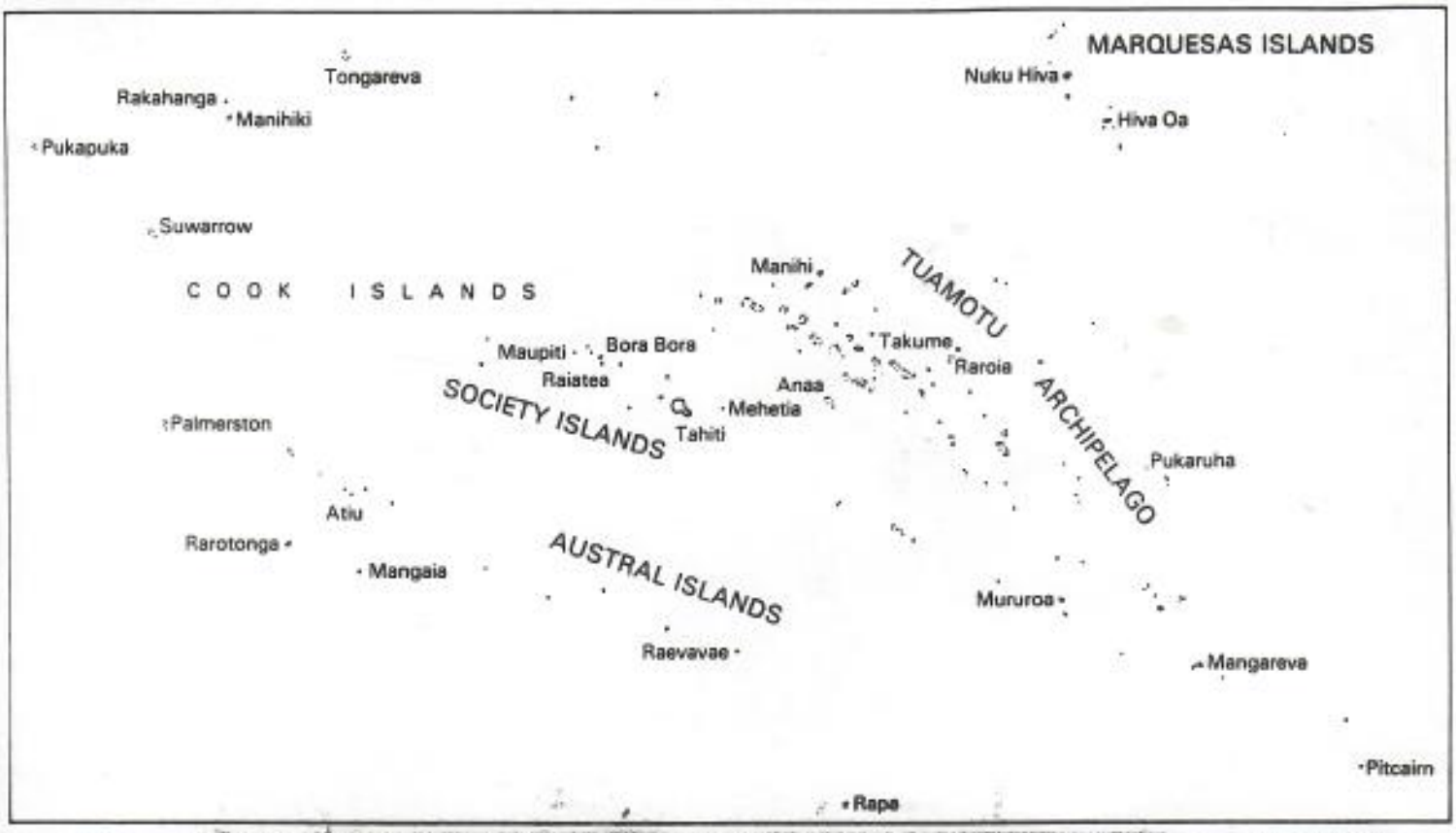
Redo + X-rays

Tagging and Measurement Data for 15 Juvenile Green Turtles
Released at Scilly Atoll, French Polynesia
on October 15, 1991
by
Philippe Siu, Jean-Pierre Landret, and George Balazs

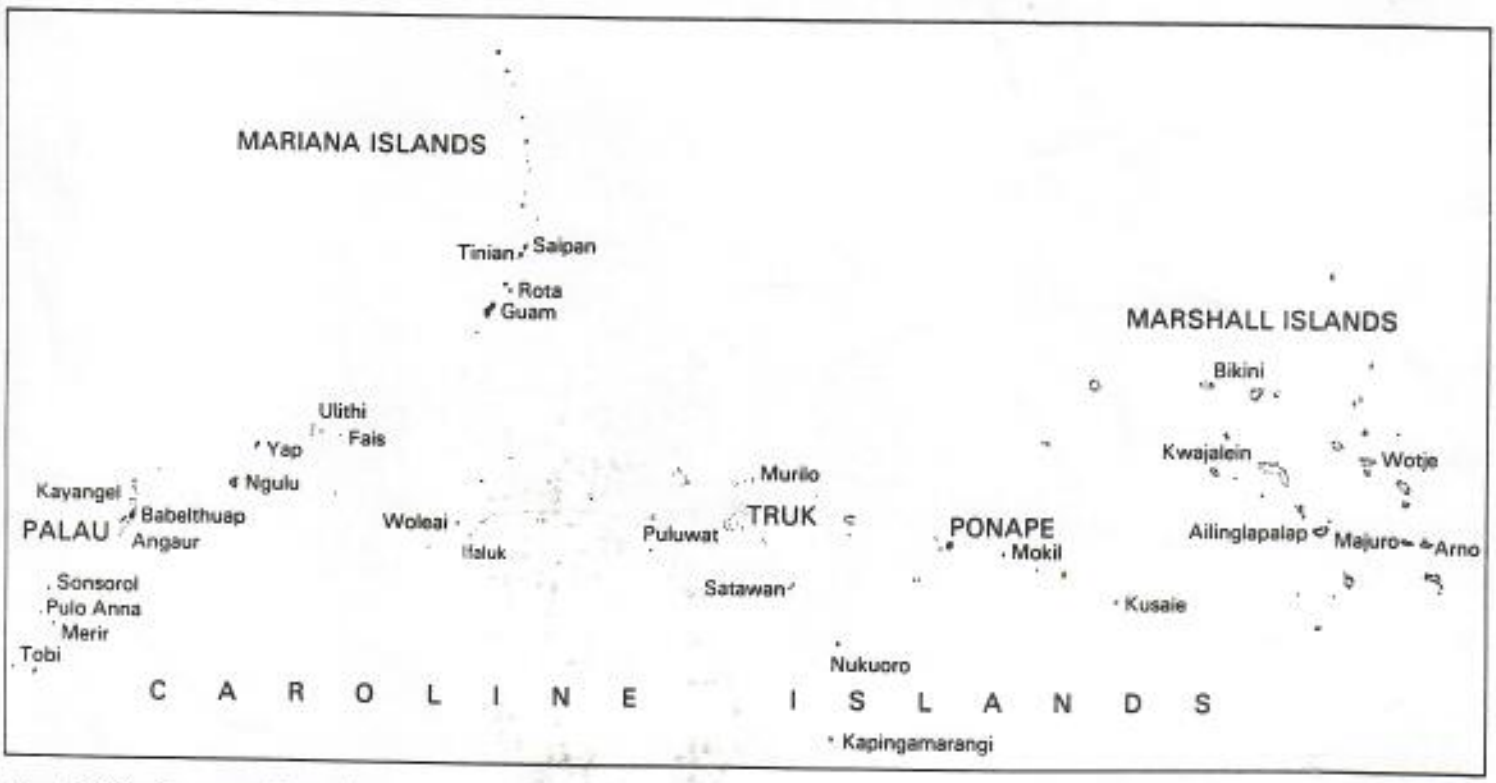
| Tag no. | Curved carapace length | Curved carapace width | Released by |
|---|---|---|---|
| X670 | 18.7 | 16.3 | Diana (mama) |
| X671 | 19.2 | 17.5 | Rene |
| X672 | 20.0 | 16.7 | Janvier |
| X673 | 18.2 | 16.0 | Omeri |
| X674 | 19.7 | 18.0 | Ismael |
| X675 | 17.2 | 14.8 | Tavita |
| X676 | 16.8 | 14.6 | Bertho |
| X677 | 18.4 | 16.7 | Teva |
| X678 | 15.9 | 14.3 | Teheiki |
| X679 | 14.0 | 12.2 | JDTK |
| X680 | 18.2 | 15.7 | Edy |
| X681 | 18.1 | 15.7 | GHB |
| X682 | 16.7 | 14.8 | Jean-Pierre |
| X683 | 18.8 | 17.5 | Axel |
| RMTP483, X669 (This turtle captured approximately 2 ago months in Rene's fishtrap) | 51.0 | 47.0 | Ismael |

$\bar{X}$ = 17.8 cm
range = 14.0 – 20.0
N = 14

SCILLY2-8T.GHB




**Map 4. Eastern Oceania**




**Map 5.** Northwestern Oceania

from 1992 World Almanac

130 ISLANDS
1544 sq miles
188,000 people
>50% TAHITI
5 Archipelagos
① Marquesas
② Tuamotu
③ Gambier
④ Society
⑤ Australs

933-3544

LAPÉ

Congé

FAX 689 43 49 79


**Philippe SIU**

Programme Coordinator

PATRICK GALENON - DIRECTOR

ETABLISSEMENT POUR LA VALORISATION DES ACTIVITES AQUACOLES ET MARITIMES

EVAAM

OU -

PHONE - 689-43-12-58

P.O. BOX 20 PAPEETE - TAHITI - FRENCH POLYNESIA

PHONES : 42.03.46 / 43.12.58 / 42.81.48 - TELEX : EVAAM 367 FP

FAX : (689) 43.49.79

PHONE 689-42-03-46


Walt Dudley 933-3411

Camilla

home - 964-1445

1ST MONDAY DEC 9. 1991

# 180 KM/H SUR SCILLY

ute va choisir Wasa ?
rnière et dès 18H00,
Bora Bora affron-
très forts vents de
Nord qui se sont en-
és durant la nuit. Au
éorologique de Ta-
n annonce des poin-
km/h aujourd'hui
s. Dès ce matin, les
aient s'orienter au
ngendrant une mer
ment déchaînée
creux de 7 m ou

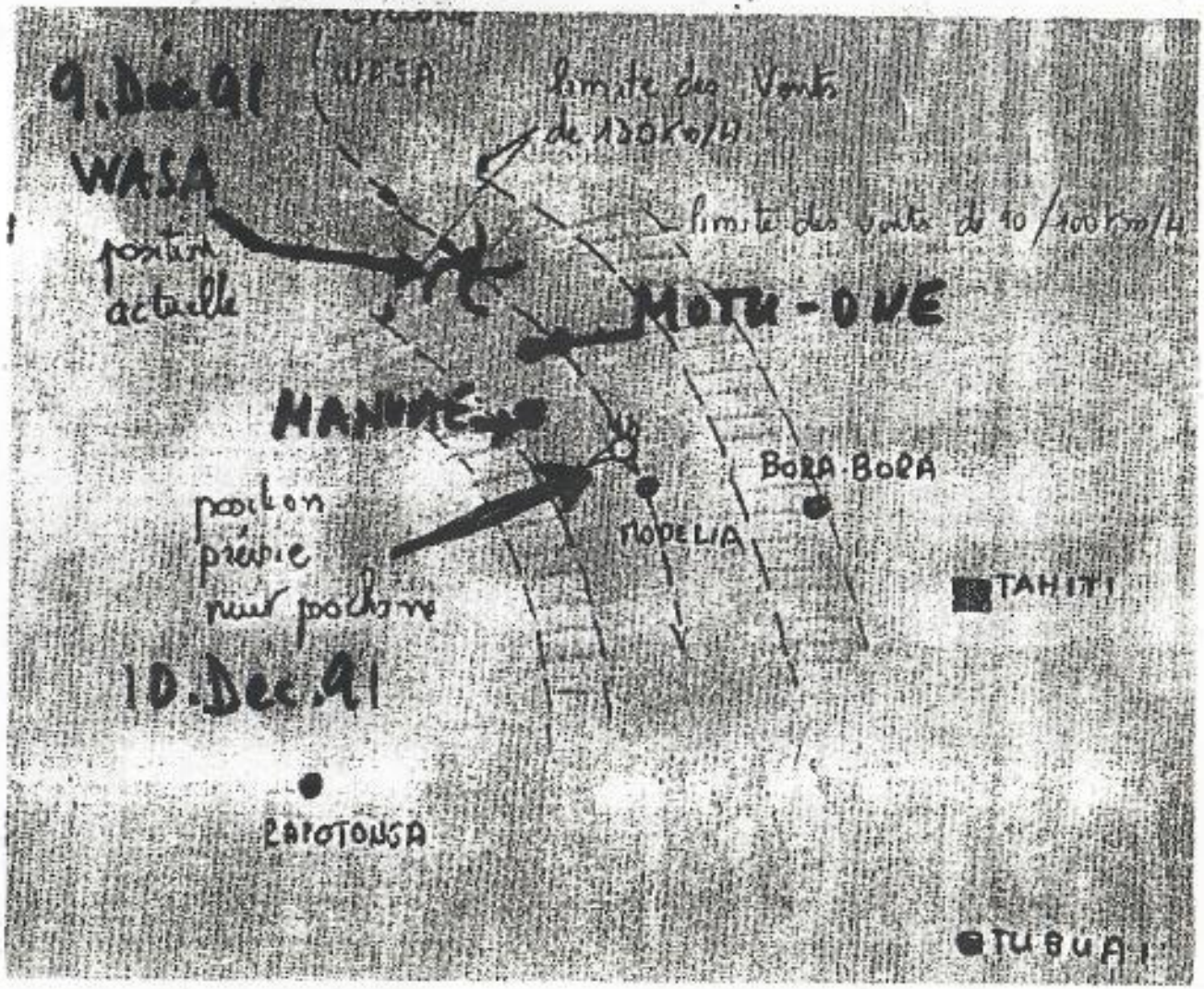
, ce sont les îles de
haa et Huahine qui
ar tour touchées par
cloniques de 100-130
à encore l'océan se
Dans l'immédiat, à
caprice de Wasa,
Îles du Vent ne sont
ment menacées. Ce
pas dire que les Îles
ont à l'abri du vent.

centres météorologi-
n alerte et collectent
m de données sur
uelles ont été égale-
s dans l'ordinateur
«Readings» implanté
d de l'Angleterre. Il
norme ordinateur, le
tiqué du monde, fi-
l'ensemble des pays
D'après son analyse
ue de Wasa et après
agé toutes les hypo-
rès les données ac-
prévisions sont op-
eudi Wasa ne sera
clone sera mort (on

Cependant Val apparaît. Il s'agit du cyclone qui a frappé lundi les Samoa américaines où l'état d'urgence a été décrété par le gouverneur. On déplore deux morts aux Samoa occidentales et de nombreux dégâts sont enregistrés dans la capitale Pago Pago. Les vents ont atteint jusqu'à 160 km/h avec des pointes hallucinantes de 240 km/h. L'électricité est coupée et les récoltes ont été perdues. C'est ce cyclone nommé Val qui apparaîtra en vue du groupe Scilly, Bellinghausen et Mopelia. Vendredi, il plongera vers le Sud. Samedi, il descendra encore plus au Sud et se renforcera. Les vents affecteront alors les Australes. Dimanche, enfin, il subira le même sort que son collègue Wasa, c'est-à-dire qu'il disparaîtra, ira mourir loin des îles. L'ordinateur affirme même que dans cette journée de dimanche, le beau temps réapparaîtra à Tahiti et dans les îles. Cependant, hier soir, à 19H00, on apprenait qu'un Gardian avait pu en début d'après-midi à 14H30 larguer du matériel, vivres, radio, ainsi que des réserves d'eau aux Polynésiens se trouvant sur l'atoll de Scilly. En revanche, Bellinghausen n'a pu être ravitaillé.

En dernière heure, on apprenait, en outre, que Scilly subissait des raffales de 180 k/mh. Wasa laissera sans aucun doute de profondes plaies dans les Îles sous-le-Vent.

Christian DUROCHER




*Comme on le remarque sur ce schéma, le cyclone Wasa entre en collision et de plein fouet avec Mopelia.*

Papeete, le 28 OCT. 1991

Réf. N° 271/90/EVAAM

# CONVENTION TORTUES

**ENTRE** l'Etablissement pour la Valorisation des Activités Aquacoles et Maritimes (EVAAM) en Polynésie Française représenté par son Directeur, Monsieur Patrick GALENON,

**ET**

Monsieur George BALAZS, sous-Directeur du Groupe de Spécialistes des Tortues Marines de L' Union Internationale pour la Conservation de la Nature et de ses Ressources, Honolulu , Hawaii, USA.

## ETANT PREALABLEMENT INDIQUE QUE :

L'EVAAM est Maître d'Oeuvre d'un programme d'élevage, de recherche et de protection des tortues marines,

L'EVAAM est habilité à passer des conventions d'études et de recherches,

Monsieur George BALAZS est spécialiste des tortues marines et a été sollicité par l'EVAAM pour participer au programme d'élevage, de recherches et de Protection des tortues marines.

