highest of the four proposed stations, atop the central peak of Indefatigable, if it were used as a "spotting" center.

Laboratory equipment, including storage batteries and wiring for meteorological shelters and instruments, $100 . . . . . 2,500.00

Pressure tanks, piping, etc. for water supply, drainage system . . . 1,200.00

Pier, dock, and harbor facilities. 3,000.00

Camping equipment for field parties 500.00

Power boat and skiff 1,000.00

Subsistence, four men per year at $1.00 per day 1,500.00

Travel 2,400.00

Freight 1,000.00

Miscellaneous 500.00

Personnel. The Museum could perhaps furnish from its present staff, temporarily at least, a supervisor or director for the first six months or year, and likewise an ornithologist. If the supervisor is in the field any considerable length of time a substitute should be furnished the office from which he is taken, $3200. In addition, there should be an assistant with a general knowledge of oceanographic practice and methods, $3200. If radiosonde experts are provided by the Institution they should receive a salary of $2400.00 each. Upon proper representations by the Institution and the Navy Department, the Weather Bureau might cooperate to the extent of the salaries of these experts if the Institution were to furnish their transportation and subsistence in return for their help with the meteorological observations.

Salaries might total 13,000.00
If undertaken for the last six months of the current fiscal year only, this amount would be halved. The following year the total estimates would be substantially reduced, as the permanent installations would have been set up.

Total $33,000.00
480.00
37,800.00

Specific recommendations regarding personnel.

I would like the opportunity of getting the project established and under way.

Mr. Perrygo is especially well qualified for the ornithological end of things if he can be spared.

The matter of an oceanographer or assistant, provided that this phase of the work is not completely covered by the Navy, is somewhat more difficult. I have in mind a Mr. Goodman, who left the University of Washington two years ago to take employment at the California Academy of Sciences. I do not know whether he has been drafted or is still available, but I should like to inquire.

If the Weather Bureau could be persuaded to set up independently or cooperatively the radiosonde work the meteorological observations would be provided for at the same time.

For the serological work on birds Dr. Alan A. Boyden, of Rutgers University, or one of his recommended graduates, should be invited.

Under a reduced estimate the staff would have to be restricted to a director and ornithologist lent by the Museum, and one paid assistant at $2400 to $3200. Guest investigators would be limited to transportation and subsistence only, but we would like to count on the cooperation of the Weather Bureau for supervising the installation of the meteorological stations if the Institution defrayed such a supervisor's expenses to and from the islands and his subsistence while there.

In spite of a restricted personnel, the meteorological and ornithological investigations, together with the conservation program, could be materially and successfully advanced. At the same time, considerable attention could be given to oceanographic and marine biological problems, as well.

Alternate estimates

Housing	$2,000.00
Furniture and fixtures	1,200.00
Water supply and drainage	1,200.00
Laboratory supplies and equipment	2,500.00
Shelters for meteorological instruments	600.00
Field and camping equipment	1,000.00
Subsistence, etc.	1,500.00
Boats	1,200.00
Winch and cable	1,400.00
Travel, based on air travel	2,800.00
Miscellaneous, freight, communications, etc.	900.00
	$16,300.00

8 and with 800 per diem

Salary

3200.00

19,500,00

2000.00

800.00

22,300.00

Meteorological Instruments

Wind direction, velocity, and sunshine

12-foot pipe support, 18-S-3135	$52.50
2 cell storage battery	12.50
1 wind & direction transmitter, 12 contact, 18-B-1016 (a)	41.50
Wire and cable	?
1 wind-vane, 3 foot, metal. 18-S-3148-100 (a) (1)	16.50
1 Anemometer, 1/60th mile & mile contacts	25.00
1 Quadruple register	480.00
1 support, sunshine transmitter, 18-S-3110 (a)	32.50
2 Thermometric elements (S.S. recorder) 18-S-3148-100.6 (a) ~~$67 ea.~~	~~134.00~~
1 Indicator, wind direction and velocity. 18-I-475 (a)	32.00
(Oil special for wind-vane bearings and anems from Weather Bureau)	
1 Tipping bucket rain gage, 18-G-250 (a)	108.50
2 Barographs, 18-B-986-40 (a), $130 each.	260.00
4 Hygrothermographs (Cent. degs.) weekly chart, 18-H-1690 (a) $144 each.	576.00
Housing for recorders and batteries	? $100 - $200 each station.

Meteorological Instruments - continued

1 Barometer, mercurial $55.00

1 Box, barometer (for 1 bar.) 20.00

1 Barometer, aneroid, for checking barographs (high precision) . . 50.00

8 Max. thermometers, 18-T-2915 (a), $2.80 each 22.40

8 Min. thermometers, 18-T-2985 (a), $2.95 each 23.60

4 Psoyhrometers sling, cent. dets. 18-P-24980, $3.50 each 14.00
(Get psy. tubing from Weather Bureau.)

4 Shelters, cotton-region instrument, 18-S-1795 (a), $23.65 each . .94.60

4 Fans, psychrometer, 18-F-115 (a), $6.30 each 25.20

4 Supports, inst. shelter, cotton-reg., 18-S-3070 (a), $4.40 ea. . .17.60

4 Supports, therm., Townsend, 18-S-3090 (a), $3.80 . . . . . 15.20

1 8-inch rain and snow gage, 18-C-260 (a) 7.90

1 Support, box, 18-S-3100 (a) 4.40

Materials needed for the collection and preservation of blood sera for serological studies:

Centrifuge - electric for 15 ml tubes.	$50.00
Centrifuge tubes, 3 dozen, 15 ml. pyrex.	9.00
Serum vials 5 dozen 60 ml cap	15.15
5 dozen 30 ml. cap.	13.00
4 gross 10 ml. cap.	19.00
Filter flasks 500 ml. cap - 1 doz.	11.40
Filter disks 500 large at $7.00 per C.	35.00
500 small at $4.50.	22.50
Suction pump for filtration.	63.00
2 Thermometers for sterilizing oven.	7.00
Pipettes 10 ml 1 doz at.	8.10
1 pipette box - 370 mm. length.	2.20
Syringes, Luer: 6-10 ml.	
6- 5 ml.	20.00
Syringe needles stainless steel	
6 No. 22, 1-1/4" long.	2.00
6 No. 20 1-1/2" "	2.00
6 No. 18 2" long.	2.28

Scalpels

Needles

Sterilizing oven

283.62

RUTGERS UNIVERSITY
NEW BRUNSWICK NEW JERSEY

DEPARTMENT OF ZOOLOGY

June 3, 1941

Dr. Waldo L. Schmitt
U. S. National Museum
Washington, D. C.

Dear Doctor Schmitt:

In reply to your letter of May 31, I would like to recommend additional items of apparatus as on the attached sheet. (Some of these merely increase the number of pieces of items already listed in my note of March 11).

With regard to a sterilizing oven the Sargent Electric oven No.7766 (AHT Company) would be suitable for me, - its list price $35.00.

This makes a total supplementary amount of $181.95 which could be reduced to $150.00 by eliminating some of the items above such as items no.1, 5, 6 on the list.

As far as optical equipment is concerned you must ask someone else better qualified than I for my own work requires only dissecting binoculars.

Yours sincerely,

Alan Boyden

Alan Boyden
Associate Professor of Zoology

AHT No.		
2994.....	Centrifuge tubes 3 dozen 15 ml. cap. Pyrex	$9.00
2319-A....	Serum vials 5 ml capacity 5 gross.....	14.40
2319-B....	Rubber stoppers for above 5 gross at $1.50	7.50
5431.....	Filter flasks Pyrex cap.500 ml. 6 at .95 each.....	5.70
E&A No.	Filter disks - Seitz	
22957/1	300 - #3 at $3.75 M.....	11.25
22958/1	300 - #6 at 5.00	15.00
E&A No.	Filters - Seitz - No. 3	
22957	4 for quantities of 20-30 ml at $7.50.....	30.00
	Filters - Seitz - No. 6	
22958	4 for quantities of 100 ml. at $11.50 ea..	46.00
AHT No.	Pipettes - serological	
8168	10 ml. cap - total length 350 ml, 1 dozen	8.10
	Total.....	$146.95

Wm D Collins 3843
Ray Wells 3876

APPARATUS

Adapters
- 3 18 mm. bore . . . . . $ .36
- 3 29 mm. bore 66

Ammeter-Voltmeters
- 2 triple range, D.C. . 21.75
- 1 milliammeter, D.C. . 45.00
- 1 millivoltmeter, D.C. . 72.00

Aspirator (attachment)
- 2 2.70

Balances, analytical
- 1 90.00

Balance, trip
- 1 12.00

Barometer
- 1 No.76894 90.00

Bath, Water
- 1 6-inch 2.25
- 1 8-inch 3.50

Batteries, flashlight
- 12 3.00

Batteries,(misc.)
- dry cells 10.00

Batteries, storage
- 6 69.00

Blowpipe
- 2 10-inch 30

Borer, cork
- 1 set 3.40

Bottle Boxes, partitioned
- 32 24-250 ml.bottles . . 48.00
- 16 24-135 ml. " . . 24.00

Bottles, buffer capacity
- 408 G.S. 135 ml. . . . . 135.00 (125 ml.)