## IL A ETE CONVENU CE QUI SUIT

### Article 1er : Objet de la convention

La présente convention est destinée à couvrir les frais de séjour et de déplacement de Monsieur George BALAZS pour une mission destinée à évaluer et recenser les sites de nidification et de démarrer les études sur les migrations des tortues marines (en liaison avec le Programme Régional du PROE/CPS).

VISÉ
Le Contrôleur Général
des Dépenses Engagées

ÉTABLISSEMENT POUR LA VALORISATION
DES ACTIVITES AQUACOLES ET MARITIMES
EVAAM

B.P. 20 PAPEETE - POLYNÉSIE FRANÇAISE - TÉL. : 42.03.46 - 42.81.48 - TÉLEX EVAAM 367 FP

**Article 2 : Obligations des deux parties**

L'EVAAM s'engage à prendre en charge le coût du déplacement Papeete/Bora Bora/Scilly/Bellinghausen/Bora Bora/Papeete et le séjour de Monsieur George BALAZS durant la mission qui se déroule du 11 octobre au 25 octobre 1991 inclus (sur la base contractuel des ANFA catégorie 1).

Monsieur George BALAZS s'engage à prendre en charge son passage Honolulu-Papeete et retour et à effectuer une mission sur l'atoll de Scilly et Bellinghausen selon un calendrier qui sera défini d'accord partie avec une reconnaissance du site, des échantillonnages et une première analyse des prélèvements.

Un rapport préliminaire sera fourni à la suite de cette étude. Les résultats éventuels sont réservés à l'usage exclusif de l'EVAAM sauf autorisation de publication conjointe avec l'établissement.

**Article 3 : Conditions de versement de l'intervention de l'EVAAM**

L'EVAAM versera 80 % des frais de séjour en Polynésie soit 124.704 FCP à la signature de la présente convention, et le solde soit 31.176 FCP à la remise du rapport de mission.

Ces dépenses seront imputées sur le Budget de l'EVAAM 1991,

- Cpte 624, frais de transport
- Cpte 625, frais de déplacement.

Mr BALAZS George.

p/o Le Directeur de l'EVAAM

EVAAM

P. GALENON

VISÉ
Le Contrôleur Général
des Dépenses Engagées

payment to your account at the BANK of TAHITI ? if you are ok.

E.V.A.A.M

Etablissement pour la Valorisation des Activités Aquacoles et Maritimes

# ORDRE DE PAIEMENT

**ATTENTION.** — La validité de cet ordre de paiement est limitée. En cas de retard apporté à son encaissement par le créancier, ce dernier court le risque de se voir opposer la prescription à l'expiration du délai de déchéance prévu par les articles 9 et 10 de la loi du 29 janvier 1831 modifiée.

Comptable assignataire : *Payeur des Ets Publics de la Polynésie Française - C.C.P. N° 9 000 502*

Ministère (ou Compte s

Ordonnateur E.V.A.

Gestion 1992

| NOM ET ADRESSE DU CRÉANCIER (1) | SOMME NETTE revenant au créancier (en monnaie locale) (2) | RÉFÉRENCES DU MANDATEMENT — OBJET DE LA DÉPENSE — PIÈCES JUSTIFICATIVES | | | | | | SOMME MANDATÉE en francs métropolitains (9) | CONTRE-VALEUR en monnaie locale (10) |
|---|---|---|---|---|---|---|---|---|---|
| | | ANNÉE d'origine (3) | DATE d'émission (4) | N° du bordereau (5) | N° du mandat (6) | N° de l'ordre de paiement (7) | Imputation — Compt. Investis. (8) | | |
| Georges BALAZS<br><br>BANQUE TERRITORIAL SAVINGS<br>32137070?-036003126943 | 124 704 | 91 | 22.11.91 | 765 | 1297 | | 625 | | 124 704 |

Conv 27/91 du 21.11.91
de 124 704 FCP

RÉFÉRENCES DES OPPOSI

| Timbre « Vu bon à payer » | Pour acquit de la somme de<br><br>À , le | Arrêté le présent ordre de paiement à la somme de (col. 10) :<br>Cent vingt quatre mille sept cent quatre francs |
|---|---|---|

EVAAM Ordonnateur

TOTAL des retenues et oppos

NET à payer (en monnaie locale)

George, This is the payment order of 80%
of the total - sent to Territorial Savings Bank -
- If you agree, I will transfer the 20%
(31176 FCP) to your bank account at the
BANK OF Tahiti here in Papeete -

EVAAM
Papeete Tahiti
PoBOX 20
FAX 689 43 49 79

Papeete 10 febuary, 1992

TO : DR. G.BALAZS, U.S. NMFS, FAX N° 8O8 943 01 20 90 HONOLULU HAWAII, USA.

FROM : Philippe SIU, EVAAM- TAHITI, FAX 689 43 49 79

MESSAGE : two pages this included -

Dear George,

Thank you for the photos taken at Papeari station and those from Scilly.I have received the materials ( books and dictionary etc...)for Odile.Everything will be brought to Scilly on the earliest ship with the material we have collected here.At this time, our second turtle trip has been posponed to march 20, because the program of AORAI is full. We plan to go to Scilly with Jean-Pierre after march 24 or 25.

I do not have any news from Scilly.I just can tell you that Moko and the group of Motu-One are still in Papeete, they are waiting for the government ship promised officially with a minimum of equipment and material to rebuilt theirs houses on Motu-One. So I think it will be better to go to Motu-One after that. Omeri will come with us by AORAI and he told me that he intends to stay on Motu-One.

About the tag recovery, have you received any answer from Ms Corazon Marallag ? I am very surprised by that information and waiting for news and explanation ! Do you think that the first turtle we have tagged on motu Honu was able to reach Philippines Islands in 30 days ? I hope you will get the answer with the tag plus some good informations about the turtle and the others tags X651 and RMTP 476. On my request, SPREP sent a total of 1000 RTMP tags with 4 applicators for continuation of the tagging program in French Polynesia. Paul told me not to use other tags in the SPREP turtle program to avoid confusion and in order to have the same address ( Nouméa) for tag recovery. The problem with the RMTP tag is the size that cannot fit with our young turtles.

Here we have tagged 100 young turtles at the Papeari Station to be released at Mopelia and Scilly on our nest trip. We will tag another 100 young turtles from the last eggs collection we made on Scilly.At this time,over the 7 nests we collected (690 eggs) we have obtained 534 hatchlings between december 20,and january 4,1992.

Have you received the turtle posters I sent to you by separated parcel ? For the Cousteau Video on Scilly, I have to get it back from the EVAAM station on Rangiroa I think I can make a NTSC copy and add some pictures from our trip to Scilly and Motu-One.

Scilly has been declared as santuary on july 1971.I am sorry I do not have any translation of the turtle regulation in english.I have ask Paul HOLTHUS to do it with the SPRP secretatriat and to make copies for SPREP members.

By separate mail,you will receive photos from our trip. For the video made by Cousteau I did not get it back yet, Axel will duplicate and transfer to NTSC system.

Did you write any report and any comments on our turtle trip to Manuae and Motu-One ? I need some your conclusion for a realistic estimate of what we have seen here and also about our turtle program at Papeari Station.

IAORANA,

Philippe SIU

TAHITI AND BEYOND: THE SOCIETY ISLANDS SISTERS OF THE WINDS JUNE 1979

Scilly Atoll

FIFTY KILOMETERS west of Bora Bora lies Maupiti; beyond that, only crumbs of the Society archipelago—Maupihaa, Manuae, Motu One.

Maupiti is a rock inhabited by 700 people, and ringed by a reef with only one pass, a channel so dangerous that the freighter *Manuia* has wrecked twice in its violent currents, once with the loss of 15 lives.

For many years this island was left to the white seabirds that constantly circle its central massif, but an airstrip was opened in 1975. Still, few tourists have come to Maupiti. There are no hotels, no running water, nothing to buy. It takes only three hours to walk around the island, and people still wave and call "*Ia ora na*—Health to you!"

I remember simple pleasures from Maupiti: washing with buckets of rainwater in

**Content with simpler things,** young Tahitians ignore the TV sets and tape recorder that add prestige to a bamboo *fare* in Mataiea (**above left**). Thirteen people —two families—share the home. The head of one household is a mechanic for the French nuclear-testing agency; the other is a spear fisherman. But with only one station, why two TV's? "One is mine," explains the mechanic with a deep sense of propriety, "and the other is his."

On isolated Maupiti (**above**) a man prepares copra—dried coconut meat—a traditional source of income for islanders. Few Tahitians bother to do the work today. Says Papeete's copra-oil plant director Julien Siu, "They sell the coconuts to tourists for water and throw the meat away. More money."

In the night of Tireo was born Poti'i-ta-rire (Girl-applauder), a handsome goddess of the sorcerer. There followed Totoro-pota'a (Pattern-trainer), god of hairdressing.

Ohua (Becoming-circular) was the birthnight of great gods of the valleys: Mahu-ni'a (Upper-Magellan-cloud) gave birth to the god To'a-hiti-mata-nui (Bordering-rock-with-great-eyes). This god fell down to the earth upon the stones of the land named To'a-hiti, and then he ascended into space and became a powerful god over land and sea. He was named To'a-hiti-mata-nui and To'a-hiti-o-te-vao (Bordering-rock-of-the-valley-recess) by people inland, and he was named To'a-hiti-o-te-vave'a (Bordering-rock-of-the-towering-waves) and To'a-hiti-a-to'a (Bordering-rock-of-rocks) by people at sea.

Na'na i tia'i i te mau vahi ma'iri ta'ue, e i te mato ia 'ore te ta'ata ia topa i reira, e na'na i pe'e haere i te feia haere i te peho ia 'ore ia ro'ohia i te ino. Ia taupùpù te tahu'a ra i ta ratou ra'au toiaha e tô mai uta i te fa'a e i tai, e ani ia ratou ia To'a-hiti e tauturu mai. E 'itea noa hia e te haere maira i te 'atete o te ra'oere ra'au e te pe'e ra'a o te ofafa'i na te pae mou'a. Mâmà noa 'tura ia ta ratou hopoi'a, e tae 'oi'oi noa 'tura ta ratou ra'au i te vahi i titau hia ra. Na To'a-hiti ato'a i fa'aora i te feia ratere i te to'a pû e te pari i te anotau vero, e i te 'au poiri ia mo'e ra ta ratou fa'aterera'a.

O Ave-aitû te rahua mai ei 'arere na To'a-hiti. E atua ave roa ia atua, i itea hia ia fano mai i te ao nei. I tono hia 'oia e To'a-hiti ei arata'i no te nu'u a Tane i te tau tama'i.

He'e te tua, o Tifai-o-te-peho; na'na i fa'a'ore i te afâfâ o te ra'au i tarai hia ra, na'na 'to'a i ha'apî'i i te tahu'a i te tifai i te iri papararî. "E taura a Tifai, " "Na Tifai ia taura." O te ta'o teie a te feia tarai va'a ra'a e te va'a na te ari'i, i ni'a i te taha mou'a, no te mea ia hope te va'a i te tarai hia ra, i ta'amu haere ia te tahu'a i te taura roroa na ni'a iho mai te fa'atautau atu na te hiti, na mua, e na muri, ei reira e tao atu ai ia Tifai e haere mai e tauturu ia ratou, a taoto noa ai mai te muhu ore i roto i te va'a. A ria ri'i a'e ua tae maira o Tifai, e haere noa 'tura ia te va'a ma te mea rave ore hia na te taha mou'a, ma te 'opa'opa 'ore mai te apere ra; e mai te hope mauroa

He presided over precipices and cliffs, to save people from falling over them, and he hovered over those who went far back into the valleys, to save them from harm. When artisans were burdened with dragging a heavy log out of a valley, they would invoke To'a-hiti (Bordering-rock) to help them. His approach was always made known to them by a rustling of leaves and the falling of stones down the mountain side. Then their burden became light, and they soon succeeded in taking the log to its destination. To'a-hiti also saved seafarers from being dashed against mid-ocean rocks and rugged coasts, in stormy weather and in darkness, when they lost their way.

Ave-aitu (Tail-god) was conjured forth to be a messenger for To'a-hiti. He was a god with a long tail, which was seen when he flew into this world. To'a-hiti sent him as a guide for Tane's hosts in time of war.

Then there came Tifai-o-te-peho (Mender-of-the-valley); he prevented wood that was being hewn out from splitting, and he also showed artisans how to mend planks that were injured. "The ropes of Tifai (Mender); these ropes are for Tifai," were the sayings of those who hewed out sacred or royal canoes upon the mountain sides, because when the canoe was hewn out the artisans would bind ropes around it with long ends streaming down from each side and end, and then they would invoke Tifai to come to their aid, and lie very still inside the canoe. In a little while a rustling wind would announce the presence of Tifai, and then the canoe seemingly would go of its

ia te taura te pe'e ra'a, a he'e noa ai ite 'aivi e na te mau vahi maruarua ra, e tae roa 'tura i te fenua pāpū. Tu'ua tura ia i raro, 'aore roa e pahurehure a'e, ei reira e ti'a ai te tahu'a i ni'a, ha'apa'o atu ai i ta ratou 'ohipa.

E rave ia ratou i te taura e na'o ai te pehe, "E pū! E pū! E pā, e taura a Tīfai!" E mama noa 'tura ia te va'a ia patō, e tae oioi noa 'tura i te farau i te marae o te tahua ra, e fa'aoti atura i reira.

Te pō o Mua-ra'au, e pō fanaura'a atua; O Tuete maira, atua no te taitai. He'e te tua, o Ta'i-iti-te-ara'ara, e atua haere ta'ata, na te to'a i te moana. He'e te tua, o Mātua, atua no te taure'are'a.

own accord, down the mountain side as straight as a dart; and like the tail of the tropic bird would the ropes stream out as it went forwards over cliffs and avalanches down onto low ground. There it was let down without having received a single scratch, and then the artisans would rise out of the canoe to perform their part of the work.

They would take up the ropes and sing, "Blow! Yield! Yield by the ropes of Tifai!" And the canoe would become light to draw, and was soon taken to the shed in the builders' marae, there to be completed.

The night of Mua-ra'au (First-plant) was the birthnight of gods; there came Tuete (Shameful-standing), god of licentiousness. There followed Ta'i-iti-te-ara'ara (Low-cry-that-awakes), who appeared as a little man, god of warriors at sea. There came Matua (Strength), god of the vigorous.

## Birth of Insects and Advent of Ghosts

He'e te tua, o Pepe-Tū, o Pepe-Hau, e o Haaro-mata-raie atua no te mata-pō.

A api te ao nei i te 'oromatua no roto mai i te ta'ata pohe. Te oro-matua o te fa'auru i te upo'o ta'ata ra, e Oromatua maita'i ia, 'e'ita e hamani'ino i te feti'i i te ao nei. E varua ta'ata oriori noa mai te Pō mai ra, e here hia 'tu e te ta'ata ora, e ore ia e hamani ino mai. E oromatua nihoniho roroa, e varua ta'ata mai te Pō mai, e oromatua ai aru, e 'u'umi e e 'ai i te feti'i e te tahi atu mau ta'ata i te ao nei. E pohe te ta'ata ia uru hia ra e tereira mau oromatua i te ta'o o te pifao.

Then there came Pepe-Tu (Butterflies-of-stability) and Pepe-Hau (Moths-of-Peace), and Haaro-mata-rai (Eye-scooper-of-the-sky),[9] god of blindness.

The world became full of ghosts of dead people, called *oromatua*. Those that occupied human skulls and were kept in people's homes were good *oromatua;* they would not hurt their relatives in this world. Ghosts that rambled back from Hades and were received kindly by living people would do them no harm. Ghosts with long teeth were also souls of human beings from Hades; they were devouring ghosts of darkness that would strangle and devour their relatives or other people in this world. People died when possessed by these spirits at the bidding of the sorcerer.

## Birth of the Turtle, Fowl, and Pig[10]

Havai'i (Ra'iatea) was really a land for strange things! It was people of that land who produced turtles, fowls, and pigs, all in one family. Those people, a man and his wife, were named Tū-moana-urifa (Dweller-in-sea-of-rank odor) and Rifarifa (Scarred), and their son, Metua-pua'a (Pig-parent). While they were on a visit at the Island of Pupua (Honden

[9] This pest may have been an insect of some kind not known in Tahiti.
[10] These legends were recited in 1825 by Mo'o, a priest of Porapora.

Island, Tuamotus), turtles were born to them and went out to sea; and in due time those turtles propagated their young throughout the groups, frequenting sandy, low islands, in preference to others for laying their eggs. When Tû-moana-urifa and his wife returned home to Havai'i, they produced a family of chickens, which prospered and were let to go into the woods, and from them the wild fowls of all the islands are descended.

It happened when the world was new, that a turtle and a fowl had a dispute, one contending for the prestige above the other, when the turtle said to the fowl: "You are common, you will be eaten by women and children, but I shall be sacred to the gods, I shall leap into the god's house." The fowl answered scornfully, "How can you leap into the god's dwelling? You will yourself be eaten by women and children, but I shall dive into the depths of the sea and escape from their hands."

Just then the turtle was picked up by a strong man and taken to the king, who was so pleased with it that he sent it to the marae for the gods, and thus the turtle was ever afterwards held sacred for the gods and was only eaten by kings, priests, and marae keepers. But as the fowl tried to dive into the sea for safety, it only succeeded in getting its head under water, when a party of women and children passing by went and seized it and took it home. So the fowl became a domestic animal and was eaten by women and children. Only white fowls were offered to the gods at the marae, because all white birds were regarded as sacred.

Tû-moana-urifa and Rifarifa had one child who was born a human being, a son whom they prophetically named Metua-puaa (Pig-parent), and when he had grown up they took him to Porapora, where he married a girl to whom he had long been affianced.

The young couple were very happy together for some time, when one day the young wife teased her husband on having no property in Porapora. So he went to his mother and told her of his grievance, and she replied: "Is that all that troubles you, my son? Do not grieve, but go early in the morning into the woods, and there open wide your mouth, and out of it will rush a multitude of small animals which will be called *pua'a maohi* (pigs; literally, native beasts). Secure them with cord, and proceed at once to make a large pen and a large shed for them. Before nightfall, your work will be done and your pigs will have grown to their full size. Place them in the pen, then go and fetch your wife to see them, and present them to her.

So the son obeyed his mother the following day, and to his great joy he realized all his expectations, and his wife and all her family were delighted with the new animals, never suspecting whence they had sprung.

From that litter were propagated all other pigs upon this earth, and they became good food for gods and men.

## Incarnations of Gods and Spirits[11]

### STONE

Stone was possessed with godly power. Tumu-nui and Tumu-iti, from which the world developed into its present state, were filled with the spirit of the great god, Ta'aroa. Among the rocks of the Pari (Bluffs), of the coast of Taiarapu, Tahiti, reposes a stone named Ta'aroa-ofa'i-i-te-Pari (Ta'aroa-in-stone-of-the-bluffs), of ancient history, which is as follows:

A long time ago, after Tahiti had come away to the east, a man went one evening to fish with hook and line among the rocks, and he had not been out long when he felt something drawing his hook of shell away, so thinking it was a fish, he pulled it up only to find that he had hold of a tenacious stone, clinging by some unseen power to the hook. Detaching it with difficulty, he cast the stone off into deep water, and tried anew to catch fish. But soon his hook was caught again by the stone, which he drew up and cast away as before; and so he continued all the evening trying to catch fish, but only getting his hook foul of the stone in whatever direction he cast his line.

So at last he carried the stone to the shore, and on examining it in daylight with the priests, it was revealed to them that it was possessed with the spirit of Ta'aroa, and they placed it in a crevice of the Pari on Taiarapu, where it has ever since remained, and fishermen rendered it homage due to Ta'aroa. It became the fisherman's god of that region, and fish were presented to it.

### TREES

All great trees of the marae, towering majestically high, were shadows of the gods and spirits innumerable, and from their branches were made dreaded idols.

The miro tree (*Thespesia populnea*) was the special shadow of Roro'o (Prayer-chanter), who inspired the priests in their devotions, for which cause it was held indispensable as a tree for the marae.

The avaro tree (*Premna*) was a shadow of the god A-varo (Heated rash). Persons approaching it irreverently were supposed soon to become afflicted with blotches over the skin, resembling the spots on the bark of the tree, the remedy for which was to burn a branch of it in the fire, accompanied with prayers to the god A-varo, when the blotches would fade and disappear.

[11] These legends were recited in 1825 by Mo'o, a priest of Porapora, and in 1840 by Anani, a Tahitian priest.

# ANCIENT TAHITI

BY

TEUIRA HENRY

BASED ON MATERIAL RECORDED BY J. M. ORSMOND

BERNICE P. BISHOP MUSEUM

BULLETIN 48



PUBLISHED BY THE MUSEUM
HONOLULU, HAWAII
1928

KRAUS REPRINT CO.
New York
1971

From HIRTH FAO 1971



(iv) Mr. Kridler should publish his information on the green turtle in the Leewards. He has tagged over 500 (males and females) and has six long-distance recoveries. This would be an important contribution to the ecology and taxonomy of the little known central Pacific green turtle.

(v) Cooperation between personnel in the United States Fish and Game Department and that of the United States Sport Fisheries and Wildlife, Hawaii Branch, is essential on matters concerning turtles, since the green turtles nesting in the Hawaiian Leewards (under the jurisdiction of the latter) may well be the same individuals feeding off the main Hawaiian Islands (under the jurisdiction of the former).

4. TAHITI

4.1 Synopsis of Activity

The following people were instructed in turtle biology and management: Mr. P. Angeli, Mr. L. Lenoir, Mr. S. Stein, Mr. J. Tapu and Mr. J. Drollet. The consultant carried out diving operations off beaches near Pirae and Papeete to check for turtle grass/algae. The main market in Papeete was checked alternate mornings for the abundance and price of turtle meat. Tourist shops were checked for stuffed specimens and shells. Many local fishermen were interviewed. Ten green turtles caught by fishermen near Motu-Honu were measured and Mr. Tapu was instructed in tagging and measuring techniques. Several stomach contents were analysed. The consultant saw a French T.V. film on sea turtles. Aerial surveys of nesting beaches and localities around Mopelia, Scilly and Tupai were made. Manihi Atoll in the Tuamotu Archipelago was visited and turtles and turtle kraal were inspected there.

4.2 Findings

As everywhere else in the world the numbers of green turtles in French Polynesia are decreasing rapidly. The consultant however believes that reasonably large populations still exist around some of the more inaccessible atolls. Whether these are resident or migratory populations is unknown.

The most common sea turtle in the area is the green turtle (French: tortue; Tahitian: honu). One of the principal nesting grounds is Scilly. Other important nesting sites are Mopelia, Bellinghausen, Tupai and some of the Tuamotu atolls. The peak nesting season in Scilly, Mopelia, Bellinghausen and Tupai is October through December. Reports indicate that some turtles can be found throughout the year off Scilly. The hawksbill turtle is sometimes taken by fishermen. There is one authentic record of a leatherback caught in a seine. On 24 September, the consultant counted 20 green turtles in the water around Mopelia (but there were no tracks on the beach), and 42 around Scilly, including 12 in a village kraal. He also noticed fresh tracks and nests on Motu Honu (islet of Scilly).

Local inhabitants of Manihi collect green turtle eggs, hatch out the turtles and raise them in village kraals for local consumption. They are fed on coconut meat and fish and between 3-3½ years of age they grow to carapace length of 20 to 28 inches.

Many males and some gravid females are speared as they mate off the nesting beaches on the atolls. Tahitian fishermen report a sex ratio in favour of males. The turtles sold in Papeete market in September were mostly males. Green turtle meat is considered a delicacy and sells for about $3 per kg in the Papeete market but there is no market for eggs. A few cured shells are sold in tourist shops at $25 but the demand is insignificant.

There are no regulations in French Polynesia concerning marine turtles.

Stomachs examined by the consultant were chiefly empty but a few contained a little green algae and one harboured a long piece of plastic. In the limited survey carried out by the consultant he did not find any extensive algae beds or grass flats.

Fisheries Department records indicate that between 1953 and 1967 from 24 (1954) to 262 (1962) turtles caught at Scilly were sold annually in the Papeete Market.

The consultant believes that he was able to build up a "turtle consciousness" in Tahiti as when he left, including the Governor and several Assemblymen.

4.3 Recommendations

(i) A thorough four-month study (October-January) should be centred on Scilly Atoll. Emphasis should be placed on training a local counterpart in stock assessment, tagging, and if predation on eggs and hatchlings is high, then training is necessary in the establishment of an egg hatchery. This would ensure that the maximum number of hatchlings reach the sea. A boat would be needed in order to check nesting densities on Mopelia and Bellinghausen during the same period. (The World Wildlife Fund might be interested in supporting a project such as this, at least in part).

(ii) It would be best to prohibit the commercial sale of green turtles until a study can be made of local stocks. However, people on atolls who depend upon turtles and their eggs for their source of protein should be allowed to take a moderate number for local consumption.

(iii) The Fisheries Department should map out all the nesting beaches in its territory with special emphasis placed on the seasonality of nesting.

(iv). The Government should show the T.V. film on sea turtles to school children. This film depicts nesting behaviour as well as predation on hatchlings.

5. WESTERN SAMOA

5.1 Synopsis of Activity

The consultant discussed with the following people the ecology, management and restocking of marine turtles: Messrs. W. Travis, J. Huntsman, K. Enari, E. Slaven, A. Banner and F. Suafoa. He described the different management programmes in Costa Rica and Sarawak and the relative merits of each, to fishery personnel. He conducted aerial surveys around the coasts and reefs of Upolu, Savai'i, Manono, Apolima, and the four islets of Fanuatapu, Namu'a, Nu'utele and Nu'ulua. The beaches and offshore water at the east end of Upolu near Mutiatele were surveyed and the consultant camped and surveyed beaches on Nu'utele Island (with Messrs. Suafoa and Banner). He surveyed Namu'a Island and conversed with various fishermen, especially those from the village of Luatuanu'u who are considered to be the best turtle fishermen. He conducted diving surveys for algae.

5.2 Findings

Fishery officials and local fishermen believe that the most common turtle in Western Samoan waters is the green turtle (Samoan = laumei) and that the hawksbill is the second most abundant. There are no major nesting grounds on the two main islands of Upolu and Savai'i.

Green turtles and to a much lesser extent hawksbills still nest in the Tokelau Islands (September-October) but their numbers are said to be rapidly decreasing.

The consultant did not see any beaches which he would consider to be major nesting beaches although it might have been somewhat early for nesting (the peak of the nesting period is presumed to be from middle October to early January). He found however, two hawksbill nests of eggs, one on the islet of Nu'utele and the other on Namu'a. On aerial surveys he counted several green turtles between the islets of Nu'utele and Namu'a and also saw two individuals around Cape Oloinomo, one near Manono and one near Safotu.

The consultant did not observe any extensive algae or grass flats but lack of time prevented an intensive study. A list of algae and flowering marine plants found in Samoan waters is shown in Appendix 4. The list indicates that Posidonia occurs in Samoa and this plant is readily eaten by green turtles in the Indian Ocean. The green alga, Valonia, is

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Proceedings of the Fifth International Coral Reef Congress, Tahiti, 1985, Vol. 5

# BREEDING EVALUATION TRIALS IN THE GREEN TURTLE *CHELONIA MYDAS* (LINNE) ON SCILLY ATOLL (Leeward Islands, French Polynesia) DURING THE BREEDING SEASONS 1982-1983 AND 1983-1984

# ESSAI D'EVALUATION DES PONTES DE LA TORTUE VERTE *CHELONIA MYDAS* (LINNE) SUR L'ATOLL DE SCILLY (Iles-sous-le-Vent, Polynésie française) AU COURS DES SAISONS 1982-1983 ET 1983-1984

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**ABSTRACT**

Three field trips to Scilly Atoll (Leeward Islands, French Polynesia), allowed estimates to be made of the frequency of layings by Chelonia mydas during the breedng seasons of 1982-83 and 1983-84. These were calculated at 7/800; the number of eggs produced being in the order of 70-80,000, with a probable emergence rate approaching 80-90%. The number of females laying during these periods is evaluated at approximately 300/400 per season.

Other observations conducted on the green turtle at Scilly are similarly reported. The question of the status of Chelonia mydas and of other marine turtles frequenting Polynesian waters is tackled, particularly in terms of their conservation and protection.

Finally, the emphasis is placed on the necessity to state precisely the figures put forward, and to extend the assessment and biological study to other French Polynesian islands.

**RESUME**

Trois séjours effectués sur l'atoll de Scilly (Iles-sous-le-Vent, Polynésie française) ont permis d'estimer le nombre de pontes de Chelonia mydas déposées sur les plages de cette île au cours des saisons 82-83 et 83-84 à 7/800. Le nombre d'oeufs produits serait de l'ordre de 70 à 80 000, avec un taux d'émergence approchant sans doute 80 à 90%. Le nombre de femelles venues pondre au cours de ces périodes est approximativement évalué à 300/400 individus par saison.

Diverses observations effectuées sur les tortues vertes à Scilly sont également rapportées. La question du statut de Chelonia mydas et des autres espèces de tortues marines fréquentant les eaux de la Polynésie est abordée, particulièrement du point de vue de leur conservation et de leur protection.

Enfin, l'accent est mis sur la nécessité de préciser les chiffres avancés et d'étendre l'évaluation et l'étude biologique à d'autres îles de la Polynésie Française.

## 1. HISTORIQUE ET OBJECTIFS DE L'ETUDE

Dans un passé récent les tortues vertes de Polynésie Française ont fait l'objet d'une enquête réalisée par HIRTH en 1970 (HIRTH, 1971) puis de missions de marquage et de mensurations menées sur l'atoll de Scilly dans l'archipel des Iles-Sous-Le-Vent en 1972,1973,1974 et 1979, sous l'égide du Service de la Pêche de Polynésie (Anon, 1979 A), et du Muséum national d'Hisoire Naturelle (Anon, 1979 B).

En 1982, un nouveau programme d'étude des tortues vertes a été mis en route sur le Territoire pour une durée de deux années. Cette étude avait pour objectifs de réaliser un inventaire des sites de ponte de la région ainsi qu'une évaluation du nombre de pontes associées à ces sites de reproduction et de mener une expérience limitée de grossissement en captivité de jeunes tortues. Pour des raisons logistiques, la prospection a été limitée à l'atoll de Scilly.

Cette note rend compte des résultats de ces missions ; l'expérience de grossissement menée au Centre Océanologique du Pacifique (1) est rapportée dans un article complémentaire.

## 2. EVALUATION DE POPULATION

### 2.1 Les missions. Matériel et méthodes

Trois séjours de 14 à 18 jours ont été effectués dans l'atoll de Scilly :

. du 04/02/83 au 18/02/83
. du 15/10/83 au 03/11/83
. du 20/12/83 au 07/01/84

au cours desquels 40 femelles ont été marquées et mesurées. Les marques utilisées sont du type MONEL TAG, taille 49, fabriquées par "THE KENTUCKY BAND & TAG Mg", et portant la mention "RET SERVICE PECHE TAHITI". Elles sont été posées sur le bord postérieur de la patte antérieure droite, dans la plupart des cas au moment de la ponte ou après celle-ci. Les mensurations relevées sur chaque animal marqué ont été la longueur et la largeur de la dossière mesurées au compas ; étaient également notés le lieu de la rencontre et le nombre d'oeufs pondus lorsque cette observation était possible (Tableau N°1 Figure n°1).

(1) Centre Océanologique du Pacifique, B.P. 7004 Taravao, TAHITI.

| N° | Sexe | Date | Lieu marqu. océan/lagon | | Long | Larg | Dates de rencontres | | | Nbre d'oeufs |
|---|---|---|---|---|---|---|---|---|---|---|
| 2201 | F | 06/02/83 | OTUE OIA | L | 96 | 75.5 | 07/02 | | | 118 |
| 2202 | F | 10/02/83 | " " | L | - | - | | | | |
| 2203 | F | 11/02/83 | " " | O | 96 | 76 | | | | |
| 2204 | F | " " " | " " | O | 97.5 | 78 | | | | |
| 2210 | F | 12/02/83 | PAPAI | O | 94 | 74.5 | | | | |
| 2211 | F | 12/02/83 | " | O | 98 | 69 | | | | |
| 2212 | F | " " " | " | O | 96 | 73 | | | | |
| 2213 | F | " " " | " | O | 89.5 | 68.5 | | | | |
| 2214 | F | 13/02/83 | " | O | 93 | 77.5 | | | | 86 |
| 2215 | F | " " " | " | O | 100 | 75 | | | | |
| 2216 | F | 14/02/83 | HONU | L | 93 | 68 | | | | |
| 2217 | F | 16/02/83 | OTUE OIA | O | 93 | 69 | | | | 95 |
| 2218 | F | 17/02/83 | HONU | O | 100 | 69 | | | | |
| - | F | 17/02/83 | HONU | - | - | - | (non marquée) | | | 90 |
| 2301 | F | 17/10/83 | OTUE OIA | O | 96 | 74 | | | | |
| 2302 | F | " " " | " " | L | 99.5 | 77.5 | | | | |
| 2303 | F | " " " | HONU | O | 96 | 75.5 | 30/10 | | | 111/105 |
| 2304 | F | 18/10/83 | OTUE OIA | O | 95 | 74.5 | 20/10 | 01/11 | | |
| 2305 | F | 20/10/83 | HONU | O | 91 | 71.2 | 21/10 | 21/12 | 04/01 | 98 |
| 2306 | F | 21/10/83 | " | O | 90.2 | 79.5 | | | | 114 |
| 2307 | F | " " " | " | O | 95.5 | 75.5 | | | | |
| 2308 | F | 22/10/83 | " | O | 97 | 76 | | | | |
| 2309 | F | " " " | " | O | 94 | 75 | | | | |
| 2310 | F | " " " | OTUE OIA | O | 103 | 80.5 | 23/10 | | | |
| 2312 | F | 24/10/83 | " " | L | 102.5 | 74.5 | 05/11 | | | 132 |
| 2313 | F | 25/10/83 | HONU | L | 100.5 | 86 | | | | 80 |
| 2315 | F | " " " | " | O | 97 | 75 | | | | |
| 2316 | F | " " " | " | O | 100.5 | 75 | 26/10 | | | |
| 2319 | F | " " " | " | - | 97 | 73.5 | 26/10 | | | |
| 2320 | F | " " " | OTUE OIA | O | 92 | 72 | | | | 37 |
| 2323 | F | 26/10/83 | HONU | O | 104 | 78 | | | | |
| 2325 | F | " " " | " | O | 99.5 | 76.5 | | | | |
| 2326 | F | " " " | " | L | 101.5 | 78.5 | | | | |
| 2327 | F | 01/11/83 | OTUE OIA | O | 105 | 73 | | | | |
| 2328 | F | 26/12/83 | HONU | - | 102 | 79 | | | | 89 |
| 2329 | F | 28/12/83 | " | O | 96 | 75 | 29/12 | | | |
| 2330 | F | 31/12/83 | " | O | 83 | 67 | mars 84-Iles Cook | | | |
| 2331 | F | 02/01/84 | OTUE OIA | L | 96 | 73 | | | | |
| 2332 | F | 05/01/84 | HONU | O | 96 | 74 | | | | |
| 2333 | F | 04/01/84 | " | L | - | - | | | | |
| 2334 | F | 05/01/84 | OTUE OIA | O | 87 | 64 | | | | |

Tableau N°1 :

Données des marquages effectués au cours des trois missions de février, octobre, novembre 83 et de décembre/janvier 83-84.