Bottles, chlorinity
- 408 G.S. 250 ml. 163.00

Beakers
- 12 50 ml. 2.00
- 12 100 ml. 2.10
- 24 150 ml. 4.60
- 24 250 ml. 4.80
- 12 400 ml. 3.20
- 12 600 ml. 3.70
- 6 800 ml. 2.20
- 6 1000 ml. 3.00
- 4 4000 ml. 7.20

Bottles
- 4 gross 52.00

Bottles, glass stoppered
- 6 125 ml. 2.00
- 6 250 ml. 2.50
- 15 500 ml. (amber glass) 7.50
- 15 1000 ml. 14.00
- 6 25 ml. (amber) . . . 1.50
- 30 2-1/2 l. 14.00
- 15 2-1/2 l. (amber) . . 10.25

Bottles, indicator
- 12 50 ml. 6.00

Bottles, oxygen
- 408 250 ml. (amber) . . . 165.00

Bottles, reagent
- 8 16-ounce 8.00

Bottles, nickel plated, sampling
- 10 2-1/2 l. 750.00

Bottles, weighing
- 4 10-gm 1.60
- 2 60 cc. 1.50

Bottles, wicker
- 20 5 gal. 36.00

Brush, buret
- 2 24

Brush, test tube
- 3 60

Buckets, galvanized
- 3 . . . . . 1.50

Bulbs, flashlight
- 4 40

Bulbs, medicine dropper
- 1 doz. 18

Bulbs, rubber pressure
- 6 90

Burets, Matchlett
- 2 50 ml. 30.00
- 2 10 ml. 30.00

Burets, Mohr
- 1 50 ml. 2.00

Burets, Normax
- 4 50 ml. 14.00
- 2 10 ml. 8.00

Buret Holder, double
- 2 . . . . . 4.00

Burners, bunsen for Flamo gas
- 4 . . . . . 1.80

1113.47

rec'd Aloha Burners
6 @ 6.60 = 4400

Feeds Nordhrup Weston

2 Thermometers

Cable, Galvanized steel
2000 m. 1/4 inch 210.00

Calculator
1 ..... 225.00

Carboys
2 2 gal. 3.00
1 5 gal. 1.80

Casseroles
6 4-inch 5.70

Cement and Glue
2 sticks DeKhotinsky (A) 1.50
2 cans Casco (waterproof) 1.05
1 lb. can LePages .. .85

Centrifuge
1 No.11600 ..... 53.00

Charcoal
1 doz. sticks .... .50

Clamps, buret
8 ..... 2.40

Clamps, condenser
6 ..... 3.60

Clamps, pinch
6 ..... .90

Clamps, screw
12 ..... 3.00

Colorimeter
1 ..... 165.00

Condensers, Liebig
2 2-1/2 inch 2.00

Condensers, reflux
2 2-1/2 inch 4.00

Cord
1 lb. B.S.16 ..... .60

Crucibles, iron
15 50 ml. 2.25
6 100 ml. 1.20

Crucibles, platinum
4 ..... 150.00

Crucibles, porcelain
6 (high) 30 ml. ... 1.80
6 (wide) 30 ml. ... 1.50

Cylinders, graduated
3 10 ml. 1.65
2 25 ml. 1.30
4 100 ml. 3.20
2 1000 ml. 4.70

Desiccators
3 6 inch 9.00

Desiccator, vacuum
1 6 inch 7.00

Dishes, evaporating
3 each of No.1,2,3,
4,6,8,10 .. 21.00

Electrode, glass
1 ..... 250.00

Electrodes, platinum
3 cathodes)
3 anodes) 90.00

Emery Cloth
assorted 1.20

Extinguishers, fire
3 Pyrene 37.50

Files
1 doz. 5 inch 1.56

Filter Paper
2 boxes No.40 7 and 9 cm. 2.55
2 boxes 41 7 and 9 cm. 2.55
2 boxes 42 2.55
1 box hardened 9 cm. 1.50
1 box 2 7,9,11 cm. 1.10

Flame tracks

Flashlights
2 1-1/2"x6-1/2" 2.00

Flasks, distilling
2 25 ml. ..... .64
2 125 ml. ..... .90
2 250 ml. 1.10
2 500 ml. 1.30
3 1000 ml. 3.30

Flasks, Erlenmeyer
10 125 ml. 1.70
10 250 ml. 2.00
6 500 ml. 1.50

Flasks, filter
2 250 ml. 1.40
2 500 ml. 1.90
2 1000 ml. 3.90
2 4000 ml. 8.00

Flasks, Florence
2 250 ml. ..... .42
3 1000 ml. 1.20

Flasks, round bottomed
2 500 ml. ..... .44
2 1000 ml. ..... .60

Flasks, ring-neck
2 500 ml. ..... .76

Flasks, volumetric (Normax)
2 100 ml. 3.60
2 250 ml. 4.00
3 500 ml. 9.15
2 1000 ml. 6.70

447.05

888.50

Funnels, Büchner
1 7 cm. 1.50
2 9 cm. 3.90

Funnels, glass
12 Normal 5.60
3 5 inch 1.50
2 3 inch (short stem) . .60

Funnels, separatory
3 250 ml. 14.25
3 500 ml. 16.50

Funnel Support
2 . . . . . 1.00

Furnace, muffle
1 . . . . . 37.50

Geuze, wire
24 6 inch 2.40
6 6 inch (asbestos center) . . .90

Glass, Beads
1 lb. 2.25

Glass Rod
1 lb. 4-6 mm. 1.10
1 lb. 6-8 mm. 1.00

Gooches, porcelain
12 25 ml. 4.80

Graphite, for water bottles
1 lb. flake 50

Grease
2 tubes Lubriseal . . . 1.50

Hopkins Head
2 52 ml. 2.00

Hydrometers
2 . . . . . 2.50

Labels
Assorted 1.50

Lamps
3 Bullit 21.00

Lead weight for cable
1 300 lb. 25.00

Magnifier for reading thermometers
2 . . . . . 6.00

Matches
1 carton (Safety) . . . 1.25

Medical Supplies
1 First aid cabinet . . 6.00

Messengers, steel
15 . . . . . 52.50

Microscopes
1 . . . . . 100.00

Mortars and Pestles
1 Agate 50 mm. . . . 6.50
2 Porcelain . . . 3.00

321.05

Notebooks, laboratory
20 . . . . . 5.00

Oven, drying
1 . . . . . 50.00

Paint and brushes
1 quart Acid proof . . . 1.25
2 brushes 50

Paper, graph etc.
. . . . . 1.00

Paper, lens
1 pkg. 50

Paper, litmus
. 80

Paper, sand
Assorted 1.00

Paraffin
. . . . . 1.00

pH Comparator, Hellige
1 . . . . . 25.00

Pipets, Friedrich
4 1 ml. 6.00

Pipets, Matchlett automatic
1 25 ml. (double) . . . 17.50

Pipets, Mohr
5 1 ml. 2.25
5 2 ml. 2.25
5 5 ml. 2.25
5 10 ml. 2.50

Pipets, Normax
1 1 ml. 1.50
3 5 ml. 4.95
4 10 ml. 7.20
6 25 ml. 12.00
2 50 ml. 4.20
2 100 ml. 4.60

Plates, electric hot
2 . . . . . 20.00

Plate, Flamo gas, hot
1 12"x16" 15.00

Plates, porcelain
3 6"x6"x3/8" 75

Plates, Witt
24 22 mm. 5.30

Plugs
6 3-way 90
12 96

Policeman, rubber
6 45

Pump, vacuum
1 Cenco (Hyvac) 80.00

276.61

Rack, Nessler
1 144 holes . . . . . .

Rack, rest tube
1 . . . . . 1.10

Rheostats
Assorted 75.00

Iron Rings
6 3 inch 1.20
6 4 inch 1.32
2 4 inch leveling bulb .76

Sample Crusher (metal)
1 . . . . . 5.50

Slides, microscope
2 gross 1.70

Soap, powdered
3 lb. 1.00

Sockets
3 Edison key 1.20

Soldering Iron and Solder
1 Soldering set 3.75
1 lb. Coil 65

Spectroscope
1 . . . . . 50.00

Stands, iron
7 . . . . . 7.70

Still, Barnstead
1 ~~gas heated 62.00~~
electric " 77.00

Stirrers, electric
2 . . . . . .17.00

Stoppers, cork
26 000 . . . . . 10.00

Stoppers, rubber
1/2 lb. No.00 37
1/2 lb. 0 37
1/2 lb. 1 37
1 lb. 2 75
2 lb. 3 . . . . . 1.50
2 lb. 4 . . . . . 1.50
2 lb. 5 . . . . . 1.50
1 lb. 6 75
1 lb. 7 75
1 lb. 8 75
1 lb. 9 75
1 lb. 10 75
1 lb. 12 75
1 lb. 14 75

Tags, linen
. . . . . 5.00

Tape
Friction 1.00
Adhesive 1.00
Scotch 50

196.99

Thermometers, Beckmann
1 U.S. tested 30.00
1 . . . . 15.00

Thermometers, depth
3 (87.50). 262.50

Thermometers, ordinary chemical
6 -10° to 110° 6.00
2 -5° to 250° 3.00
2 -10° to 350° 4.00