Le dénombrement des montées à terre a été effectué chaque nuit sur les îlots (motu) du Sud et tous les deux jours sur le motu PAPAI. Les autres motu ont été visités à des intervalles de plusieurs jours en raison de la faible activité de ponte observée sur ces plages.

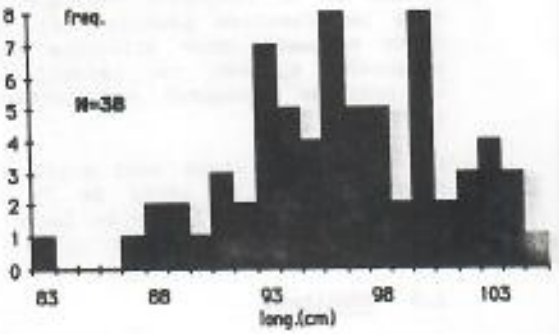



Figure n° 1 :

Répartition des longueurs des dossières des femelles mesurées à Scilly en 1983 et 1984.

## 2.2 Description succinte de l'atoll de Scilly

Situé à l'extrême ouest de la Polynésie par 16°30' Sud et 154° 40' Ouest, l'atoll de Scilly ou Manuae appartient à l'archipel des Iles-Sous-Le-Vent.

Cette île, entièrement bordée par un récif corallien, présente sur sa côte Nord-Est une succession de motu, pour la plupart plantés de cocotiers, et sur ses faces Ouest et Sud une formation sableuse qui rejoint parfois le récif externe. Les deux grands "oa" du motu "village" et du motu Honu sont parfois le siège de courants relativement importants portant de l'océan vers le lagon. Le cordon de sable de la côte ouest, correspondant au moins partiellement à une ancienne ligne de motu (Anon, 1979 B), limite avec le récif externe une zone peu profonde, un à deux mètres, en communication avec le lagon par de petites passes (Figure n° 2).

La face océanique des motu est constituée, en arrière de la zone battue, par un platier submergé de faible largeur, quelques dizaines de mètres tout au plus, puis par un conglomérat récifal. En arrière de cette formation on trouve soit des levées biodétritiques, résultant de l'accumulation de débris coralliens et coquilliers par les vagues, soit des plages généralement de petites dimensions. Du côté lagon, les motu présentent soit de belles plages de sable fin, soit des levées détritiques d'assez forte pente et peu larges.

Les zones fréquentées par les tortues lors de leurs montées à terre sont généralement des petites plages accessibles par des "coulées de sable" situées au niveau de la banquette récifale fossile. Mais les femelles peuvent aussi franchir cette banquette pour atteindre les zones sableuses situées en retrait, parfois au prix de blessures des pattes et du plastron.

Les plages du lagon sont aussi le siège d'une activité de ponte de la part de femelles séjournant dans le lagon pendant un temps assez long.

## 2.3 Résultats

Les données d'observations des montées à terre sont rassemblées dans les tableaux 2,3 et 4. Seules quelques traces ont été observées sur le motu village et le motu Fara ainsi que sur le cordon sableux de l'Ouest de l'atoll.

- Motu Village : 4 traces en février 1983
  : 0 traces en octobre et décembre/janvier 83 et 84
- Motu Fara : quelques traces anciennes en février 83
  : 0 trace en octobre et décembre/janvier 83 et 84
- Banc de sable : quelques traces en février 83
  2 en octobre 83 et quelques traces en décembre/janvier 83 et 84 (généralement ce sont des traces de traversées de ce banc avec de rares essais de creusement de nid).

Ceci re_présente au plus une dizaine de traces par période d'observation, soit au maximum dix pour cent de l'activité globale de ponte recensée pendant ces périodes. Les montées à terre sont un peu plus abondantes sur les motu Otue et Ropu, de 10 à 15 pour l'ensemble de chaque mission. L'essentiel de l'activité de ponte se déroule sur les motu du Sud, motu Honu, motu Otue Oia et motu Papai (Figures n° 3,4,5).

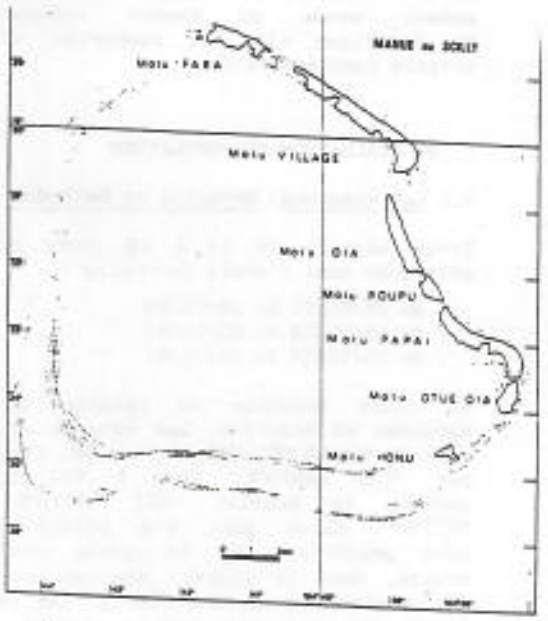



Fig. n°2 : Carte de l'atoll de Scilly

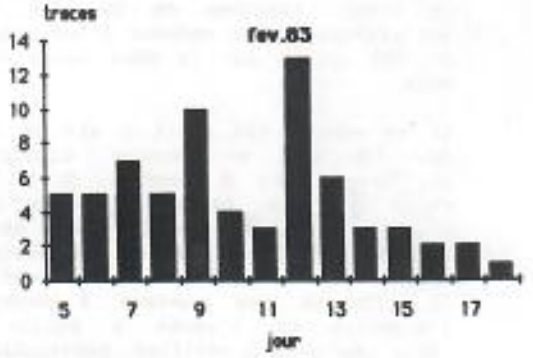
| DATE | MOTU HONU | | | MOTU OTUE OIA | | MOTU PAPAI | | TOTAL | OBS. |
|---|---|---|---|---|---|---|---|---|---|
| Nuit du../au.. | océan | pointe | lagon | océan | lagon | océan | lagon | | Phase Lun. |
| 05/06 FEV. | | 1* | | 1 | 1 | 1 | 1* | 3 | |
| 06/07 " | | 2* | | 0 | 1 | 1 | 1* | 3 | |
| 07/08 " | 0 | 1 | 0 | 0 | 3 | 2* | 1* | 7 | |
| 08/09 " | | 2* | | 0 | 0 | 2* | 1* | 5 | |
| 09/10 " | | 2* | | 0 | 0 | 7 | 1* | 10 | |
| 10/11 " | 0 | 0 | 0 | 0 | 1 | - | 3 | 4 | |
| 11/12 " | 0 | 1 | 0 | 2 | 0 | 0 | - | 3 | |
| 12/13 " | | 2* | | 0 | 0 | 10 | 1* | 13 | N.L. |
| 13/14 " | | 2* | | 1 | 0 | 2 | 1* | 6 | |
| 14/15 | 0 | 0 | 0 | 0 | 0 | 2 | 1* | 3 | |
| 15/16 " | 0 | 0 | 0 | 1 | 0 | 2 | - | 3 | |
| 16/17 " | 1 | 0 | 0 | 1 | 0 | - | - | 2 | |
| 17/18 " | 1 | 0 | 1 | 0 | 0 | - | - | 2 | |
| 18/19 " | 0 | 0 | 0 | 0 | 1 | - | - | 1 | P.Q. |
| Total obs. | | 15 | | 5 | 7 | 29 | 11 | 69 | |
| Total est/14j. | | 15 | | 5 | 7 | 40 | 15 | 84 | |

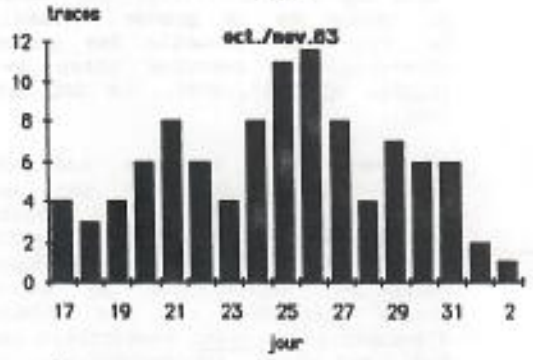
Le décompte des traces observées au début de chaque mission permet d'estimer l'activité de ponte immédiatement antérieure.

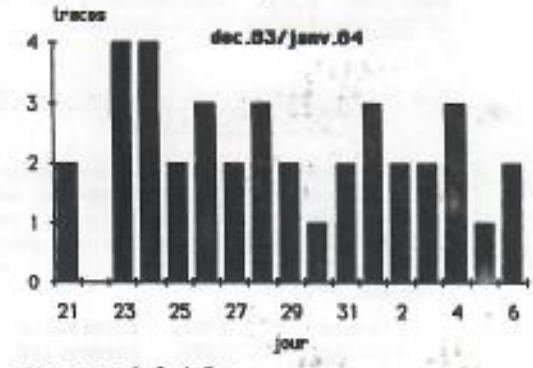
Les traces peuvent en effet demeurer visibles pendant une durée de l'ordre de quinze jours à trois semaines dans les conditions climatiques rencontrées à Scilly. A l'examen du tableau n°5, il apparait que les périodes de février et d'octobre 83, d'activités globales comparables, sont précédées par des situations différentes :

- au cours de la saison 82/83, l'activité la plus intense se situe plus tôt dans la saison, vraisemblablement en décembre

- la mission d'octobre 83 semble coïncider avec la période de plus grande abondance de montées à terre, puisque les estimations antérieures à la mission de décembre 83/janvier 84 sont moins élevées.




Figures n° 3,4,5 :

Evolution quotidienne du nombre de traces en février 83 (données dans les tableaux 2,3,4.

| DATE | MOTU HOMU | | | MOTU OTUE OIA | | | MOTU PAPAI | | TOTAL | OBS. |
|---|---|---|---|---|---|---|---|---|---|---|
| Nuit du../au.. | ocken | pointe | lagon | oc. | pointe | lagon | ocken | lagon | | Phase lune |
| 17/18 OCT | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 4 | |
| 18/19 " | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 3 | |
| 19/20 " | 0 | 0 | 0 | 0 | 0 | 0 | 4* | 0 | 4 | |
| 20/21 " | 0 | 1 | 0 | 0 | 0 | 0 | 5* | 0 | 6 | |
| 21/22 " | 0 | 2 | 0 | 2 | 0 | 0 | 4* | 0 | 8 | P.L. |
| 22/23 " | 1 | 1 | 0 | 1 | 0 | 0 | 3 | 0 | 6 | |
| 23/24 " | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 4 | |
| 24/25 " | 0 | 0 | 0 | 0 | 1 | 2 | 5 | 0 | 8 | |
| 25/26 " | 3 | 3 | 1 | 1 | 0 | 0 | 3 | 0 | 11 | |
| 26/27 " | 2 | 3 | 1 | 3 | 0 | 0 | 3 | 0 | 12 | |
| 27/28 " | 1 | 2 | 0 | 0 | 1 | 1 | 3 | 0 | 8 | |
| 28/29 " | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 4 | |
| 29/30 " | 0 | 1 | 0 | 0 | 0 | 2 | 4 | 0 | 7 | D.Q. |
| 30/31 " | 0 | 1 | 0 | 1 | 0 | 0 | 4 | 0 | 6 | |
| 31/01 NOV | 0 | 0 | 1 | 0 | 0 | 1 | 4 | 0 | 6 | |
| 01/02 " | 0 | 0 | 0 | 0 | 0 | 2 | - | - | 2 | |
| 02/03 " | 0 | 0 | 1 | - | - | - | - | - | 1 | |
| Total obs. | 7 | 15 | 4 | 12 | 3 | 10 | 49 | 0 | 100 | |
| Total /mois | | 26 | | | 25 | | 49 | | | |
| Total est./17j. | | 26 | | | 26 | | 55 | | 107 | |

| DATE | MOTU HOMU | | | MOTU OTUE OIA | | | MOTU PAPAI | | TOTAL | OBS. |
|---|---|---|---|---|---|---|---|---|---|---|
| Nuit du../au.. | ocken | pointe | lagon | oc. | pointe | lagon | ocken | lagon | | Phase Lune |
| 21/22 DEC. | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | P.L.le20 |
| 22/23 " | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 23/24 " | 0 | 1 | 0 | 0 | 0 | 2 | 1 | 0 | 4 | |
| 24/25 " | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 4 | |
| 25/26 " | 0 | 1 | 0 | 1 | 0 | 0* | 0 | 0 | 2 | |
| 26/27 " | 0 | 1 | 0 | 1 | 0 | 1* | 0 | 0 | 3 | |
| 27/28 " | 0 | 0 | 0 | 1 | 0 | 1* | 0 | 0 | 2 | |
| 28/29 " | 0 | 0 | 0 | 1 | 0 | 0 | 2* | 0 | 3 | |
| 29/30 " | 0 | 0 | 0 | 0 | 0 | 0 | 2* | 0 | 2 | |
| 30/31 " | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 31/01 JANV. | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | |
| 01/02 " | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 3 | |
| 02/03 " | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | |
| 03/04 " | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | |
| 04/05 " | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | |
| 05/06 " | 0 | 0 | 0 | 0 | 0 | 1 | - | 0 | 1 | |
| 06/07 " | 0 | 1 | 1 | 0 | 0 | 0 | - | - | 2 | |
| Total obs. | 1 | 12 | 2 | 6 | 0 | 7 | 10 | 0 | 38 | |
| Total/mois | | 15 | | | 13 | | 10 | | | |
| Total est./17j. | | 15 | | | 13 | | | 24(1) | 52 | |

Tableaux n° 2,3,4 :

Récapitulation du nombre de traces observées sur le motu du Sud de l'atoll de Scilly au cours de la mission effectuée en février 83, octobre-novembre 83, décembre-janvier 83/84. 2x: 2*: valeur estimée pour la nuit d'après un décompte global sur deux nuits.

| | Mission de février 1983 | Mission de octobre 1983 | Mission de décembre et janvier 83/84 |
|---|---|---|---|
| Durée de la mission | 14jours | 17jours | 17jours |
| Nombre de traces "anciennes" (ensemble de l'île) | 176 | 65 | 49 |
| Moyenne par nuit: | | | |
| sur 15 jours | 11 à 12 | 4 à 5 | 3 à 4 |
| sur 21 jours | 8 à 9 | 3 à 4 | 2 à 3 |
| Estimation du nombre de traces au cours de la mission | | | |
| sur les 3 motu sud: | 84 | 100 | 52 |
| sur l'ensemble de l'île: | 107(1) | 133(1) | 67(1) |
| Moyenne par nuit: | 7.6 | 7.8 | 5.1 |
| Nombre de femelles marquées: | 13 | 20 | 7 |
| Nombre moyen d'oeufs par ponte: | 95 ET=15.5 (Nbre pontes=6) | | 103 ET=34.1 (Nbre pontes=6) |

Tableau n° 5 :

Estimations du nombre de traces de montées à terre, précédant les missions et intervenues au cours de ces missions.

L'estimation du nombre de montées à terre pour l'ensemble de chaque saison peut être déduite d'une extrapolation des chiffres précédents à une durée de cinq mois retenue comme représentative d'une saison de ponte d'après le témoingnage des habitants de Scilly, ceci en l'absence d'informations plus précises sur le déroulement des deux saisons considérées.

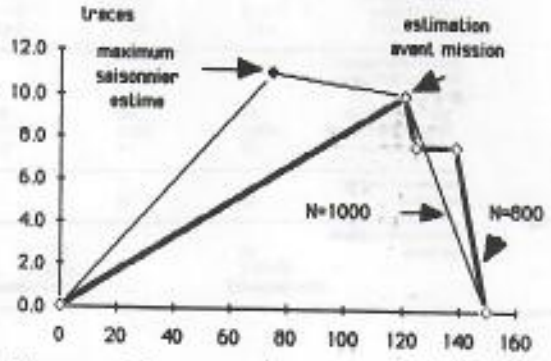
Les courbes estimatives (Figures n°6 et 7) recouvrent les mois d'octobre à février et passent par les valeurs de montées à terre estimées aux diverses périodes d'observations. L'intégration de ces courbes sur la durée choisie fournit une évaluation de l'activité saisonnière, ce chiffre n'étant qu'une indication très approximative d'une activité globale.

La saison 82/83 fait l'objet de deux hypothèses :

- l'une basse où l'on considère que les observations de février 83 constituent le maximum saisonnier : dans ce cas, le nombre approximatif de montées à terre se situerait aux environs de 800

- l'autre élevée où l'activité moyenne de février 83 se situerait en fin de saison et serait précédée par un pic en décembre 82 à un niveau moyen de 10 à 11 traces par nuit ; alors le nombre total de traces atteindrait environ 1 000.

Bien qu'il ne soit pas possible d'y associer un chiffre, le témoignage recueilli sur place laisse penser que cette dernière hypothèse est acceptable puisqu'il fait état de nombreuses montées de femelles en décembre 82. Cette saison a été perturbée par le passage de plusieurs cyclones, dont le premier, LISA, est passé à quelques dizaines de milles de Scilly vers le 10 décembre en modifiant considérablement l'aspect de certaines plages avec pour conséquence la destruction de nombreux nids.




Figures n° 6 :

Hypothèse d'activité de montées à terre au cours de la saison 82-83.
Courbe 1 : le maximum se situe au moment de la mission de février 83
Courbe 2 : le maximum se situe à la mi-décembre, puis la courbe passe par les valeurs estimées pour la période précédant la mission

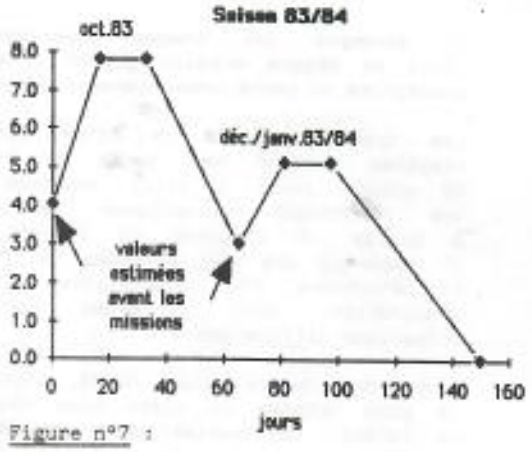



Figure n°7 :

Hypothèses d'activité de montées à terre au cours de la saison 83-84

Les informations dont nous disposons pour la saison 83-84, puis étalées dans le temps, traitées de la même manière que ci-dessus nous amènent à une estimation de 700 traces sur la même durée de cinq mois.

Il ne semble pas qu'il y ait de montées de femelles en nombre significatifs de février/mars à octobre, à la différence d'autres sites de ponte où une activité faible semble se maintenir au cours de l'hiver austral. Les évaluations fournies ci-dessus concerneraient donc la totalité des montées à terre pour l'ensemble de l'année à Scilly. Ceci reste cependant à vérifier, particulièrement en raison de la grande variabilité de la répartition annuelle des pontes déjà observées sur certains sites de ponte (LEBEAU et coll,1979), (LE GALL et coll, 1985).

La répartition annuelle influant sans doute sur le sex-ratio des nouveaux-nés, par le biais de la variation de la température d'incubation (MROSOVSKY, 1981), une meilleure connaissance des variations saisonnières du volume des pontes déposées et des températures d'incubation in situ permettrait certainement de mieux appréhender la biologie de Chelonia mydas en Polynésie.

## 2.4 Estimation du nombre de femelles et du nombre de pontes

Nous ne disposons que de peu d'observations de remontées à terre successives associées à des pontes sans compter les remontées à terre à intervalle d'un ou deux jours induites par l'activité de marquage (Tableau n°1) :

- femelle n° 2302, intervalle de 13 J
- femelle n° 2304, intervalle de 12 J
- femelle n° 2305, intervalle 61 et 14 J
- femelle n° 2312, intervalle de 12 J

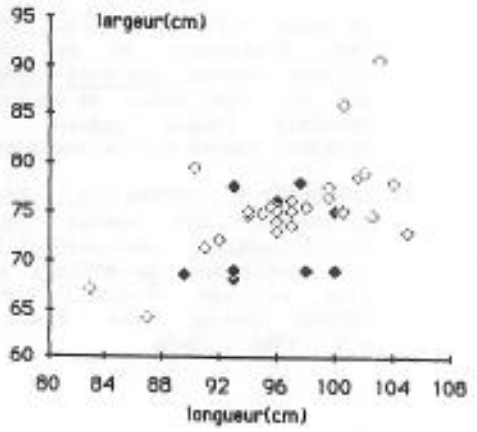



Fig. n° 8: Relation Longueur-largeur sur les femelles marquées à Scilly.

◆ : Saison 82-83

◇ : Saison 83-84

La durée du cycle inter-pontes apparait donc comparable à celles observées sur d'autres sites de ponte avec une valeur de l'ordre de 12 à 15 jours ; les intervalles de 14 et 61 jours correspondraient donc à six pontes successives déposées pendant la période recouvrant les deux dernières missions de la fin de 1983. La durée des séjours à Scilly n'étant pas assez importante pour augmenter les chances d'observations de pontes consécutives, il n'est pas possible d'interpréter les données de montées à terre pour en tirer une estimation du nombre de femelles et du nombre de pontes par femelle.

On peut seulement avancer que le nombre de femelles est au plus égal au nombre estimé de traces, et plus vraisemblablement compris entre le tiers et la moitié de ce dernier, en considérant que les femelles pondent chacune en moyenne de deux à trois fois par saison, cette fréquence ressortant en effet de l'ensemble des observations faites sur Chelonia mydas (BALASZ,1980, LEBEAU et coll ,1979). Le nombre de pontes peut être estimé égal au nombre de traces.

En février 1983, le décompte des oeufs de six nids, soit par observation directe lors de la ponte, soit par dénombrement des restes d'oeufs après émergence, fournit une valeur moyenne de 95 oeufs par nid. Sur les huit nids observés en octobre/novembre 83 et décembre/janvier 84, cette moyenne atteint 103 oeufs, soit globalement une moyenne de 99,7 oeufs/nid (écart type de 27.08).

En conclusion, avec les réserves émises sur la méthode d'estimation et en gardant à l'esprit la caractère très incomplet de ces observations, le nombre de femelles venues pondre à Scilly au cours de chacune de ces deux saisons peut être estimé à environ 400. Le nombre de pontes associées est évalué à 800, au minimum pour ces deux saisons, et le nombre d'oeufs déposés à 80 000.

### 2.5 Taux d'émergence et prédation à terre des nouveaux-nés

Seulement trois nids ont pu être examinés en vue d'une estimation du taux d'émergence ; les valeurs de ces taux calculées d'après le nombre de coquilles vides, d'oeufs entiers (infertiles ou non) et de nouveaux-nés demeurés dans le nid sont de 94.4, 82.6 et 93.4 pour cent. Cinq autres émergences ont été signalées par les restes de nouveaux-nés mangés par les pagures sans qu'il ait été possible de trouver les nids correspondants. Enfin, cinq nids prélevés à Scilly et ramenés à Tahiti pour l'essai de grossissement ont donné des taux d'éclosion de 73.6, 57.3, 75.4, 97.2 et 15.8 pour cent,(1)ce dernier chiffre étant dû à une mortalité importante des embryons à divers stades assez avancés qu'on peut sans doute relier au chavirage du nid au cours du transport.

Sans observation d'émergence diurne, il nous a pas été possible d'évaluer l'importance d'une éventuelle prédation aviaire sur les nouveaux-nés au sortir du nid. Les frégates sont présentes sur l'atoll, et bien que nichant sur le motu Fara, au nord de l'île, où aucune ponte n'a été observée, quelques individus paraissent assurer une "veille" au-dessus des motu Papai et Otue Oia, veille qui peut être aussi bien motivée par l'interception des fous (Sula sp) à leur retour de la pêche que par l'éventualité d'une pêche de petites espèces pélagiques du lagon.

Les émergences nocturnes paraissent faire l'objet d'une prédation assez importante de la part des bernard l'hermites qui forment généralement un cordon dense au bas des plages. En particulier nous avons pu observer partiellement une émergence dans laquelle 52 nouveaux-nés ont été trouvés vivants pour 17 capturés par les pagures, (le nombre total de nouveaux-nés n'est pas connu).

Sur la face océanique des motu, malgré la distance parfois importante séparant les nids de la mer et la difficulté de franchissement du récif fossile, nous n'avons trouvé que très peu de restes de petites tortues.

(1) Les conditions d'incubation sont détaillées dans la deuxième partie de ce rapport consacrée aux résultats de l'essai de grossissement en captivité, et non présentée ici.

Les rares émergences nocturnes observées montrent généralement une grande dispersion des nouveaux-nés au cours de leur trajet vers la mer. A l'inverse, les plages situées du côté du lagon permettent un accès direct à ce dernier.

## 3. CONCLUSION

L'atoll de Scilly demeure le lieu de ponte le plus fréquenté de la Polynésie Française avec 700 à 800 montées à terre estinées pour chacune des saisons de reproduction 1982-83 et 1983-84.

Le présent travail reste cependant trop limité dans le temps et dans l'espace pour fournir un inventaire et une évaluation plus complets des sites de ponte en activité ainsi qu'une estimation même approchée de la population de tortues vertes de la région. L'absence de données historiques récentes interdit de comparer avec précision le niveau d' abondance actuel à une situation antérieure. Le déclin de cette population reste cependant tout à fait plausible et, malgré le niveau d'activité observé au cours des séjours effectués à Scilly, il parait nécessaire d'accentuer les mesures de protection prises en faveur des tortues vertes.

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Papeete, le 20 march 1992

Réf. N° /EVAAM

Dear George,

Thank you for all the material you have sent (pins from Hawaii and the nice turtle pin - plus the last one of University of Hawaii. Here I found an turtle pin, the one of the celebration of the centenary of Papeete and tiare tahiti pin

I did not find the hat you want, but here are two other with different design. I will try to look in different stor in Papeete & ask my friend Jacky from Bora Bora to get one from Vaitape.

If you find other pins with animals, I will appreciate. I can may be find them at sea life park. or Waikiki aquarium.

I am happy that the presentation on Sicily went very well at the symposium. Did you write a brief presentation paper? Could you send me a full copy of your presentation? I suppose the 2 figures and 3 pages of texts on stomach contents, Conservation recommandations and table on long-distance migration

ÉTABLISSEMENT POUR LA VALORISATION DES ACTIVITES AQUACOLES ET MARITIMES
EVAAM

are part of your presentation paper.

With Jean Pierre, we are preparing a technical report on the ecological aspect and the conservation of the nesting ground in Scilly and others islands - Motu one, Mopelia, Tetiaroa. I think, we should publish together a report for the next Turtle meeting if there is a meeting this year.

We still plan to visit Mopelia and Scilly, but our agenda has been changed for several reasons: bad weather around Society islands and "AORAI" is still occupied by the pearl-oyster team in the Tuamotu.

We have plan to return and to release 50 to 100 turtles from Papeari during our next trip - Last turtle hatched at Papeari - the egg has been collected in Mopelia and Scilly -

Concerning your question on turtles tagged by Lebeter in 1983-84, over 40 turtle one turtle has been caught in Rituteki (Cook) N° 2330 - tagged on 31/12/83 in Scilly caught on 04/03/84 in Rituteki.)

In november 1984, LEBESCH has tagged and released 46 juvenile from 35 cm to 48 cm Lenght. near Mehetia Island. One of them was caught in Rangiroa on September 1985 in a fish trap by a fisherman.

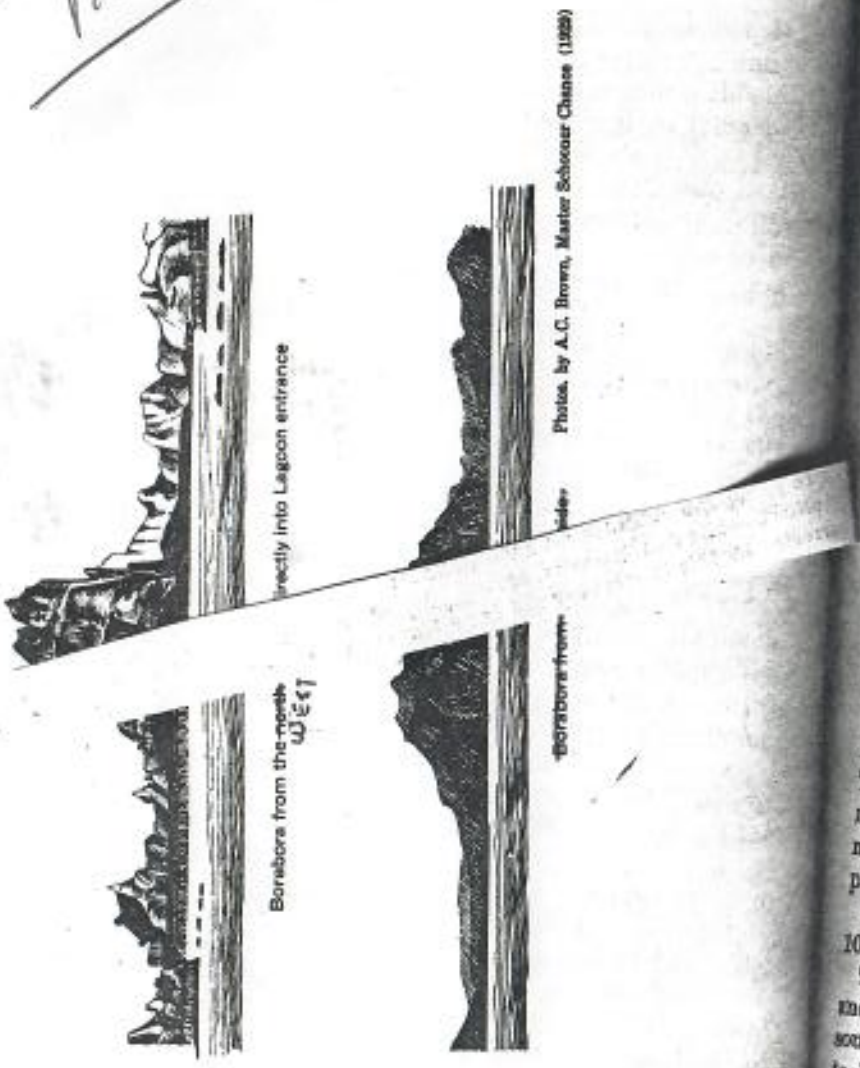
I will send more information on the total number of turtle tagged here since 1972.

You will find also here enclosed, a copy of an article on "La Depiche" reporting on the presentation of the Conservation Turtle Program and the poster on "Honu" we have sent to school, airport and several Island medical Center, Post office etc.—

Iaorana !

Odile.

PACIFIC ISLANDS PILOT



Photos. by A.C. Brown, Master Schooner Chanse (1928)

Borabora from the north

Borabora from the west



group of reefs, between which the channel is intricate. North of Paipai Pass are Tapuamu and Vaiore Bays, both of which afford anchorage. The passages as far as the latter bay appears to be clear of dangers, but about ½ mile northward of that bay there is a 2-foot patch lying about 400 yards offshore.

The passage on the eastern side of the island, northward of Toahotu Pass appears to be clear of dangers as far as the group of reefs off the center of the northern side of the island, but eastward of Mataira Point, about 2½ miles north of the pass, the channel between the reefs on either side is only about 300 yards wide. The western end of Tetaro Islet, in Teavapiti Pass, just open westward of the western end of Toahotu Island, lying on the southern side of Toahotu Pass, bearing about 178°, leads through the channel.

**BORABORA ISLAND** (*16°30′ S., 151°45 W., H. O. Chart 2005*), about 10 miles northwestward of Tahaa, consists of two parts, the western and smaller being known as Tupa Island. A barrier reef surrounds both parts.

The island is distinguished by the double-peaked Mount Pahia, which is 2,165 feet in height and located in the center of the larger island. At about ⅓ mile to the eastward of this mountain is Mount Temanu, 2,379 feet in height. In general the island is more craggy than the other islands of the Society Group. The eastern side has a barren appearance. (See sketches facing this page.)

The barrier reef around the eastern, northern, and northwestern sides of the island is covered with islets, most of which are wooded. The remainder of the reef is awash in places and in others has as much as 10 feet of water over it. The reef is nowhere more than 1½ miles from the shore and the sea breaks heavily over it. The only passage through the reef is Teavanui Pass on the western side.

**Tides.**—The mean high-water interval at Borabora Island is 12h. 10m.

**Teavanui Harbor,** on the southwestern side, between Borabora and Tupua, is about 1½ miles long, north-northwest and southeast, and from 1 to 1½ miles wide. The depths are about 11 to 18 fathoms.

Teavanui Pass, which leads through the barrier reef, is about 400 yards wide between the edges of the shoals extending from the barrier reef on either side. It is straight, free from danger, and has a least charted depth of 5½ fathoms in the fairway.

The edges of the reefs are clearly visible, but with strong northwesterly winds the sea breaks right across the entrance, rendering it difficult to distinguish the channel.