Thermometers, reversing, temp.
12 ea (75.00). 900.00

Tongs, beaker
2 . . . . . 2.00

Tongs, crucible
2 . . . . . 2.00

Tongs, nickel-plated
1 . . . . . 2.00

Tools, carpenter's
1 set 75.00

Torch
1 . . . . . 6.00

Towels, cloth
50 yards 10.00

Triangles
6 clay 90
4 silica 1.60

Tripods
4 . . . . . 2.60

Tubes, centrifuge
. . . . . 1.50

Tubes, Nessler
48 50 ml. 28.80
48 50 ml. 28.80
48 100 ml. 33.60

Tubes, T and Y
3 T 30
2 Y 30

Tubes, test (hard glass, Pyrex)
1 doz. 6 inch 60

Tubes, test (soft glass)
2 doz. 5 inch 48
1 doz. 8 inch 65

Tubes, thistle
2 30

Tubing, glass (combustion)
2 lb.19 mm. 3.00

Tubing, glass (Pyrex)
1 lb. 6 mm. 1.00

Tubing, glass (soft glass)
1 lb. 6 mm.(outside) . . .50

Tubing, gum rubber
20 ft. 3/16 inch 1.80

Tubing, pressure
10 ft. 3/16 mm. 2.00

Tubing, rubber
15 ft. 3/16 inch 1.35

1427.58

Vials
Assorted 2.00
Watch glasses
6 1-1/2 inch 20
6 2 inch 20
12 3 inch 40
12 4 inch 50
6 5 inch 40
6 6 inch 40
Watch, stop
1 1/5 sec. 16.50
Weights, analytical
2 sets 78.00
Weights, trip balance
1 set 8.00
Winch and tackle for
handling cable . . .
Wing tops for Flamo gas
2 20
Wire
1 roll iron 50
1-1/2 ft. Pt 2.00
Wire (miscellaneous)
. . . . . 3.50
Wool, iron
1 lb. 50
Wool, glass 1/4 lb. 50
Woulff Bottle
4 500 ml. 7.00
Wrench, for sample bottles
2 . . . . . .

120.80

CHEMICALS

Acetic Acid, glacial ($HC_2H_3O_2$)	10 lbs.	10.40
Alcohol		
amylic	2 lb.	2.25
ethyl	5 gal.	35.00
methyl	1/2 gal.	.75
Aluminum		
metal	1/2 lb.	.65
chloride	1/2 lb.	.30
nitrate	1/2 lb.	.45
Ammonium		
acetate	1 lb.	.79
bicarbonate	1 lb.	.39
carbonate	1 lb.	.52
cerium sulfate	1 lb.	2.50
chloride	1 lb.	.45
fluoride	1/4 lb.	.88
hydroxide	16 lbs.	3.78
metavanadate	1 oz.	1.00
molybdate [$(NH_4)_6Mo_7O_{24}\cdot 4H_2O$]	3 lbs.	5.70
persulfate	1/4 lb.	.26
polysulfide	1 lb.	.48
sulfide	1 lb.	.48
thiocyanate	1/2 lb.	1.20
Antimony		
pentachloride	1/2 lb.	1.06
trichloride	1/2 lb.	1.05
Arsenic		
pentoxide	1/4 lb.	.61
trichloride	1/2 lb.	1.70
trioxide	1/2 lb.	.52
Asbestos	1 lb.	4.36
Balsam, Canada	1/4 lb.	.75
Barium		
chloride	1 lb.	.48
hydroxide	1 lb.	.62
Benzene	1 lb.	.34
Benzine	1 lb.	.73
Beryllium nitrate	1 oz.	.75
Bismuth		
sulfate	1 oz.	.65
trichloride	1/4 lb.	1.43
Boric Acid	2 lb.	.94
Bromine	1/2 lb.	1.30
Bromphenyl blue	1/4 lb.	1.09
Cadmium nitrate	1/4 lb.	.49
Calcium		
metal	1 lb.	1.30
acetate	1/4 lb.	.42
carbonate	1 lb.	1.35
Chloride (reagent)	1 lb.	.91
chloride (for desiccators)	2 lb.	.84
hypochlite	2 lb.	.96
nitrate	1/2 lb.	.62
sulfate (precipitated)	1/2 lb.	.52
sulfate, anhydrous (Plaster of Paris)	1 lb.	.15
Carbon		
disulfide	1 lb.	.43
tetrachloride [CCl_4]	1 lb.	.61
Carborundum, powder	1/4 lb.	.25
Chloroform	1 lb.	.75
Chromium sulfate	1/4 lb.	.26
Citric Acid	1/2 lb.	.72
Cobalt		
acetate	1/4 lb.	.98
nitrate	1/4 lb.	.81
Collodion	1 lb.	.48
Copper		
metal	1/2 lb.	.54
nitrate	1/4 lb.	.27
acetate	1/4 lb.	.43
oxide	1/4 lb.	.61
sulfate	1 lb.	.52
Cotton, absorbent	1/2 lb.	.40
Dimethylglyoxime	1/4 lb.	1.72
Diphenylamine	1 oz.	.68
Drierite	1 lb.	.75
Ether, ethyl	2 lb.	1.48
Ferric		
chloride	1 lb.	.44
nitrate	1/4 lb.	.43
Ferrous		
chloride	1 lb.	.78
sulfide	2 lb.	2.06
Hexamethylene tetramine	1/4 lb.	.29
Hydrochloric acid [HCl]	18 lb.	3.06
Hydrofluoric acid	1 lb.	1.52
Hydrogen peroxide	1 lb.	1.25
Hydroxylamine·HCl	1 oz.	.70
Iodine [I_2]	1/2 lb.	1.46
Iron, wire	1/2 lb.	.85

87.11

32.60

Lead		
metal	1 lb.	.96
acetate	1/2 lb.	.46
dioxide	1/4 lb.	.59
nitrate	1/4 lb.	.30
Lithium chloride	1/4 lb.	1.04
Litmus paper	10 vials	1.20
powder	1 oz.	.23
Magnesium		
chloride	1/4 lb.	.55
nitrate	1/4 lb.	.26
sulfate	1/4 lb.	.20
Manganous chloride	1/2 lb.	.62
sulfate [$MnSO_4$]	6 lb.	5.46
Mannitol	1 lb.	2.44
Mercury, metal	3 lb.	6.90
Mercuric chloride [$HgCl_2$]	1/2 lb.	1.64
Mercurous chloride	1/2 lb.	1.88
nitrate	1/4 lb.	.90
Methyl orange (indicator)	1/4 lb.	1.50
Methyl red (indicator)	1 oz.	1.17
Microcosmic salt	1/4 lb.	.30
Alpha-naphthyl-amine acetate	100 gms.	5.00
Nickelous nitrate	1/4 lb.	1.16
Nitric acid	21 lb.	6.09
Perchloric acid	2 lb.	3.58
Phenolphthalein	1/4 lb.	.78
m-Phenylene diamine·HCl	25 gms.	.31
Phosphoric acid	2 lb.	1.24
Potassium		
acetate	1/4 lb.	.31
antimonate		
bromide	1/4 lb.	.23
chlorate	1 lb.	.64
chloride	1/4 lb.	.34
chromate [K_2CrO_4]	2 lb.	1.56
dichromate	2 lb.	1.50
ferricyanide	1/2 lb.	.88
ferrocyanide	1/2 lb.	.80
Hydroxide [KOH]	10 lb.	7.40
iodide [KI]	2 lb.	6.06
nitrate	1/4 lb.	.22
nitrite	1 lb.	1.73
oxalate	1/2 lb.	.70
perchlorate	1/2 lb.	1.00
permanganate	1 lb.	1.33
dihydrogen phosphate [KH_2PO_4]	1 lb.	1.18
pyroantimonate	1/4 lb.	1.46
sulfate	1/4 lb.	.26
Potassium thiocyanate	1 lb.	.96
xanthate	1 oz.	.20
Quinhydrone	1/4 lb.	2.03
Salicylic acid	2 lb.	1.82
Sand, sea	1 lb.	.15
Silver nitrate	20 lb.	150.00
Sodium acetate	1/4 lb.	.20
arsenite	1/2 lb.	.60
bicarbonate	2 lb.	.84
bismuthate	1/4 lb.	1.50
bromate	1/4 lb.	.73
bromide	1 lb.	.79
carbonate (anhydrous)	2 lb.	1.80
chlorate	1 lb.	.68
Chloride [NaCl] (PO_4 and NO_2 free)	40 lb.	3.12
cobaltinitrite	1/2 lb.	.76
hydroxide	5 lb.	3.30
nitrate	1 lb.	.43
nitrite	1 lb.	.61
oxalate	1/2 lb.	1.18
peroxide	2 lb.	1.14
phosphate (tertiary)	1/2 lb	.58
Disodium phosphate	1 lb.	.47
Sodium polysulfide	1 lb.	.31
selenite	100 gms.	4.00
silicate (water glass)	2 lb.	.40
sulfate (crystals)	1 lb.	.51
sulfide	1 lb.	.70
sulfite	1 lb.	.44
tartrate	1/2 lb.	.78
tetraborate, decaborate (Borax)	2 lb.	.78
thiosulfate [$Na_2S_2O_3$]	2 lb.	1.02
tungstate	1/4 lb.	1.25
Stannic chloride	1 lb.	1.17
Stannous chloride [$SnCl_2$]	1 lb.	1.13
Starch	1 lb.	1.00
Stopcock grease	25 gm.	.35
Strontium		
acetate	1/4 lb.	.68
nitrate	1/4 lb.	.59
Sulfanilic acid	1/2 lb.	1.48
sulfur	1 lb.	.20
Sulfuric		
acid [H_2SO_4] c.p.	36 lb.	7.56
acid [H_2SO_4] tech.	9 lb.	.54
Thallous nitrate	25 gms.	2.50
Tin, metal, mossy	1/2 lb.	1.18