The prevailing wind blows out of the pass and the current sets out at a rate varying with the amount of the surf running over the reefs.

The conspicuous temple with a red bell tower surmounted by a white mast, the landing pier, and the flagstaff at the root of the pier, are easily recognized.

**Range lights** are shown from white masonry pyramids 1,203 yards apart. (See Light List.)

In 1936 it was reported that the line of the range beacons (103°) passed too close to the reef on the southern side of the entrance and it was recommended that a course of 105° be steered for the front beacon of the range, open slightly southward of the rear beacon, which course will lead through midchannel.

**Anchorage.**—Sheltered anchorage can be found in any part of the harbor.

**VAITAPE.**—The village of Vaitape stands on the eastern side of the harbor.

Wharf.—There is a small pier which has a depth of 11 feet at its head. A wooden post has been placed on either side of the pier to secure bow and stern lines. There is undertow at the wharf.

Water.—Good water is piped to the wharf through a ¾-inch pipe.

**Motu Iti (Tubai)** (*16°16′ S., 151°49′ W., H. O. Chart 2023*), about 8 miles north-northwestward of Borabora Island, consists of a group of low wooded islets which are connected by a coral reef, through which there is no passage. The islands are not permanently inhabited but they are visited by natives of the neighboring islands to gather coconuts or to fish.

The area surrounding the islands is said to be free from danger.

**Maupiti,** about 27 miles westward of Borabora Island, is a small island, 698 feet in height. The barrier reef extends for a distance of about 2 miles off the southern side and about 1 mile off the other sides. The southern part of the barrier reef, except for a few islets, is mostly awash, but the northern part of the reef is above water and has some wooded islands on it. The lagoon is encumbered with coral reefs and affords very little anchorage space. The entrance to the lagoon is between two islets on the southern side but it is narrow and tortuous and only available to small vessels with local knowledge during fine weather. The depths in the entrance decrease quickly from 6 to 4 fathoms. In the lagoon, the depths between the coral reefs are only 2½ to 3 fathoms.

In bad weather the sea breaks across the entrance and in fine weather rollers are common. A strong current always sets out of the entrance.

**Mopihaa (Mopelia)** (*16°49′ S., 153°57′ W., H. O. Chart 1987*), about 100 miles westward of Maupiti, is an atoll consisting of many low islets on a reef. The eastern side of the reef is occupied by a



long, narrow band of dry land with numerous coconut trees. On the western and northern sides there are a number of islets, many of which are covered with brushwood or trees.

The islets are only inhabited occasionally.

The only pass through the barrier reef is on the northwestern side; it is only about 30 yards wide, steep-to, and with a depth of 32 feet, but its inner part is almost closed by shoals. The current in the pass runs with a velocity of as much as 3½ knots.

The lagoon has plenty of water, but there are some shoals which, however, are easily seen. The lagoon cannot be considered as ordinarily accessible even to the smallest vessels without the greatest care and local knowledge. A pilot for the lagoon is said to be available at Borabora.

**Fenua Ura (Scilly Islands)** (*16°30′ S., 154°40′ W., H. O. Chart 824*) atoll, on which there is a group of small, low, and, consequently, dangerous islets, lies about 43 miles west-northwestward of Mopihaa. The atoll is about 7 miles in extent and the lagoon has no entrance except a boat passage about 800 yards from the north point, on that part of the barrier reef which trends to the west-southwestward.

The eastern side of the atoll is said to be green with trees but the western side is reported to be coral which breaks heavily for about 5 miles.

**Bellingshausen Island (Motu One),** about 40 miles northward of Fenua Ura, is an atoll and consists of four low coral islands covered with coconut trees and other vegetation, on a reef of triangular form, the whole about 3 miles in extent. The reef is steep-to and has a number of rocks on it. There is no opening into the lagoon. Landing can be effected in fine weather on the west-northwest or lee side of the reef. The islands are inhabited.

## CONVERSION TABLES

### FEET TO METERS

| Feet | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0.00 | 0.30 | 0.61 | 0.91 | 1.22 | 1.52 | 1.83 | 2.13 | 2.44 | 2.74 |
| 10 | 3.05 | 3.35 | 3.66 | 3.96 | 4.27 | 4.57 | 4.88 | 5.18 | 5.49 | 5.79 |
| 20 | 6.10 | 6.40 | 6.71 | 7.01 | 7.32 | 7.62 | 7.92 | 8.23 | 8.53 | 8.84 |
| 30 | 9.14 | 9.45 | 9.75 | 10.06 | 10.36 | 10.67 | 10.97 | 11.28 | 11.58 | 11.89 |
| 40 | 12.19 | 12.50 | 12.80 | 13.11 | 13.41 | 13.72 | 14.02 | 14.33 | 14.63 | 14.93 |
| 50 | 15.24 | 15.54 | 15.85 | 16.15 | 16.46 | 16.76 | 17.07 | 17.37 | 17.68 | 17.98 |
| 60 | 18.29 | 18.59 | 18.90 | 19.20 | 19.51 | 19.81 | 20.12 | 20.42 | 20.73 | 21.03 |
| 70 | 21.34 | 21.64 | 21.95 | 22.25 | 22.55 | 22.86 | 23.16 | 23.47 | 23.77 | 24.08 |
| 80 | 24.38 | 24.69 | 24.99 | 25.30 | 25.60 | 25.91 | 26.21 | 26.52 | 26.82 | 27.13 |
| 90 | 27.43 | 27.74 | 28.04 | 28.35 | 28.65 | 28.96 | 29.26 | 29.57 | 29.87 | 30.17 |

### FATHOMS TO METERS

| Fathoms | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0.00 | 1.83 | 3.66 | 5.49 | 7.32 | 9.14 | 10.97 | 12.80 | 14.63 | 16.46 |
| 10 | 18.29 | 20.12 | 21.95 | 23.77 | 25.60 | 27.43 | 29.26 | 31.09 | 32.92 | 34.75 |
| 20 | 36.58 | 38.40 | 40.23 | 42.06 | 43.89 | 45.72 | 47.55 | 49.38 | 51.21 | 53.03 |
| 30 | 54.86 | 56.69 | 58.52 | 60.35 | 62.18 | 64.01 | 65.84 | 67.67 | 69.49 | 71.32 |
| 40 | 73.15 | 74.98 | 76.81 | 78.64 | 80.47 | 82.30 | 84.12 | 85.95 | 87.78 | 89.61 |
| 50 | 91.44 | 93.27 | 95.10 | 96.93 | 98.75 | 100.58 | 102.41 | 104.24 | 106.07 | 107.90 |
| 60 | 109.73 | 111.56 | 113.39 | 115.21 | 117.04 | 118.87 | 120.70 | 122.53 | 124.36 | 126.19 |
| 70 | 128.02 | 129.85 | 131.67 | 133.50 | 135.33 | 137.16 | 138.99 | 140.82 | 142.65 | 144.47 |
| 80 | 146.30 | 148.13 | 149.96 | 151.79 | 153.62 | 155.45 | 157.28 | 159.11 | 160.93 | 162.76 |
| 90 | 164.59 | 166.42 | 168.25 | 170.08 | 171.91 | 173.74 | 175.56 | 177.39 | 179.22 | 181.05 |

### METERS TO FEET

| Meters | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0.00 | 3.28 | 6.56 | 9.84 | 13.12 | 16.40 | 19.68 | 22.97 | [illegible] | 29.53 |
| 10 | 32.81 | 36.09 | 39.37 | 42.65 | 45.93 | 49.21 | 52.49 | 55.77 | 59.06 | 62.34 |
| 20 | 65.62 | 68.90 | 72.18 | 75.46 | 78.74 | 82.02 | 85.30 | 88.58 | 91.86 | 95.14 |
| 30 | 98.42 | 101.71 | 104.99 | 108.27 | 111.55 | 114.83 | 118.11 | 121.39 | 124.67 | 127.95 |
| 40 | 131.23 | 134.51 | 137.80 | 141.08 | 144.36 | 147.64 | 150.92 | 154.20 | 157.48 | 160.76 |
| 50 | 164.04 | 167.32 | 170.60 | 173.88 | 177.16 | 180.45 | 183.73 | 187.01 | 190.29 | 193.57 |
| 60 | 196.85 | 200.13 | 203.41 | 206.69 | 209.97 | 213.25 | 216.54 | 219.82 | 223.10 | 226.38 |
| 70 | 229.66 | 232.94 | 236.22 | 239.50 | 242.78 | 246.06 | 249.34 | 252.62 | 255.90 | 259.19 |
| 80 | 262.47 | 265.75 | 269.03 | 272.31 | 275.59 | 278.87 | 282.15 | 285.43 | 288.71 | 291.99 |
| 90 | 295.28 | 298.56 | 301.84 | 305.12 | 308.40 | 311.68 | 314.96 | 318.24 | 321.52 | 324.80 |

### METERS TO FATHOMS

| Meters | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0.00 | 0.55 | 1.09 | 1.64 | 2.19 | 2.73 | 3.28 | 3.83 | 4.37 | 4.92 |
| 10 | 5.47 | 6.01 | 6.56 | 7.11 | 7.66 | 8.20 | 8.75 | 9.30 | 9.84 | 10.39 |
| 20 | 10.94 | 11.48 | 12.03 | 12.58 | 13.12 | [illegible] | 14.22 | 14.76 | 15.31 | 15.86 |
| 30 | 16.40 | 16.95 | 17.50 | 18.04 | 18.59 | [illegible] | 19.68 | 20.23 | 20.78 | 21.33 |
| 40 | 21.87 | 22.42 | 22.97 | 23.51 | 24.06 | [illegible] | 25.15 | 25.70 | 26.25 | 26.79 |
| 50 | 27.34 | 27.89 | 28.43 | 28.98 | 29.53 | 30.07 | 30.62 | 31.17 | 31.71 | 32.26 |
| 60 | 32.81 | 33.36 | 33.90 | 34.45 | 35.00 | 35.54 | 36.09 | 36.64 | 37.18 | 37.73 |
| 70 | 38.28 | 38.82 | 39.37 | 39.92 | 40.46 | 41.01 | 41.56 | 42.10 | 42.65 | 43.20 |
| 80 | 43.74 | 44.29 | 44.84 | 45.38 | 45.93 | 46.48 | 47.03 | [illegible]7 | 48.12 | 48.67 |
| 90 | 49.21 | 49.76 | 50.31 | 50.85 | 51.40 | 51.95 | 52.49 | 53.04 | 53.59 | 54.13 |



# SAILING DIRECTIONS

FOR

# THE PACIFIC ISLANDS

(EASTERN GROUPS)

## VOLUME II

FIFTH EDITION

1940

ISSUED UNDER AUTHORITY OF
THE SECRETARY OF THE NAVY

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1940

## 87. Joseph Allen

JOSEPH ALLEN, of the American whaling vessel *Maro*, on 2 June 1820 discovered an island or rock, 150 feet high with two detached humps, the position given being latitude 25° 3′ N., longitude at 3 miles away 167° 40′ W. He named it Gardner's Island.[1]

This was Gardner Island, a barren, rocky island with a smaller pinnacle rock on its north-western side,[2] in the north-western sector of the Hawaiian Islands.

## 88. Thaddeus Bellingshausen

THADDEUS BELLINGSHAUSEN was the commander of a Russian exploratory expedition of two ships, the *Vostok* and the *Mirnyi*. Bellingshausen wrote a detailed account of his voyage with charts.[3]

Coming north from Amanu in the Tuamotu Archipelago, Bellingshausen, on 10 July 1820, came to an inhabited island, the position given being latitude 15° 51′ 5″ S., longitude 140° 49′ 19″ W., called by him Count Arakcheev Island.

This was Angatau, in the stated latitude north of Amanu. It may have been discovered by Magellan (see section 2), but Bellingshausen gave the first firm record of it.

Sailing west from Angatau, Bellingshausen came past Takume and Raroia, and on 13 July 1820 saw two more islands. The first was a small island called 'Nihera' by some islanders who came aboard. Its position was taken as latitude 16° 42′ 40″ S., longitude 142° 44′ 50″ W. The other island lay to the north-west of it.

These two islands were Nihiru and Taenga. Nihiru was a new discovery.

Having continued to the west past Makemo, Bellingshausen was

[1] Stackpole, E. A., *The Sea-Hunters* (Philadelphia–New York, 1953), p. 269, citing *New Bedford Mercury*, 8 June 1821.

[2] *Pacific Islands Pilot*, vol. iii, p. 299.

[3] *The Voyage of Captain Bellingshausen*, ed. Debenham, E. (London, 1945).





informed almost immediately that two more islands were in sight from the mast, one south-west by south, and the other west by south. The ship could not fetch an island called by Bellingshausen General Raevski Island because of the head wind. It was judged to be in latitude 16° 43′ S., longitude 144° 11′ W. This was on 15 July 1820.

These were the Raevski Islands, a cluster south-west of Makemo —another new discovery.

The first island to be sighted after General Raevski Island, also on 15 July 1820, was judged to be 12½ miles long and 6½ miles wide. Two narrow openings into the lagoon were noted. The position given was latitude 16° 28′ 35″ S., longitude 144° 17′ 33″ W. Bellingshausen called it Graf Osten-Saken Island.

This, as might be expected from the map, was Katiu, a large atoll 9 miles north-north-west of the Raevski Islands.

The next day, 16 July 1820, Bellingshausen saw Tahanea and Faaite, neither of which were new discoveries, and more land to the north-west of Faaite. The next day this latter land was inspected more closely. The position given for its northern point was latitude 16° 9′ 20″ S., longitude 145° 33′ 55″ W. Bellingshausen called it Count Wittgenstein Island.

This was Fakarava, north-west of and close to Faaite—another new discovery.

Beyond Fakarava Bellingshausen came to two islands which he surmised correctly were two of Cook's Palliser Islands (see section 37)—Toau and Kaukura.

On 18 July 1820, at daylight, Bellingshausen found himself near a small island, higher than the others, the position given being latitude 16° 11′ 18″ S., longitude 146° 15′ 50″ W. The diameter was thought to be 5½ miles. This was named Admiral Greig Island. Here a landing was made.

The small island was Niau, which lies 18 miles west of Toau and Fakarava. The *Pacific Islands Pilot* says that it is 5½ miles long and consists of a crater with a lagoon, being about 26 feet high, all of which agrees with Bellingshausen's topographical details. Niau was another new discovery.[1]

Bellingshausen now sailed to Tahiti past Makatea. From Tahiti he came north again to the north-western Tuamotus, encountering

[1] *Pacific Islands Pilot*, vol. iii, p. 115.

Tikahau, which he recognized as Kotzebue's Krusenstern Island (see section 83). He then came west, and at a distance from Tikahau thought to be 22 miles, he passed an island judged to be 5½ miles long and 2 miles wide, apparently uninhabited. The position given was latitude 14° 56′ 20″ S., longitude 148° 38′ 30″ W. This island, which Bellingshausen called Lazarev Island, was seen on 30 July 1820.

This was Matahiva, 22 miles west-north-west of Tikahau, 5 miles long and 3 miles wide—another new discovery.

During his passage through the Tuamotus, Bellingshausen saw numbers of islanders, some of whom occasionally attacked the ship. The only close contact was at Nihiru, where a chief of Anaa who was visiting the island, accompanied by a woman, came aboard and was entertained to dinner by Bellingshausen.

On 1 August 1820 another island was discovered. It was considered to be little more than ¼ mile long in a north-west by north direction, and in width less than ½ mile. The position given was latitude 10° 5′ 50″ S., longitude 152° 16′ 50″ W. It was named Vostok.

This was the modern Vostok. It may have been discovered by Magellan.

From Vostok Bellingshausen came past Rakahanga, Pukapuka, and Vavau to the Fiji Islands. On 19 August 1820 he saw three islands. The first two were small islands about 6½ miles apart, the position given for the more easterly being latitude 21° 1′ 35″ S., longitude 178° 40′ 13″ W. Bellingshausen called this Mikhailov, and the other, to the north-west of it, Simanov. North-west of the latter, high land was seen. This proved to be a cluster of small high islands, the centre judged to be in latitude 20° 39′ S., longitude 178° 40′ W. Here they made contact with the inhabitants, who told them the name of the cluster was Ono.

These were the south-easternmost islands of the Fiji group, Tuvana-i-Tholo (Mikhailov), Tuvana-i-Ra (Simanov), and Ono-i-Lau (Ono). These are south of Oliver's course to the west from Tofua (see section 47). Ono-i-Lau may have been discovered by the *Bounty* mutineers (see section 44).

At Ono the Russians had friendly contacts with the chief Fio and his people. They got many fine artifacts, drawings of which were included with Bellingshausen's account, together with impressive portraits of the chiefs.

Bellingshausen's contributions to the discovery of the Pacific



Islands were as follows: On 10 July 1820 he gave the first firm record of Angatau in the Tuamotu Archipelago. This island may have been discovered by Magellan (see section 2). On 13 July 1820 Bellingshausen discovered Nihiru, on 15 July 1820 the Raevski Islands and Katiu, on 16 July 1820 Fakarava, on 18 July 1820 Niau, and on 30 July 1820 Matahiva, all in the Tuamotu Archipelago. On 1 August 1820 Bellingshausen gave the first firm report of Vostok Island. On 19 August 1820 Bellingshausen discovered Tuvana-i-Tholo and Tuvana-i-Ra, and either discovered, or rediscovered after the *Bounty* mutineers (see section 44), Ono-i-Lau, in the Fiji Islands. Landings were made on Niau and Ono.