Titanium potassium oxalate	1/4 lb.	.56
Turmeric Powder	1 oz. . .	.25
Uranium nitrate	1/4 lb. .	1.69
Uranyl Acetate	1/4 lb. . . .	2.00
Wax, sealing	2 lb.	.70
Xylene	1 lb.	.47
Zinc		
metal	1 lb.	.55
acetate	1/4 lb.	.30
nitrate	1/4 lb.	.31
sulfide	1 oz.	.49
Zirconium nitrate	. . . .	1.25

8.57

405.10

CALIFORNIA ACADEMY OF SCIENCES
GOLDEN GATE PARK
SAN FRANCISCO, CALIFORNIA
TELEPHONE BAYVIEW 5100

Nov. 20, 1935

tell about
Lava
Books

Mr. Waldo L. Schmitt,
Smithsonian Institution,
Washington, D.C.

Dear Mr. Schmitt:

In looking over a book published in London in 1823 and relating to Porter's cruise to the Pacific there are one or two items of interest pertaining to the Galapagos which may be of interest to you. One of these is a note giving the bearings of the anchorage made by the ESSEX at James Bay, and from these it may be that the approximate position of the grave of Lieut. Cowan may be located as I do not suppose they would travel far from the landing to inter his remains. The bearings given are as follows:

SW part of Albany Island bearing NW X N, Cape Marshall on Albemarle NW, and west point of bay SW X S.

I sent this item to Captain Hancock in case he may be interested enough to look around. If you should visit James Bay it might be well to have a look around, as even at this late date it might be that some signs of a border of lava boulders may be found.

Another item speaks of the carvings of ships names in the rocks at the water hole outside of Tagus Cove. You probably have visited this already and know the spot. If not you will find the place marked on the detail chart of Tagus Cove, Certainly this must be on the VELERO. I do not remember seeing any while I was there, but that is no sign that they are not visible.

Another item is the description of a cave on the NW side of Wenman. I copied this passage out of the book for Captain Hancock, and so you will have it in your notes on the Enchanted Islands will do the same for you.

CALIFORNIA ACADEMY OF SCIENCES
GOLDEN GATE PARK
SAN FRANCISCO, CALIFORNIA
TELEPHONE BAYVIEW 5100

" On the northwest side I discovered the mouth of a cave, very small at the entrance, into which I went with my boat, and proceeded, as near as I can judge, about one hundred yards; and , judging from the beating of the seas against the sides, and the acho from the top, I supposed it to be there, forty yards wide, and twenty yards high. We were, however, in perfect obscurity, and the apprehension of not finding my way out again prevented my proceeding farther. The water was every where of sufficient depth to float a ship of the line, and in this cavern , and at its mouth, we caught the most of our fish."

This looks as if it may be a good place for you. When I was at Wenman I was too busy gathering in geckos to do much exploring, so I did not see this cave. I thought you might like these items for your note book; hence the brain storm.

Very truly yours,

Joseph R. Slevin

California Academy of Sciences.

I think my Galapagos article will be in December Natural History

In this book, published in London 1823, Porter gives his notes on tortoises and I can't understand how Darwin omitted it before leaving for the Galapagos

JRS.

CALIFORNIA ACADEMY OF SCIENCES
GOLDEN GATE PARK
SAN FRANCISCO, CALIFORNIA
TELEPHONE BAYVIEW 5100

November 18,1935

Mr.Waldo L.Schmitt,
Smithsonian Institution,
Washington,D.C.

Dear Mr.Schmitt:

Your of November 14 at hand. I shall write Mr.Beck and tell him of your desire to have some prints of the tortoises just as a matter of courtesy as I am sure he will have no objections. I have his negatives here and the arrangement I made with him was to pay for the cost of printing and so much per picture that is published. The rate he asked was one dollar per picture. I'm sure he would have no objection to your publishing any with proper credit, and of course as far as I am concerned you can count me out of the picture altogether. I'll be glad to send some prints along just as soon as I hear from him.

It is too bad that Captain Hancock is scared out of Iguana Cove and Vilamil. Of course, the crater and the grass uplands are the main attractions. On a clear day you could ask for nothing more awe inspiring than a view of the great crater. It would not be necessary to anchor there, but merely heave to and put a landing party ashore. The vessel could run over to Conway Bay and anchor. However, I imagine the Captain would not leave the vessel long enough to take a ride up to the crater, and no doubt he would not let anyone else handle the vessel so he could remain with the shore party. Iguana Cove is OK on a smooth day.There is no place to anchor, but arriving there early in the morning he could leave a party ashore for most of a day and leave enough time to run over to Black Beach and anchor before dark. I think the VELERO ought to make the run in four hours. Heading for the highest peak on Charles will land you at the anchorage.

The inscriptions on James Island are just to the north of the flamingo pools. I'll enclose a little sketch of the James Bay anchorage giving the location of the place. As I remember there are two or three little gullies leading

CALIFORNIA ACADEMY OF SCIENCES
GOLDEN GATE PARK
SAN FRANCISCO, CALIFORNIA
TELEPHONE BAYVIEW 5100

down towards the beach just to the northward of the north point of James Bay and this one with the inscriptions is the largest of them. You no doubt can get a chart at the Hydrographic Office giving the detail of the James Island anchorage and this will give you the correct location. You will no doubt find the name of the Schooner ACADEMY there too. Possibly the weather has worn some of the names by this time, but you will no doubt find several old New Bedford whalers. You might keep your eye open for the name of the Frigate ESSEX. That would be quite a find. I do not remember seeing it and it may not be there. However, it would be well to be on the lookout for it. I have tried to find out something about the location of Lieutenant Cowans grave at James Bay, but there does not seem to be any mention as to the exact location. I got Mr.Parker, of the British Museum, to look at the Log of the Frigate "Briton", which is on file at the Admiralty Offices, to see if he made any mention of it as he was the party who discovered it during the cruise of the British Frigate BRITON in 1817. The data regarding the stop at James Bay is very meagre and mentions only the fact that a landing party went ashore and brought off some tortoises. Most of the entries in the Log for that day seem to be concerning the stores issued. Our own Navy Department has no record of it either, but if you go there it would be a good thing to see if there was any signs of a grave in back of the beach opposite the landing. I should think there would be some sign of a circle of lava blocks or some such sign. I couldn'timagine it being disturbed to any extent even at this late date. The original log of the ESSEX was lost no doubt, but Porter in his Journal of a Cruise to the Pacific mentions the fact that the duel between Cowan and a brother officer took place and that Cowan was buried where he fell at James Bay. Porter's letters back to the Navy Department mention the death of Cowan, but only in a list of deaths on board the frigate,and his name was listed according to rank. I got this information from the Captain in charge of historical documents at the Navy Department. I think it would be quite a thing to discover this grave. Should you do so it would be nice to photograph it, or even see if there were any remains left of the casket made by the ship's carpenter. It would be well to photograph the ships names if you locate them in the gulley north of James Bay. I was thinking it would be a great event in thecruise of the VELERO to bring the remains, should they be discovered, back to Arlington for interment.

CALIFORNIA ACADEMY OF SCIENCES
GOLDEN GATE PARK
SAN FRANCISCO, CALIFORNIA
TELEPHONE BAYVIEW 5100

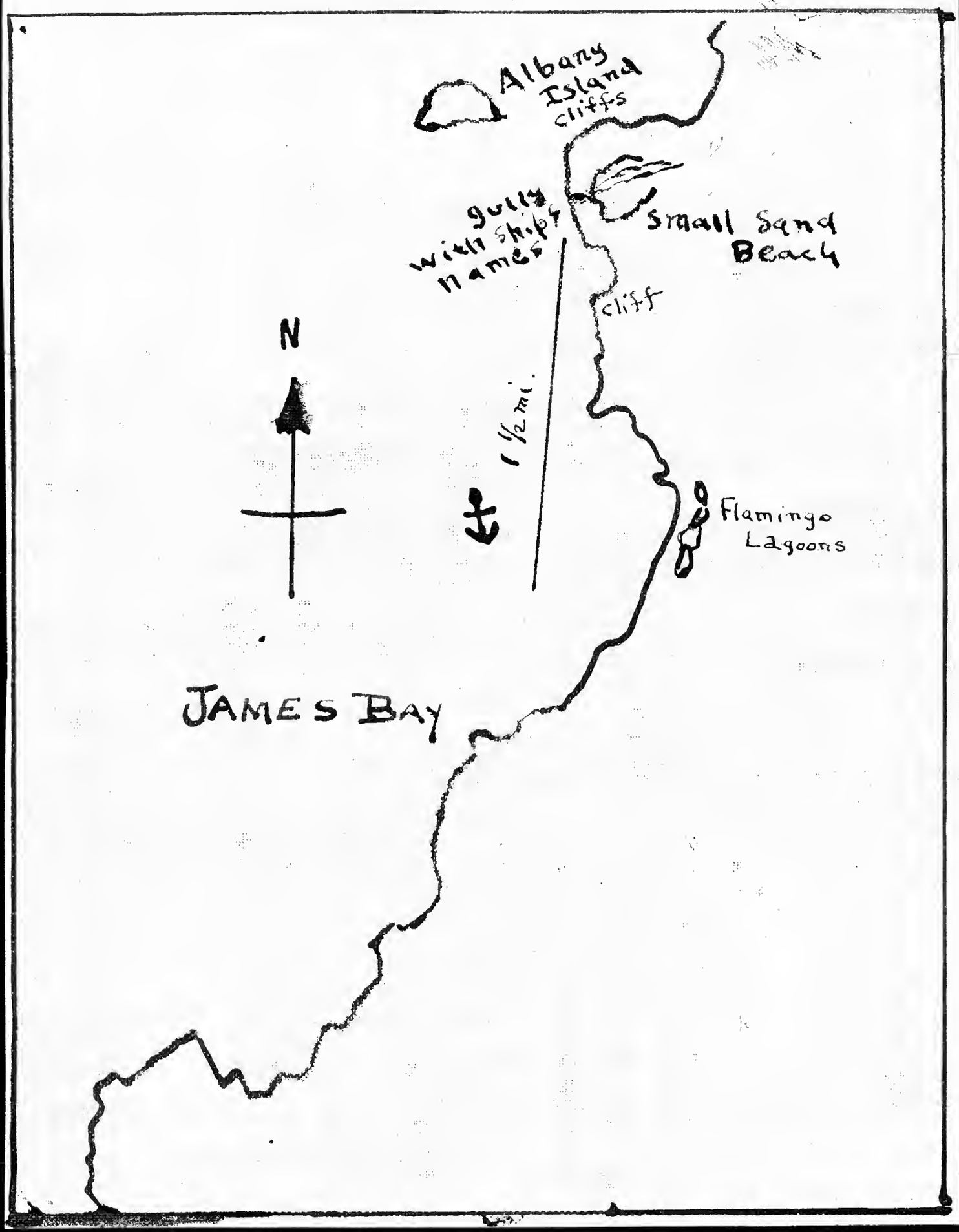
I trust that all the pictures I sent to the American Museum will be published. It was my intention, when I tried the National Geographic, to make a big splurge with Hancock's photos. as I thought that magazine would be the only one that could afford to print so many. However, I did not have a sufficient stock on hand and Mr.Swett said I would have to go down to Los Angeles to choose them. Of course, I did not want to stand the expense of a trip down there if the article was not accepted,so sent as many sampls as I had and told them the supply was practically unlimited. The arrangement I made with Captain Hancock was to pay for the prints off of his films and to present him with an oil painting of a Galapagos Land Iguana for the privilege of having the use of his pictures. Mr.Tose, our Chief of Exhibits, agreed to paint two pictures,or four if necessary, to illustrate the article.The Land Iguana, was sent with the photographs as a sample, but the thing did not seem to appeal to the Geographic. Mr.Tose touched the oil painting up to make more of a picture of it than an illustration,and I am sending it to Captain Hancock to fill my part of the bargain, despite the fact that it will not be published. I did not try any color pictures on the American Museum. Maybe the Captain will hang the picture in the dining room of the VELERO and you will see it when you make the next cruise. It would not pay the Department of Herpetology to make another trip to the Galapagos, and besides, though I would not care to have it repeated as I think Captain Hancock is the best ever, I would be very much opposed to making a trip on the VELERO. It is too stylish to suit my blood.

There is another landing on Indefatigable that is not too bad and that is directly opposite Duncan Island. Anchorage may be found most anywhere along the coast and it was from this landing that a party went inland and found where the remains of the old settlement are located. From this anchorage it is only a short run over to Duncan(four or five miles),and if I remember correctly around the rocks at Duncan we usedto get plenty of barcaleau and fishing in general was not bad. The signs of the settlement we saw were agaves and banana trees.

You might let me know if you get started for the Galapagos so the tortoise pictures will not lay around during your absence and possibly get lost. If there are any questions you want to ask about our experiences just shoot them along.

Very sincerely,

Joseph R. Slevin


Albany Island cliffs
gully with ship's names
small sand Beach
cliff
N
1½ mi.
Flamingo Lagoons
JAMES BAY

November 14, 1935

Mr. Joseph R. Slevin
California Academy of Sciences
Golden Gate Park
San Francisco, California

Dear Mr. Slevin:

I do hope that your article will be well illustrated. That was one difficulty with the Nature Magazine. They would not give me more space, and some pictures I asked of Mr. Swett did not reach us in time for the rotogravure supplement. We may publish those at some future date. I sometimes feel that neither your article nor mine reached the proper man at the Geographic Society, or else he didn't stop tp think about the Darwin centennial.

Could I get prints of some of the Hollo Beck tortoise pictures? I hope it may be possible to arrange for some if and when you have them copied for the Academy. I would be glad to pay for their cost. I have nothing on tortoises in my own file of pictures, and whatever pictures you could let me have would not be published unless express permission were first obtained from you or from Mr. Beck.

If I have a spare copy of that inscription at Las Cuevas I will send it to you with this letter; otherwise a little later. I am intrigued by what you say about the inscriptions on the rocks near James Bay. Can you give me a little sketch map showing the approximate location of the gully of which you speak? In what direction does it lie from the flamingo pool? If Captain Hancock heads back to the Galapagos this winter I expect to be a member of the party, and I would certainly take pains to get those inscriptions if I can readily locate them. I shall also bear in mind what you say about Cowley Mountain.

I would likenothing better than to go along on some trip with you, for you folks saw a great deal more and got more intimately acquainted with the islands than any other group. Captain Hancock has always fought shy of Iguana Cove and the Villamil landing. He has had so many unfavorable reports about the prospects of anchoring

or landing there that he will never venture near either one of them.

I shall certainly look in on you again this winter if the trip materializes.

Sincerely,

W. L. S.
LMc

Waldo L. Schmitt, Curator,
Division of Marine Invertebrates.

WLS:LMc

CALIFORNIA ACADEMY OF SCIENCES
GOLDEN GATE PARK
SAN FRANCISCO, CALIFORNIA
TELEPHONE BAYVIEW 5100

November 5,1935

Mr.Waldo L.Schmitt,
Smithsonian Institution,
Washington, D.C.

Dear Mr.Schmitt:

Yours of October 31 at hand. Glad to get the items you checked up on explained. I am still surprised that " fresh water tortoise" is given for Galapago and that Darwin had not heard of Porter's activities seeing he was so vitally interested in the Galapagos. However, news no doubt traveled slowly in those days and Porter's account of his voyage might not have reached England by that time.

I can't imagine why the National Geographic should have turned down your article. Of course, I am not enthused over the articles in the detective magazines and think a better class magazine should be approached. However, I thought, seeing the National Geographic was after excellent pictures that the assortment available from Hancock should put most anything over. My point was to stress on the photographs, which to my mind are far more interesting and educational than many I have seen in the Geographic.

My Galapagos article should be out very shortly if I was not too late in getting the last batch of pictures in. The editor of Natural History said he wanted to put the article in the coming number and wanted the remaining pictures as soon as possible. I shipped them yesterday by special delivery and air mail. I had forwarded one shipment, but I wanted to get a good land iguana and a good sea iguana picture as the ones I sent were nothing to boast of. I got two excellent ones together with one ortwo other things I asked for, so I hope the article will get out this year.

Included in the article are a couple or three prints of scenes on the way down to the Galapagos. When on the"Oaxaca" Stone took a fine picture of the big cave on the largest of Las Tres Marietas and this was such a fine picture I thought it would go well. Also included a picture of a rooster fish just as it was being gaffed. This is an excellent picture too and gives life to the article. For an historical touch there is a picture of an inscription on one of the rocks at Cocos Island. It was such an excellent print I'm sure it will

CALIFORNIA ACADEMY OF SCIENCES
GOLDEN GATE PARK
SAN FRANCISCO, CALIFORNIA
TELEPHONE BAYVIEW 5100

reproduce well. It tells of the visit of a French Brig under command of the Count de Gueydan. When Beebe copied a lot of the inscriptions he had this one down, but had it wrong. I tried to find out who theCount of Gueydan was, but to date have not been able to do so. The name of the ship, or rather brig, is S. Mte Le Genie. I thought this would be a nice thing to get in, mentioning that Cocos was often visited by the early navigators.

Among the old pictures I got some from Rollo H.Beck showing the tortoises and the ravages of the oil hunters. Beebe published one of this type,but mine is a different print. The barrel at Postoffice Bay as it stood in 1902 is shown as an historical picture. I trust the editor will get in all the pictures I sent.