## 89. Captain Browne

Captain Browne, of the British vessel *Eliza Francis*, on 21 August 1821 discovered a small island, 5 miles in circumference, and took its position as latitude 0° 23′ S., longitude 159° 46′ W.[1]

This is almost precisely the position of the modern Jarvis Island, a detached small coral island in the mid-Pacific area, which was no doubt the island discovered by Browne.

## 90. Captain Patrickson

In October 1822 Captain Patrickson of the British vessel *Good Hope* discovered two low islands near each other, abounding in coconut trees, named by him Reirson's Island and Humphrey's Island respectively. The positions given were, for Reirson's Island, latitude 10° 6′ S., longitude 160° 55′ W., and for Humphrey's Island, latitude 10° 30′ S., longitude 161° 2′ W. As the ship passed Reirson's Island a number of inhabitants were seen, and it was conjectured that Humphrey's Island, being to leeward, was inhabited likewise.[2]

[1] Krusenstern, A. J., *Supplémens* (St. Petersburg, 1836), p. 22; Royal Geographical Society, *Journal* (London, 1837), p. 227.

[2] Horsburgh, J., *India Directory*, vol. ii (London, 1827), p. 596.

Tabiteuea, the largest of the southern Gilbert Islands, he was told that there were other islands in the vicinity including Nukunau, and identified the latter with Byron's Island, although he did not visit Nukunau.[1] Nukunau is, however, a small island, and if it had been Byron's Island it would have been hard for Byron to miss the main Gilbert chain on his north-west course after leaving it. Tabiteuea itself answers much better to Byron's description, being a large island with much foul ground on the south side, and densely populated in historical times, which conforms with the launching of sixty canoes from one part of the island in question. It is also the most likely island in the vicinity of the stated latitude to be seen from the south-west and south without sight of any other island before or after. On the other hand, Byron's longitudes of other islands in the South Pacific are all several degrees to the west of their true position, whereas his longitude for Byron's Island is one degree only to the west of Tabiteuea. There are not sufficient grounds for an identification of Byron's Island beyond concluding that it was either Tabiteuea or Beru or Nukunau, all of which are in or near the stated latitude.

Byron gives a lively picture of the Gilbertese he saw in the canoes and on the ship at the time of this first European contact. Their canoes contained between three and six people. Some of the men came aboard, and showed an intrepid and cheerful disposition. They were tall, well-proportioned, and clean-limbed, their skin a bright copper colour, their features extremely good. One of them captivated the Englishmen by his lively antics and clowning. They wore attractive shell ornaments round their necks, wrists, and waists, and their ears were bored and elongated. Some of them had a kind of spear stuck full of shark teeth, sharp as a lancet, for about 3 feet of its length.

John Byron, on 7 June 1765, discovered Napuka and Tepoto in the Tuamotu Archipelago; on 24 June 1765 Atafu, the northernmost of the Tokelau Islands, a landing being made; and on 2 July 1765 either Tabiteuea or Beru or Nukunau in the southern Gilbert Islands.

[1] Wilkes, C., *Narrative of the United States Exploring Expedition* (Philadelphia, 1845), vol. v, pp. 5–17, 80.

6/17/1769 Tahiti



## 30. Samuel Wallis

After Byron's return to England (see section 29) the *Dolphin*, in command of Captain Samuel Wallis, was sent on another voyage of exploration, in company with the *Swallow*, commanded by Philip Carteret. Carteret's ship became separated from the *Dolphin* as they were entering the Pacific, and its voyage across the Pacific, being virtually an independent one, is covered in the next section. The authorities for Wallis's exploration are his own journal as edited by Hawkesworth,[1] and the log or diary of the master, George Robertson.[2] The first of these is followed except where Robertson is specifically named.

Having come out of Magellan Strait on 12 April 1767, Wallis decreased his latitude slowly, and on 6 June 1767 discovered a low island about 4 miles long and 3 miles wide, with a large internal basin, the latitude given being 19° 26′ S. To this island he gave the name Whitsun Island. Here, according to Robertson, some of the men swam ashore to visit the island. Another island lay to the north-west distant about 4 leagues, some 6 miles in length and a mile wide according to Wallis's estimation. At this latter island, to which the name Queen Charlotte's Island was given, the Englishmen made contact with the inhabitants, who sailed off to the west-south-west in some large double canoes. A landing was made on Queen Charlotte's Island. The expedition proceeded in the direction the canoes had taken, and saw an island south-west of Queen Charlotte's Island while the latter was still in sight. This new island, which they called Egmont Island, had the appearance of two islands joined by a reef, the whole enclosing a lagoon, the latitude given being 19° 20′ S. They saw some inhabitants. The date of the finding of Egmont Island was 10 June 1767. Leaving in the evening, the next day they saw another inhabited island surrounded by rocks, of much the same appearance as Egmont Island, but narrower, to which they gave the name Gloucester Island, the latitude given being 19° 11′ S. This was on 11 June 1767. At five the next morning, 12 June 1767, they set off again, and soon saw another island to which they gave the name Cumberland Island. At dawn the next morning, 13 June 1767, they saw another small island which had the appearance of small keys, to which they gave the name Prince William

[1] Hawkesworth, J., *Voyages* (London, 1773), vol. i, pp. 362–522.
[2] In *The Discovery of Tahiti*, ed. Carrington, H. (London, 1948).

Neal

Henry's Island, the latitude given being 19° S. They did not see more land for 4 days.

The six islands, all conforming closely in latitude, relative location, and topography to Wallis's details, were Pinaki (Whitsun), Nukutavake (Queen Charlotte), Vairaatea (Egmont), Paraoa (Gloucester), Manuhangi (Cumberland), and Nengonengo (Prince William Henry), all in the Tuamotu Archipelago. Vairaatea was the island called San Miguel, seen by Quiros the day before reaching San Pablo (Hao). The other five islands were new discoveries.

At Nukutavake Robertson went round the island making observations of the islanders and their arts and crafts. They were armed with spears up to 14 feet in length pointed with bone. They had double canoes about 30 feet long, 4 feet broad, and 3½ feet deep, fastened together with transverse beams, the mast being stepped in the middle of the midship beam. Even bigger vessels were in process of being built on stocks, but they did not give the impression of being used for long voyages. Many turtle-backs, as well as fine tortoise-shell, were found, as well as much pearl-shell. Graves with canopies near by were found, the canopies consisting of four pillars of stone with coconut-leaf roofs and sides made of twigs.

Four days after Nengonengo, on 17 June 1767, the ship came to a very high well-peopled island, nearly circular, about 2 miles across, to which Wallis gave the name Osnaburgh Island, the latitude given being 17° 51′ S. The next day, 18 June 1767, shortly after leaving Osnaburgh, they came to a very high, large island of delightful and romantic appearance, the native name of which later proved to be 'Otaheite'. Here they stayed 5 weeks. This island Wallis named King George the Third's Island. On 27 July 1767 they set sail and passed another high island, called the Duke of York's Island, 2 miles west of King George the Third's Island. The references to it indicate that it had been seen previously from Tahiti. On 28 July 1767 they passed another inhabited island about 6 miles long, with a mountain in the middle, the latitude given being 17° 28′ S., which Wallis called Sir Charles Saunders's Island. Next day, 29 July 1767, they passed another island thought to be about 10 miles long and 4 miles broad, the latitude given being 16° 46′ S., which Wallis called Lord How's Island. In the afternoon they saw some low islands and breakers, the latitude given being 16° 28′ S., naming them the Scilly Islands. No more land was seen till 13 August.



These islands were Mehetia (Osnaburgh), Tahiti (King George the Third's Island), Moorea (Duke of York's Island), Mopihaa (Lord How's Island), and Motu One (Scilly Islands), all in the Society Islands, and all new discoveries. The latitudes, relative location and sailing times, and topographical descriptions all conform with these identifications.

Wallis's account of the stay of the *Dolphin* at Tahiti is, together with Robertson's observations, outstanding in the annals of discovery. The Englishmen had to fight their way to an anchorage against hundreds of canoes, but they became so friendly with the inhabitants and their chieftainess Purea that when they left 'our Indian friends, and particularly the Queen, once more bade us farewell, with such tenderness of affection and grief, as filled both my heart and my eyes'. The people were well made, active, the women handsome, and some of them very beautiful, with ideas of virtue which did not accord with European convention. They used cloth made of the beaten inner bark of a tree. Their ornaments were flowers, feathers, shells, and pearls. Both men and women practised breech tattooing. They had in profusion pork, poultry, dog flesh, fish of many sorts, bread-fruit, bananas and plantains, yams, apples, and a sour fruit. They used huge nets for catching fish, as well as hooks. They cooked their pork, bread-fruit, and yams in pits with hot stones, leaves, and embers. Their weapons, scars, and surgical skill indicated their practice of warfare. Their canoes comprised single sailing canoes with outriggers, dug-out canoes made from the trunk of the bread-fruit tree, two-masted double canoes, and ceremonial canoes with awnings, all of them well made. Their principal weapons were slings, bludgeons, and spears, their bows and arrows being only fit to knock down a bird. The climate appeared to be good and no disease was seen. To these details Robertson adds the following. There was a large place of worship with three stone walls within one another. Images were cut in the trunks of trees one above the other, five such in one trunk being seen on one occasion. The chieftainess's house was very large, being 320 feet long and 36 feet broad, supported

by fourteen large wooden pillars in the middle of the house, each about 15 to 16 inches in diameter and about 24 feet high.

Taking a westerly course from Motu One, Wallis, on 13 August 1767, came to two inhabited islands close together, one like a sugar loaf and the other in a peak, the latitude being given as 16° S. These were plainly Niuatobutabu and Tafahi, discovered by Le Maire (see section 16).

Continuing on from Niuatobutabu and Tafahi, the voyagers 2 days later, on 16 August 1767, came to an island which was low at the coast but appeared to be high inland, surrounded by reefs. The ship's boats, while examining the coast, found a passage through the reef, and had a contact with some canoes. The latitude given was 13° 18′ S. The island was named Wallis's Island.

This was Uvea, sometimes called Wallis Islands, consisting of a main island and several islets within a barrier reef with several channels through it, in latitude 13° 20′ S. The main island has a hill 470 feet high near its middle.[1] This was a new discovery.

At Uvea Robertson went with the boats near the shore, but after contact with some of the islanders there he withdrew. He got two wooden clubs from the islanders, who had shark-bone and shell necklaces and shell ear pendants.

On 3 September 1767 land was seen bearing east-north-east distant 5 miles; half an hour later more land was seen in the north-west, and half an hour again a 'proa' was seen sailing at a distance. Two hours later the two islands were distant about 3 leagues on either hand, and many others, much farther off, were in sight. The latitude of one of the two islands was given as 11° N., the latitude of the other as 11° 20′ N. No more land was seen before they reached the Ladrones.

These data show that Wallis saw first Rongerik and then Rongelap in the western chain of the Marshalls, and passed between them. They are the only islands in the vicinity of the stated latitudes far enough apart and yet near enough to each other to be seen at a fair distance on either hand. Rongelap had been discovered by Saavedra (see section 5). Wallis was the discoverer of Rongerik.

[1] *Pacific Islands Pilot*, vol. ii, p. 355.



Samuel Wallis, on 6 June 1767, discovered Pinaki and Nukutavake, landings being made. On 11 June 1767 he discovered Paraoa, on 12 June 1767 Manuhangi, and on 13 June 1767 Nengonengo. These five islands are all in the Tuamotu Archipelago. On 17 June 1767 he discovered Mehetia; on 18 June 1767 he discovered Tahiti, numbers of landings being subsequently made; some days later he discovered Moorea; on 28 July 1767 he discovered Tubuai Manu; and on 29 July 1767 he discovered Mopihaa and Motu One; all six of these islands being in the Society Islands. On 16 August 1767 he discovered the mid-Pacific atoll Uvea. On 3 September 1767 he discovered Rongerik, in the Marshall Islands.

## 31. Philip Carteret

PHILIP CARTERET, commanding the *Swallow*, was separated from Samuel Wallis in the *Dolphin* (see section 30) as they came out of Magellan Strait, and made an independent voyage across the Pacific. The authority for this voyage is Carteret's journal as edited by Hawkesworth, which contains reproductions of charts and sketches of the islands that were seen.[1]

Carteret left Masafuera, near the South American coast, on 24 May 1767, and on 2 July 1767 came to an island like a great rock rising out of the sea, appearing to be about 5 miles in circumference and to be uninhabited, a profile sketch of it being given. On 11 July 1767 he discovered a small, low, flat island appearing to be almost level with the water's edge, but as it was to windward south of them they could not fetch it. Its latitude was given as 22° S. They called it Bishop of Osnaburgh's Island. The next day, 12 July 1767, they fell in with two small wooded islands which appeared to be uninhabited. The southernmost, on which a landing was made from the ship's boat, was a slip of land in the form of a half-moon, low, flat, and sandy, and from the south end a reef ran out for about ½ mile. The other of these two islands, distant from it some 4 or 5 leagues to the west-north-west, very much resembled it. Their latitudes were given as 20° 38′ S. and 20° 34′ S. respectively. To these Carteret gave the name Duke of Gloucester's Islands.

[1] Hawkesworth, J., *Voyages* (London, 1773), vol. i, pp. 523–676.

and Helen Reef, the southernmost islands of the western Carolines, some 150 miles from Morotai and 35 miles west and east of each other. Tobi, according to the *Pacific Islands Pilot*, is covered with coconut palms which attain a height of 118 feet, and Helen Reef, while consisting for the most part of reefs, has a low, thickly wooded islet at the northern end.[1]

The details given in the accounts are not enough to establish whether the island encountered by Woodes Rogers on 10 April 1710 was Tobi or Helen Reef. These islands may have been discovered by the Portuguese (see section 4).

## 26. Francisco Padilla

In 1710 a Spanish ship named the *San Trinidad*, under the command of Francisco Padilla, with Josef Somera as pilot, went with some Spanish missionaries from Manila to find the islands which were known to exist to the east of the Philippines (see section 21). An account of this voyage was left by Somera.[2]

The Spaniards found, in latitude 5½ degrees north, the two islands of Sonsorol, so named to them by the islanders themselves; and heard from the latter that the principal island 'Panloq' lay to the north-north-east, at a distance which the Spaniards judged to be probably about 50 leagues from Sonsorol. Sonsorol itself had already been discovered by Gonzalo Gomez de Espinosa (see section 2). Padilla decided to try to discover 'Panloq'. Leaving Sonsorol on 9 December 1710, he duly found 'Panloq' on 11 December 1710, the latitude being taken as 7 degrees 14 minutes north. Six canoes came off when the ship was a league off shore, and a skirmish took place. The ship passed between two islands, through a channel barely a league wide. On 13 December, without further contact, the ship returned to Sonsorol.

This is the first clearly established European contact with the Palau Islands, lying between latitudes 6 degrees 40 minutes and 8

[1] *Pacific Islands Pilot*, vol. i, pp. 507–8.

[2] Somera, J., cited in English by Burney, J., *Discoveries in the South Sea*, vol. v (London, 1817), pp. 12–16, from *Lettres . . . des missions étrangères* (Paris, 1781), vol. xi.



degrees 20 minutes north, some 150 miles north-east of Sonsorol. They may have been discovered by the Portuguese (see section 4). See also the discussion of Drake (section 11).

## 27. Jacob Roggeveen

In 1722 Jacob Roggeveen crossed the Pacific from the east as the head of a Dutch exploratory expedition with commercial objects. Three ships entered the Pacific, namely the *Arend*, the *Thienhoven*, and the *Africaansche Galey*, but the *Africaansche Galey* was wrecked in the Tuamotus. The authorities for this voyage are the journals of Roggeveen himself, and of Cornelis Bouman, the captain of the *Thienhoven*.[1] Roggeveen's account is followed, with cited details from Bouman.

Roggeveen's first aim was to find the land reported by Davis (see section 22), supposed to be 500 leagues west of Copiapo in Chile. The expedition left Juan Fernandez on 17 March 1722. On 5 April 1722 a well-peopled hilly island, named by Roggeveen Paasch Eyland (Easter Island), was discovered, the latitude as they approached it being taken as 27 degrees 4 minutes south. The ships remained here until 13 April, during which time a landing was made on the island, and the presence of some large statues was noted.

This was the detached island known, from Roggeveen's name, as Easter Island, the latitude of which is 27 degrees south. It is not credible that this island was seen by Davis, for the reasons given in section 22.