I went overland to Las Cuevas from Cormorant Bay and have a faint recollection of seeing the name of Cobos on the rock cliff. One thing that always make me sad when I think of the inscriptions on the rocks is the fact that I lost my notebook getting off the beach just north of James Bay after I had copied the names of a lot of whalers, the number of days they were out from New Bedford,and in some cases the names of the Captains and Mates. These were all in a little gully just north of James Bay.

When I had the National Geographic in mind I bargained on getting a lot of pictures as I thought that magazine would be the only one rich enough to carry so many illustrations. I sent some smaples and told them I would furnish ample for the article. However, as you know they turned it down saying that they had two years supply of natural history. I suppose this was a polite way of letting me down. I did not send the full quota of pictures as it would have been necessary to go down to Los Angeles to pick them out as Swett told me he did not have prints of all the negatives. Iwould have to go through the card catalog and pick out the subjects I wanted. I did not want to do this on account of the expense of the trip down there.

There are one or two places in the Galapagos I would like to visit again, but as far as I am concerned I guess they are a closed book. It would not pay me to go down again as far as herpetology is concerned. I would like to visit the country to the northwest of Vilamil Mountain again and also to look on the right part of Duncan Island to see how the crop of tortoises is. A visit to the southwest slope of Iguana Cove Mountain would also be in order to see if the big tortoises were still there.

CALIFORNIA ACADEMY OF SCIENCES
GOLDEN GATE PARK
SAN FRANCISCO, CALIFORNIA
TELEPHONE BAYVIEW 5100

If you go down with Hancock this winter you ought to try and get him to take a look at Cowley Mountain. You can anchor off Cowley Island in perfect safety and land right at the foot of the mountain. This mountain is different from the rest of them and has the slope you land on a clear field of pumice. You travel over pumice a long way up the slope and around the rim of the crater find a forest of sword grass. Of course, there is not a great deal around there, but it shows a type of Galapagos country you will not see elsewhere.

I thought by this time we would be seeing in the Museum News that you were on the way to Los Angeles to join the VELERO III. However, now that the Ritters have gone the Enchanted Islands may have lost some of their charm for him. It may be possible that my article will come out in the December Natural History, so you might keep your eye open for that issue if you are not in the Galapagos. I'll be glad to know if you think it should have passed inspection.

Very truly yours,

Joseph R. Slevin

California Academy of Sciences.

The Geographic never got over their peeve with me over asking for the return of my not used Juan Fernandez photos and the ___ book a rare one it is. They turned down my Darwin article which appeared in the Nature Magazine and refused to consider an article on the Presidential Cruise of '38

October 31, 1935

Mr. Joseph R. Slevin
California Academy of Sciences
Golden Gate Park
San Francisco, California

Dear Mr. Slevin:

I do appreciate your letter of the 25th more than I can say, and that is why I answer it so promptly. I wish now that I had been a little more careful as to my reptile references and that I had applied to some one in our Reptile Division for comment on my statements. Stejneger is away, but I do not know that I would have thought of him had he been here. I am afraid that I let sentiment carry me away when I was thinking about retracing Darwin's trails.

"Galapago" was one of the particular things which I did check up, for I had seen various reference to the translation of this word. One of the latest and best Spanish dictionaries that I have seen-- Appleton's, 1930-- carries "fresh water tortoise" for this word. Some of the earlier travellers had used the same phrase. That is the reason I did check this point. Of course, the usual Spanish dictionary is no place for a scientific definition.

There is one article you will enjoy regarding Darwin, and that is James Ritchie's review of his (Nora Barlow) recently published diary (Cambridge University Press, 1933). This appears in Science Progress, Vol. 28, No. 112, pp. 736-742, April 1934. Darwin was perhaps too young a man to have known of Porter's account. In his "Voyage of the Beagle," at least the editeon I have at hand, he himself acknowledges having learned from Mr. Lawson for the first time that the tortoises differed on the different islands.

I can't begin to thank you for your letter. It, too, makes me homesick for those islands. There is so much yet to be done there. Did you ever make that landing on Charles called Las Cuevas, the one away over to the east where there is that Cobos inscription on the cliff wall? If there are any pictures that I can help you out with, please let me know. Make your wants known and I will see if I can fill them.

I hope the American Museum will make an effort to get your article out before the close of the year. It should appear in '35. I felt rather miffed with the National Geographic Society, not only because they turned down my article and yours, but because they overlooked a really wonderful opportunity of comemorating the

I hope the American Museum will make an effort to get your article out before the close of the year. It should appear in '35. I felt rather miffed with the National Geographic Society, not only because they turned down my article and yours, but because they overlooked a really wonderful opportunity of commemorating the anniversary of an epoch-making voyage. Their excuse for turning me down was that there had been too much notoriety in connection with the islands recently, but I felt it was a rather poor excuse, for the scientific end of it transcended everything else. In England, the British Association held commemorative exercises because of this hundredth anniversary. Yes, the Nature Magazine article is largely that which I had offered the Geographic Society, but much reduced. I had made considerable mention of the findings that you and Swarth had made regarding the origin of the Galapagos fauna, but all that was cut out for want of space.

You are certainly a good scout, and I wish that I could go to the Galapagos with you one of these days.

If I were you, I would prod the American Museum regarding your article, in view of the year in which it should appear.

All good wishes to you.

Sincerely,

Waldo L. Schmitt, Curator,
Division of Marine Invertebrates.

WLS:LMc

CALIFORNIA ACADEMY OF SCIENCES
GOLDEN GATE PARK
SAN FRANCISCO, CALIFORNIA
TELEPHONE BAYVIEW 5100

October 25,1935

Dear Mr.Schmitt:

Your Galapagos article in Nature Magazine was read with great interest and I think you have a very nice assortment of pictures. May I ask if this is the same article as you tried the National Geographic on? I tried them on mine and they informed me that they had two years supply of natural history articles and any more would be a little too much, or words to that effect. However, a short time ago I sent it to the American Museum and they are willing to take a chance with it. I suppose they are booked ahead for a long time, so it may be ages before the article is published.

There are one ortwo points in your article that I think might need straightening. Of course, my criticism is strictly friendly and not to be taken in any other way. However, in case you should write anything else on the Enchanted Islands you might check on the following:

Where you speak of following Darwin's steps on Charles- page 268 "the tortoises and land iguanas have disappeared". As far as the records show I know of no land iguana ever having been found on Charles. It was on James that he saw so many of them.

Page 271 Are you sure about " As in Spanish a fresh water tortoise is a Galapago ? I always thought the sea turtle and any of the terrapins were called tortuga and the land animal Galapago. The sea turtle was sometimes called tortuga de mar.

Page 312 " On Albemarle it is already rare, while on Charles,James, and Indefatigable it has become completely extinct".-- I'm sure there are no records from Charles. On Indefatigable it was taken in 1902 by Beck,and in 1924-25 by the Norwegian Expedition to the Galapagos. The Norwegians took two at Conway Bay. However, it is extremely rare on Indefatigable.

CALIFORNIA ACADEMY OF SCIENCES
GOLDEN GATE PARK
SAN FRANCISCO, CALIFORNIA
TELEPHONE BAYVIEW 5100

It seems strange to me that Darwin did not know of Porter's notes on Galapagos tortoises. As you know it was Porter who first called attention to the fact that the tortoises from the different islands were different. I should think the scientists would have known of these notes by 1835. Porter mentions this fact in his Journal of a Cruise made to the Pacific Coast.

I enjoyed the article very much and I can easily see where the magazine would be glad to get it. I think the National Geographic goes in more for descriptive travel of countries where tourists can get to. Some of your pictures make me feel homesick!! Many a night I spent trying to get a wink of sleep in those caves on Charles. I suppose you will be starting down again before long. With best wishes and congratulations on your article, I remain

Very truly yours,

Joseph R. Slevin

California Academy of Sciences.

Things to do:

Blood sera

Tortoises each id

Iguanas each id

Both on confined
mainland species

Different land & marine
iguanas for various
ids. (protein)

coffee dollar
ahead
on per due
to keep up in
land in ~~trade~~
Ecuador

never say anything
about trouble getting
through reef & Pilamid

Avdgson Poulton
so can be moved

of Slevin acc't

p. 126 old hail to
settlement in
interim, any other
dope on ~~~

d p. 127 Rough many
p. 128 miles

Things to do

Zoological (= Biological)

Tortoises each island and against mainland species, & ? Aldabra } relative age of habitats (or nearest ancestral type

Iguanas, marine diff species and islands against each other and also mainland forms.

On supposed Indo pacific types of marine invertebrates or near relatives of same

Iguanas land ditto

Geospizas & other birds against Indian d'Amor (& [illegible] birds flamingo, Brown Pelican)

Oceanographic

Currents and water conditions from day to day, year to year, at several selected stations. (a check on Humboldt Current?

Tidal conditions throughout islands.

Meteorological

Met. Station half way, & on shore both on lee & windward sides of given isld.

Geology:

Relative age, rocks
and lava flows
(re marble)
helium & radium
different isds.

Need?

Core drills

Pneumatic hammers and
portable compressors for same

Paleontology

Thoroughly go through
existing deposits; are
there any more, on other
islands or same isds.

Things to do (contd)

Get tortoise ?
range skeletons ?
long

Biological

Land Census of existing animal life

Tortoises
Growth rate under nat. conditions
tag or mark.

Erect pens for nests when discovered

Pay reward for discovery of nests

Film mating + behavior generally

Ecology
Encourage reproduction see what can be done about this historically by enclosure around nests (including breeding pens?)
Destruction of introduced pests (carnivores) rats, dogs, cats

Baits lines
cutoirh (try out
diff. methods
advocated by Biol. Survey

We have here and example of how carnivores are destroying. Increase ~~[illegible]~~
dogs, cats, rats eat eggs

Freshwater

Protective coloration
why needed or present in galapagos
Also when hawk seems not to eat small birds.
Eats snakes + insects
? grass hoppers.

Marine

Look for Indo pacific types

Zonation
Distribution
~~Ecology~~ Biology

Fish food, plankton
Fishes (Icthyology) } Tuna biology
Invertebrates

Survey of islands:
life: dist. abundance
vegetation zones – water
fossils – minerals – geology
lava for age

{ tortoise on horseback / raise eggs / get rid introduced animals rats cats dogs }
{ helium / radio-active elements }

Boyden, serological studies { hair lines / catrich, female dogs / hair around }

Geospiza birds raise clutch & band young.

{Proper motor boat} (2 motor boats / one small; one cabin cruiser for getting around isles }
Diesel. or gas
safer

(1) Helpers cooks for 6
(1) motor boat man. 1
(1) janitor, handy man, cook helper if need be steward
(1) deck hand & asst. janitor

— Scientific – steering.
(1) director tortoise
(2) serological work { iguana
or just (2) (3) physiologist { birds
(4) bird man tortoise
invertebrate coll.

Growth rate
Tortoises under
natl conditions

---

erect pens for
nests of turtles
when discovered

Pay reward for
discovery.

Mating

Protective coloration?
when Galapagos Hawks
eats snakes

& most small
birds; also
eats insects

Charles limited water.
Chatham plenty water but
amoebic dysentery.
James but no water?

Isla Indefatigable. pipe line
Albemarle a few landings at Villamil
Iguana cove, bad landing for.

Reported occurrences of water should be investigated (record traffic of animals in water and visiting it — flash light + movie camera that makes records.)
{invisible light
photo electric cell}

~~Hood~~ no water
Duncan water.

J. W. Bay Chatham would require water source, + pump + pipe line.

Publicity
Dept. Director

Problems to be
investigated
Distribution + abundance
of existing life
census of whole
of islands
Increase
rate of reproduction

Breeding dates

Books

Barrier reef

Calif Acad Sci

Huts

Lab + dining; 35 × 18½

Kitchen; 10 × 12

Long hut 5 rooms; 99 × 12½

1 = store, { 4 for ladies and married couples

Living hut; 40 × 12½

{Portable can be moved if desired change location

Labor

2 women cooks & husbands

2 men for rough labor [boys college boys

Supt. work

Engineer

Boats - Gas - Tanks

Sloop & motor diesel?

winch & —
Sonic Sd. down to 120-160 fms.

storage batteries
Light plant
compressor
exhaust
refrigeration sharp freezer or elec elect

Ask Brame?

Temperature — water bottles
salinity — titration? — anything to photo electric cell
oxygen content (Winkler)
hydrogen ion ~~content~~ concentration
dissolved phosphate — Atkins mod. method
nitrate
silica
turbidity — Clarks photo electric cell
Ewings camera
Seasonal variations at selected stations

Current meters (have 3) same " "

Weather Bureau "cages" & instruments
one at sea level one half
way up and at top.

Optical equipment

2 binoculars { at least one armed / one with stage

microscope lights.

1 compound { binocular objective / high power

1 Cameras for color still } 750 -1200

1 " " " movie

Photo equip. dark room

Cameras 150

{ Oceanographic apparatus 1,000

Geological ,500

Meteorological 1,500

Geological [illegible] Camera

Geol. Soc.

Quarry & core drills

Coast

{ Housing 6-8000

Power boat ~~6~~ 8,000

Elect light plant diesel

+ Ship station

Refrig X Radio

= Sounder 3,500

Housing

Portable house type laboratory including bedrooms, etc., for staff. Building similar to the Troy Laboratory shown in the blue print received from the Hodgson Co. ~~A screened~~ porch such as is shown on p. 27 of their catalog should be added to the house. At times mosquitoes are a frightful pest in the Islands.. . . . . $6,000

Lodgings for crew and help . . . . . Perhaps 2,000

Housing for power plant and shops. 1,000

Chemical closets and other necessary plumbing 500

Kitchen utensils, stove, refrigerator, ~~laundry equipment~~. 500

Laundry equipment 200

24 bentwood chairs 63.28

Dining table 25.00

Furnishings for 6 bedrooms (2 double; 4 single). 308.32

8 beds.....	$132.00
8 bureaus.....	72.00
8 mirrors.....	44.00
8 tables.....	48.00
8 matting rugs, 27"x54"..	12.32

10 porch chairs (fiber). 64.00

8 straight chairs.....	50.00
2 rocking chairs.....	14.00

2 porch tables.(fiber) 17.00

Bedding, linen, etc. . . . . .

Boats, sounding, radio, and navigational equipment; fuel

ANTON DOHRN (70' x 16' x 6' draft; new engines needed; 9-10 knots ?) (Orig. cost, $30,000) . . . . . $8,500 - $9,000

DARWIN (28'10" x 8'6" x 24" draft; 25-40 6 cyl. Kermath, 80 gal. tank, 3-1/4 miles per gal; self starter should be added) 450

VELELLA (about 25' long, narrower than DARWIN, 35-50 4 cyl. Kermath, self starter should be added) 450

Skiffs, prams, or dories . . . . . ✓

Power skiff, 14 ft. 200
(12 ft. $160)

Shallow water fathometer . . . . . 3,250 –
Storage battery extra.

Radio phone capable of reaching Panama . . . . . 2,500 –

2 portable radio phones for communicating between field parties and base laboratory and boats . . . . . ✓

Radio direction finder . . . . . ✓

Field glasses . . . . . ✓

Telescope . . . . . ✓

Range finder (Navy type) . . . . . ✓

Chronometers . . . . . ✓

Sextant . . . . . ✓

Stop watches

Boat compasses . . . . . ✓

Hand compasses . . . . . ✓

Patent logs . . . . . ✓

Fuel: diesel oil, gasoline, lubricating oil, includes running boats, light power, and evaporator. 3,600

Diesel oil weighs 7.3 lbs per gal
Gasoline weighs 7.7 lbs per gal.

Light and power equipment

2 10-k.w. (diesel powered) generators, complete $3,500.00

Electric fans, lights, wiring, etc. 500.00

Diesel fired evaporator, 100 gal. a day capacity. . . . . Under 500.00
(In this connection, I understand that Dr. Abbot is building a small portable solar evaporator. If practicable and not too expensive, it might be ideal for producing water for branch laboratories and field stations.)

Water storage tank, fresh water, 10 x 10 cypress 2 inch staves, 46,000 gal. 150.00

pump & pipe line

500 gal. galvanized pressure tank for fresh water, heavy duty, electric driven pump. 80.00

Water storage, salt, ~~as above~~ wood 6x8 - 975 gal. . . . . 80.00 wood

Electric pump for circulating ~~salt~~ 2nd water in aquaria, lead lined. . . . . .

Lead lined pipes for this system . . . . . .

Electric pump for salt water flushing system, showers, and fire protection. . . . . .

Diesel oil storage tank, 5,000 gal. 1,000.00
(1000 gals., $300)
Pump and piping extra.

Gasoline storage tank, 500 gal. 160.00
Pump and piping extra.

B 300

Portable sharp freezer, 6.2 cu. ft. 200.00
A sharp freezer, aside from kitchen refrigerator, should be somewhere provided for freezing specimens in case there are any that are to be shipped in the frozen state or dealt with some time after collection. A freezer of this type would be required if local meat supplies, such as beef from Albemarle, were depended upon. The cattle are slaughtered far up in the hills and, under present conditions, by the time the meat reaches the shore it has to be cooked immediately to prevent spoilage. This sharp refrigerator might have to be installed on the DOHRN or whatever vessel is purchased for the laboratory's use. Should have two, one afloat, one ashore.

Laboratory equipment

Microscopes and lamps. $1,200
- Binocular stage.....$300
- Binocular arm..... 300
- Compound..... 450
- 3 microscope lamps..... 150

Chemical and physical oceanography. 6,500
- 12 Thermometers.....900
  - (We have a stock of these left over from Johnson-Smithsonian Exped.)
- 2000 meters 1/4 inch cable for handling water bottles.210
  - (There is some cable, if in good condition, left over from the Johnson-Smithsonian Exped. that might be used.)
- 10 Water bottles..... 750

Have itemized list for $6,500 total.

Winch

[NOTE: A suitable hoist and winch for handling the 1/4" cable and the water sample bottles not included in the above total of $6,500.]

Winch - - - - - - - - - - -

Apparatus for serological investigations.. 350-500

Hand lenses, dissecting instruments, etc. . . . . .

~~Field glasses~~ . . . . . .

~~Telescope~~ . . . . . .

~~Range finder (Navy type)~~ . . . . . .

Preservatives . . . . . .
- Alcohol
- Formalin
- Misc. chemicals

Glassware, tanks, and other containers. . . . . .

Aquaria . . . . . .

Photographic equipment, including Eastman Ektra and B. & H. 16 mm. auto load, and accessories, and dark room facilities. . . . . $1,500 - $2,000 1/

Film. 1,000

Medical supplies. . . . . .$100 - 200

Meteorological Observations

observing station, could be visited once week only hence recording

Each station, not including housing for recorder and battery or necessary wire and cable. $1,198.80

Wind, sunshine, rain	868.00
Barograph	130.00
Hygrothermograph	144.00
Thermometers & shelter	51.80

4 stations placed

4,775.20
800.00
132.00
198.00
6,905.20

Housing, wire, and cable. . . . . $100 or 200.00

Instruments 132.90

Barometer, mercurial, with box	75.00
Barometer, aneroid	50.00
Rain gauge	7.90

} for checking and calibrating recording instruments

Shops, repair, construction.

Machine shop, lathe, drill-press, forge, anvil, tools,
pipe, fittings, brass, iron, and steel, rods,
sheets, etc. . . . . $1,500 - $2,000

Carpenter shop, tools, saw, circular and band, shaper,
drill-press. 500

Lumber . . . . . .

Hardware . . . . . .

Office equipment

Typewriter (There should be two typewriters)	$70.00
Typewriter desk	14.00
Book case	17.50
File case	20.00
Stapling machine	2.75
Fireproof cabinet or ✓	
Safe	155.00

Library

Books and periodicals	

Transportation - Subsistence for staff and investigators

Round trip New York - Balboa, if on transportation requests. . . .	$120	each
Per diem enroute, 10 days at $2 - $3.	$20 - 30	"
Perdiem in Panama or Zone, per day.	5	"
Subsistence per man per day, $1.00+, per year.	400	"

The Carnegie Institution allowed $1.00 a day per man. The Division of Home Economics of the Department of Agriculture estimates from $5 to $6 a week per man, or 75 to 85¢ per day. We should certainly base our estimates on the Carnegie figure to be safe, and perhaps add 10% to that.

Suggested scientific staff
Board, lodging, and transportation to the Islands furnished)
(or are quarters and subsistence to be subtracted?)

(1) Resident director (superintendent and manager). $3,200 3,800
(1a) Clerk stenographer (recording & drafting) 1,800
(2) Visiting investigators (one or more specialists appointed for periods of three to six months or a year. Salary to be paid only if necessary for him to hire a substitute during absence in field). 2,400 2600

(3) Oceanographer and chemist (trained postgraduate student assistant to resident director, junior rating?). 2,000

(4) Marine biologist
Do. 2,000

(5) Vertebrate zoologist
Do. 2,000

(6) Botanist
Do. 2,000

(7) Weather observer (if instruments, food, lodging, and transportation were furnished, Weather Bureau very probably could be persuaded to detail one of their men for work, salary paid). . . . . .

(8) Ecuadorian Scientist

(a). One, no salary; board and lodging to be furnished. . . .

(b). If two are accepted, board and lodging and salary to be paid by Ecuador on pro rata basis; would be expected to share twin bed room. . . . . .

Note on (2)

The visiting investigators are to be selected for special jobs.

First recommendation is Alan A. Boyden, Rutgers, who can be obtained on leave (if all else furnished, no salary needed) for 3-4 months of serological studies on endemic vertebrates. This would appear to be the most important investigation that would return worthwhile and note-, as well as newsworthy results in minimum time regarding relative age of closely related species of both birds and reptiles on the various islands, and on Cocos where a species of Galapagos finch occurs. At another time a first rank ornithologist or botanist might be sent to the laboratory under a similar arrangement for special investigations.

Note on (3), (4), ~~and~~ (5) and (6)

Whichever of these lines of research is represented in the person of the resident director could in the beginning at least be omitted from the resident staff. However, resident director would have almost enough to do running the laboratory; at best, he could spare only limited time for research work during the first year.

Director should have one clerical (secretarial) assistant.
I remember how much Hildebrand had to do at Beaufort; during new building.

Operating personnel for boats and shore stations

1. Mate (Captain, engineer, and machinist) 2400

2. Engineer (and engineer, machinist, electrician, and radio man). 2400

3. ? Radio man and electrician 2000

4. Deck hand (janitor ashore) 2000

5. ? Second deck hand 1800
   If DOHRN is used for otter trawling, should have second deck hand (either one or both to serve as launch men).

6. Cook (must be first class) 1500

7. Mess boy (to help cook, care for quarters, do laundry ?) . . 600

8.) ? Ground keepers, one or two Ecuadorians. 300
9.)

Tortugas Laboratory Budget (approximate)

- - - - - - - -

The matter of setting up and maintaining the Tortugas Laboratory presented the Carnegie Institution with much the same problem as that confronting us in the proposed Galapagos Island research station. I therefore append an approximation of the budget of that laboratory, where I was fortunate enough to spend four summers, along with statements of the capital investment and grants for three different years as given in the Year Books of the Institution.

The laboratory was kept open for about twelve weeks each summer, roughly two and a half months. The budget was for the running expenses of the summer season only, except for the charge for the mooring site in the Miami River where the laboratory boats were kept during the winter. I understand that the larger repairs and replacements and special trips and travel, such as through the West Indies, to Tahiti, Samoa, and the like, were separately appropriated for. They were not included in the regular laboratory budget. The budget items of travel, hotel, and laundry covered the expenses of the visiting investigators on their way to the laboratory and home again. Temporary help numbered from six to seven people; provisions and ice provided for 18 to 25 for the twelve weeks period.

Travel		$2,500
Hotel and laundry.		250
Temporary laboratory help (6-7).		2,500
Captain Mills' salary.		2,400
Provisions and ice	$1,800 -	2,500
Scientific supplies.	750 -	2,000
Gas and oil	1,200 -	1,800
Wharfage		300
Upkeep and minor repairs (usually $2,000)	1,000 -	2,000
Miscellaneous		400
(in 1915 the laboratory budget totaled $19,150)	$13,100 -	$16,650

12 weeks, [illegible]
then 3 mos

x 4

52,400 / 66,600

Tortugas capital investment (actual)

Open from	May 20-Aug. 2 1915	May 31-Aug. 21 1925	June 3-Aug. 10 1937
Vessels	$32,325.40	$30,930.43	$30,930.43
Buildings, dock, furniture, etc.	11,651.96	12,130.86	12,930.86
Apparatus and instruments	4,981.94	9,322.55	9,322.55
Total	$48,959.30	$52,383.84	$53,183.84

Tortugas Grant (for corresponding years, actual)

Running expenses	$19,150.00	$13,500.00	$15,000.00

Recommended for purchase this year.

Most of these items should be ordered promptly because some deliveries are slow or delayed due to present emergency.

Microscopes and lamps . . . . . (Need almost a year's notice to get.)	$1,200
Camera equipment . . . . . (safe buy, any time.)	$1,500 - 2,000
Fathometer	3,250
Weather Bureau instruments for four stations, plus checking set, not including wire and housing, at $1,200 each, plus $133 (checking set)	4,933
Typewriter . . . . . (Should be two typewriters.)	70
Safe	155
Serological apparatus.	350 - 500
* Radio phone . . . . . (branch sets extra	2,500
Navigational aids, range finder, radio compass, field glasses, chronometers, sextant, etc.	

Water bottles (reversing) $750.00

Evaporator $2-300.00

Dohrn 10,000.00

1,608

Federal Telegraph Co. Newark, N.J.
Portable Signal Corps radio phone

Maintenance and salaries

Scientific staff (Director and 3-4 assistants; one assistant should be clerk-stenographer [secretary]; one vacancy to be hald for one or more specially invited visiting investigators if need be; one or two scientific assistants for or to assist with special lines of research, one oceanographer at least).	$10,000 - $12,000
Weather man (there is possibility of Weather Bureau detailing man for job; if so, subsistence only).	
One or two Ecuadorian scientists (if one, lodging and subsistence only; if two, no cost).	
Operating personnel (5-6)	9,000
Captain or mate Engineer One or two deck hands or launch men Cook Mess boy (also attends rooms) ? Janitor service and ground keepers (one or two Ecuadorians)	
Subsistence for 8-11	6,000
Fuel, upkeep of boats, repairs	8,000 - 10,000
Travel and miscellaneous	2,000
	$35,000 - $39,000

supplies 750-2,000

Capital investment (minimum)

Vessel	$1.00 - $10,000
Launch, at least one	450
Small boats, one power skiff	200
Two dories or prams	
Shore laboratory and scientific staff lodgings	2,000
Crew quarters and shops.	2,000
Furniture, fixtures, linen, etc.	800
Tools, shop equipment.	2,000
Generators	2,000
Evaporator	300
Tanks for fuel, water, gas, etc.	1,000
Pumps, pipe lines, plumbing, etc.	1,000
Freezer	400
Laboratory equipment, scientific and Weather Bureau apparatus.	5,000
	$27,150

D

Capital investment (maximum)

Vessels and small boats	$20,000
Housing, furniture, fixtures, linen, etc.	12,000
Tools and shop equipment	3,000
Light, power, pumps, pipes, tanks, evaporator, freezer	7,000
Laboratory equipment, scientific and Weather Bureau apparatus	17,000
	$59,000

60,000