The Dutchmen landed on Easter Island in force, headed by Roggeveen himself, with Bouman also in attendance. The following combines details from both their accounts. The people of Easter Island were well-proportioned, with big strong muscles. Their colour was not black, but pale-yellow or grey-brown, as could be seen from looking at the young men, who did not paint their bodies dark blue or were of higher rank and accordingly not obliged to do agricultural work. Their teeth were snow-white and

[1] *De reis van Mr. Jacob Roggeveen*, ed. Mulert, F. E. Baron (The Hague, 1911).

exceptionally strong, as shown by the fact that even the old people could crack hard nuts by biting them. The hair and beard of most of them was short, but some had their hair long and hanging over their backs or plaited and rolled together on the top of the head. Their clothing consisted of material which looked like a kind of cotton but was not woven or twined. It appeared to be dyed with red or yellow earth. The islanders had no utensils but calabashes. They cooked fowls by wrapping them in grass and putting them on glowing stones with leaves on top. Their huts consisted of a framework covered with rushes or long grass, with a low entrance, and with mats for floor coverings. Outside the huts were large, wide-polished stones, apparently used as seats. Ornaments seen were a mother-of-pearl necklace, a shell on a chief's chest, and ear-drops which seemed to be of vegetable matter, to accommodate which there were big slits in the wearers' ears. Their canoes were made of many small pieces of timber tied together with cord, were about 10 feet in length apart from the very high sharp prows, and were leaky because there was no efficient caulking of the seams. The people had fowls, bananas, small green oranges, yams, sugar cane, sweet potatoes, and an unknown variety of swede or turnip. Their cultivations on gently sloping hills were neatly divided by furrows into square patches, in which the sweet potatoes and aforesaid variety of swede or turnip were grown. The islanders cut their bananas with a sharp piece of black stone, and then twisted them off. The statues, says Roggeveen, were up to 30 feet high and more, these being made of clay or sticky earth into which small, smooth pebbles had been put very neatly and closely together so that the impression of a human body was created, the conclusion about the method of construction of the big statues being reached after pulling a piece off. All the statues were covered with a long cloth hanging from the neck to the soles of the feet, under which a slight protuberance gave the indication of arms. On the head was a basket containing stones painted white and piled together. The islanders lighted fires in front of some of these and subsequently squatted on their heels with their heads bent, bringing the palms of their hands together and moving them up and down.



Leaving Easter Island on 13 April 1722, Roggeveen came west, decreasing his latitude with the intention of following Le Maire's track (see section 16). On 18 May 1722 a small island was seen, the latitude being considered to be 15 degrees 12 minutes south. It was thought at first to be Le Maire's Honden Island (Pukapuka, in the Tuamotu Archipelago), but when this did not appear to fit in with the expedition's further contacts Roggeveen called it Bedrieglyke (Doubtful or Deceptive). Shortly after leaving this island the *Africaansche Galey* was wrecked on a large, low island comprising several islets, the latitudes near which were taken as about 14¾ degrees south. The crew of the galley were rescued and divided among the other ships. While at this island five sailors deserted. This island was named Schadelijk (Disastrous). The expedition left this island on 24 May, and the following morning, 25 May 1722, another large, low island considered to be west of the south of Schadelijk was encountered, the latitude near it being taken as 14 degrees 33 minutes south. This island was named Dagenraad (Dawn). Some alarm was caused by these encounters with dangerous islands. They decided to come south. On 27 May 1722, in the evening, another low island was seen. This was named Avondstond (Evening). At midday on this day the latitude had been taken as about 15¼ degrees south. On 28 May 1722 another low island, close to the west side of Avondstond, was found. It was called Meerder Zorg (More Trouble). On this day the latitude was taken as 15 degrees 10 minutes south. On 29 May, according to Bouman, the expedition passed between Avondstond and Meerder Zorg to the south, skirting the latter on its south side, and on 30 May 1722 they had the western part of Avondstond south-east of them at 3 Dutch miles (about 12 geographical miles), and Meerder Zorg north-east of them. They soon saw another low island to the north-west by west, which they named Goede Verwaghting. This extended east and west. At noon on this day the latitude was taken as 15 degrees 17 minutes south. On 2 June 1722, or 1 June according to Bouman, they encountered a moderately high craggy island. The latitude near it was taken as 15 degrees 43 minutes south. A landing party collected some greenstuff, in consequence of which the island was called Verkwikking (Refreshment). The islanders first welcomed them but later threw stones at them. No more land was seen for several days after leaving Verkwikking.

A comparison of these data with a detailed map of the north-western sector of the Tuamotu Archipelago will show that they correspond with the following sequence of islands. The small island that was first seen was Tikei. Schadelijk, where the *Africaansche Galey* was wrecked, was Takapoto. When John Byron

visited an island which was undoubtedly Takapoto in 1765 (see section 29), a landing party found relics of a Dutch longboat. Takapoto had, however, been discovered by Le Maire. The island to the west of Schadelijk, namely Dagenraad, was either Manihi or Ahe. It may have been discovered by Le Maire. Coming south, the expedition then saw Apataki (Avondstond), and then Arutua (Meerder Zorg), which lies 9 miles west of Apataki. The ships passed south of Arutua, and then saw Rangiroa to the north-west by west. Rangiroa had been discovered from the north by Le Maire. Then the expedition came to Makatea (Verkwikking), which is unique in those parts in being of moderate height and hilly. All these islands fit in with Roggeveen's relative locations, topographical descriptions, sailing times, and broad latitudes. The new discoveries among them were Tikei, Apataki, Arutua, and Makatea, and possibly Manihi or Ahe according to which of these was seen by Roggeveen and which before him by Le Maire.

On 6 June 1722, 3 days after leaving Makatea, two more islands were seen to the south. Bouman of the *Thienhoven*, which was nearer these islands, said that when seen at daylight, at a distance of 8 to 9 Dutch miles (about 32 to 36 geographical miles), one of these, a very high island, was to the south-east of the ship, and the other, a lower island, was to the south-west by south. According to Roggeveen, the latitude on this day was taken as 15 degrees 37 minutes south, and the two islands were 2 Dutch miles apart. He identified them with Le Maire's Cocos and Verraders (Tafahi and Niuatobutabu).

These two islands were the northern islands of the Society Islands, Borabora and Maupiti. The sailing time of 3 days from Makatea is realistic in relation to these islands. Their latitudes are about 16½ degrees south. Borabora has peaks of over 2,000 feet. Maupiti is a good deal lower, its highest point being 698 feet.[1] Tubai, also known as Motu Iti, a low atoll, lies between Borabora and Maupiti at a distance of 7 miles from Borabora and 24 miles from Maupiti. While Borabora and Tubai might appear to agree with Roggeveen's figure of 2 Dutch miles between the two islands, this does not accord with Bouman's bearings, nor with the fact that Tubai at a long distance would not be visible, nor with the

[1] *Pacific Islands Pilot*, vol. iii, pp. 180–1.



further fact that, if Tubai had been visible, Maupiti would have been more so. Roggeveen was thus the discoverer of Borabora and Maupiti.[1]

On 13 June 1722 a low island estimated to be about 1 Dutch mile in circumference was seen, and was called Vuyle Eyland (Bird Island). The latitude on this day was taken as 14½ degrees south. Very soon thereafter high land was seen to the north-west, first from the *Thienhoven*. The next day the two ships stopped off this high land on its south side, the latitude near it being taken as 14 degrees 9 minutes south. It was found to consist of four islands. The easternmost was the largest; to the west of it were two islands divided by a narrow channel; and west of these was a small island. These islands were called Boumans Eylanden.

Bird Island was the modern Rose Island, a small atoll in latitude 14 degrees 33 minutes south, the easternmost of the Samoa Islands. The Bouman Islands to the north-west of Vuyle Island were the Manua Islands of the Samoa group. Of these, Tau, the easternmost, is 3,056 feet high, Olosenga, 5¾ miles north-west of Tau, is 2,095 feet high, Ofu, ¾ mile west of Olosenga, is 1,589 feet high, and two islets lie close together near the west side of Ofu.

While the Dutch ships were at Tau three canoes came out to them. They were not made out of a log, but constructed of framework and planks in a workmanlike way. A ship's boat went in to the shore, where large numbers of people were gathered. There were numbers of canoes there to meet them, one of which was very large. In this sat a man who was obviously a person of authority, and with him a girl who wore a blue coral necklace. The men had spears, bows, and arrows. The people resembled the Easter Islanders in having good physiques: also in painting themselves, but not so abundantly, as the painted adornments began at the thighs and went down to the legs. Nothing else was seen that the islanders used for clothing their nakedness except a belt round their waists, to which a great number of long and wide leaves or rushes or some other plant was attached.

Early the next day, 15 June 1722, a high island was seen, first from the *Thienhoven*, being named Thienhoven accordingly. Bouman says

[1] These identifications accord with those of Mulert, in *De reis van Mr. Jacob Roggeveen* (The Hague, 1911), p. 165 n.

they sailed on a west-north-west course along it at a distance of 7 to 8 Dutch miles, and later in the day saw another high island to the west-south-west, the previous island being still in sight. They could not get much idea of the extent of the second island to the west. The second island was named Groeningen.

The first of these islands, Thienhoven, was Tutuila, which rises to 2,141 feet, and the second, Groeningen, was Upolu, which has a number of peaks of which the highest is 3,607 feet[1]—both in the Samoa group. Tutuila is about 50 miles west of the Manua Islands, and Upolu is about 38 miles west-north-west of Tutuila. It is plain that the expedition did not proceed far enough before dark to appreciate the full extent of Upolu, or to see Savaii to the west of it.

No more islands were seen until Roggeveen reached New Ireland on 17 July 1722.

The contributions of Jacob Roggeveen to the discovery of the Pacific Islands were as follows: On 5 April 1722 he encountered Easter Island, a landing being made. This was a new discovery because it is not credible that Davis had seen it (see section 22). On 18 May 1722 Roggeveen discovered Tikei; on 25 May 1722 he discovered, or rediscovered after Le Maire (see section 16), either Manihi or Ahe; on 27 May 1722 he discovered Apataki; on 28 May 1722 he discovered Arutua; and on either 1 or 2 June 1722 he discovered Makatea, a landing being made; all these islands being in the Tuamotu Archipelago. On 6 June 1722 Roggeveen discovered Borabora and Maupiti in the Society Islands. On 13 June 1722 Roggeveen discovered Rose Island and the Manua Islands, and on 15 June 1722, Tutuila and Upolu, in the Samoa group, these discoveries being first seen from his second ship the *Thienhoven*.

[1] *Pacific Islands Pilot*, vol. ii, pp. 405–6, 410–11.



## 28. Norton Hutchinson, James Dewar, and Thomas Baddison

On 5 March 1761 three British ships, the *Carnarvon* (Captain Norton Hutchinson), the *Warwick* (Captain James Dewar), and the *Princess Augusta* (Captain Thomas Baddison) passed Mapia, south of the western Carolines, on the way to China, and some months later came back over the same course, being on occasion separated from one another. A chart embodying the information of one Scott of the *Warwick* shows that the expedition on the way to China, after leaving Mapia, encountered an island in the western Carolines, the position shown for it being that of Pulo Anna. It would appear that another island to the south-east of this position and corresponding to that of Merir was seen by the *Carnarvon* on the way back.[1]

These would appear to be the first reasonably well-established European sightings of Pulo Anna and Merir. Either or both of these islands may have been seen by the Portuguese (see section 4).

## 29. John Byron

In 1765 John Byron came through Magellan Strait into the Pacific as commander of a British expedition of two ships, the *Dolphin* and the *Tamar*, sent by the British Government on a voyage of exploration. The authority for this voyage is Byron's journal as edited by Hawkesworth.[2]

By Byron's time the improvement in navigation had reached a stage where figures for latitude were fairly precise, although not yet for longitude. The modern abbreviations for degrees, minutes, and seconds were becoming generally adopted, being a token of the improvement. These latter are therefore used in the present and ensuing sections.

[1] Eilers, A., in *Ergebnisse der Südsee-Expedition 1908–1910. II. Ethnographie B Mikronesien*, vol. ix, part 1 (Hamburg, 1935), p. 164—citing Dalrymple, A., *A Collection of Charts* (London, 1781–94).

[2] Hawkesworth, J., *Voyages* (London, 1773), vol. i, pp. 1–139.

# ECOLOGICAL ASPECTS OF GREEN TURTLES NESTING AT SCILLY ATOLL AND MOTU-ONE IN FRENCH POLYNESIA

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## INTRODUCTION

The three small neighboring atolls of Scilly (16° 30′S, 154° 40′W), Motu-one (15° 49′S, 154° 31′W) and Mopelia (16° 49′S, 153° 57′W) are located in a remote and seldom-travelled region of the South Pacific at the western limits of French Polynesia. Maupiti and Bora Bora, two high volcanic islands with permanent human habitation, are situated 250-300 km to the east. Tahiti and the capitol city of Papeete lie another 300 km to the southeast of Bora Bora. Although green turtles, Chelonia mydas, used to nest in great numbers at Scilly, Motu-one, and Mopelia, considerable declines are known to have occurred during recent decades due mainly to commercial exploitation for markets in Tahiti. At present, only Scilly continues to have significant numbers of nesting turtles. Few people have ever been able to visit these three isolated nesting sites for the purpose of tagging turtles and gathering relevant ecological information. However, turtles that have been intermittently tagged there in the past by local authorites have shown some amazing long-distance migrations across a broard expanse of the insular Pacific from longitudes 155°W to 165°E (Anon. 1979, Doumenge 1973; see also summaries of these papers by Balazs 1982, Meylan 1982, Pritchard 1982, and Groombridge and Luxmoor 1989).

These movements, ranging up to 4000 km, represent some of the longest migrations ever documented for green turtles worldwide. Except for Scilly, there are no other known nesting sites of any magnitude for sea turtles throughout all of the 130 islands and atolls comprising French Polynesia.

During October 1991 we visited Scilly and Motu-one via Bora Bora aboard the 20-m R/V Aorai to conduct biological studies that included tagging of nesting turtles. Several hundred eggs and hatchlings were also collected for ongoing captive rearing experiments in Tahiti. The expedition was undertaken by EVAAM, an agency of the Government of French Polynesia. Additional financial assistance was provided by the Regional Marine Turtle Conservation Programme of the South Pacific Regional Environmental Programme (SPREP 1991). An overveiw of the results of the expedition are provided herein. Some brief historical aspects of green turtles in the area are also presented, along with preliminary conservation recommendations aimed at preventing the further depletion of this important resource.

## HISTORICAL OVERVIEW

As elsewhere in Oceania, green turtles have been and continue to be a prized food to the native people of French Polynesia (Leach et al. 1984). In ancient times turtle was "held sacred for the gods and was only eaten by kings, priests, and marae (or temple) keepers" (Henry 1928). Icons of turtles were associated with royalty, the supernatural, and the afterworld (Rolett 1986). Petroglyphs of turtles as sacred symbols were carved on certain boulders and limestone slabs incorporated into the marae. For example, a boulder in the interior of Bora Bora, known as ofai honu

(turtle stone), contains numerous turtle petroglyphs. This stone was believed be the parent of the island and of its chiefs (Emory 1933).

There is no indication that permanent human settlements ever existed on Scilly, Motu-one, or Mopelia until recent times, although historically the rugged seafaring people of Maupiti visited these sites to obtain turtles and other resources. Beginning in the late 1800's or early 1900's longer and more frequent visitations were made for the purpose of making copra. Mopelia, the closest of the three atolls to Maupiti, appears to have had the most continuous human occupation for copra production (see Eggleston 1953). During the 1950's as many as 200 copra workers are known to have occupied Motu-one where a concrete warehouse and other facilites were constructed. However, with the advent of nuclear testing and associated higher-paying job opportunities elsewhere in French Polynesia during the 1960's, Motu-one was virtually abandoned along with many of the other atolls worked for copra. During our visit in October 1991 there were only eight people living on Motu-one. The relatively small numbers of turtles nesting today at Motu-one and Mopelia are undoubtedly the direct result of persistent and excessive hunting pressures from human habitation.

At Scilly, the earliest permanent settlement established to make copra appears to have been about 1952. The elder of the Taputu family (deceased in 1985) arrived in 1952 and his descendants have continued to live there up to the present. Rene Taputu, who was born at Scilly in 1955, currently oversees a population of 25 residents that include many children. Rene

Taputu is also the principal person knowledgeable about the atoll's turtles which continue to be a prominent component of the local diet. Up to 50 adult turtles (both males and females) are consumed annually under special permission previously granted by local authorities.

The main nesting season extends from October to December, but some turtles are present and sporadically nest throughout the year. Very few immature turtles are encountered, and the green turtle is the only species ever seen. The Taputu family has a history of raising small numbers of hatchlings in captivity for a year or so prior to releasing them as a restocking effort.

According to Rene Taputu, and verified by other sources, between 1952 and 1969 about 1000 adult turtles a year (both males and female) were taken for markets in Tahiti, as well as local consumption that included food for pigs being raised on the atoll. Eggs are not taken at present, but it is unclear if they ever were in the past. During 1967, 100 nesting turtles were captured in a single night on the most southerly islet of Motu Honu. A stone flung by a turtle nesting at this site fatally struck one of the atoll's inhabitants. Pens constructed on the islets of Motu Rahi and Motu Oia along the east side of the atoll made it possible to hold several hundred turtles alive for months until vessel transport arrived from Tahiti, Maupiti, or Bora Bora.

During September 1970 FAO consultant Harold Hirth visited French Polynesia as part of a broader survey of sea turtles of the South Pacific region (Hirth 1971). The visit included an overflight of Scilly and Mopelia. Due in part to Hirth's conservation recommendations, regulations

were enacted during 1971 prohibiting the sale of turtles throughout French Polynesia. Restrictions were also placed on the time of year and carapace size that turtles could be captured, although enforcment of all of the above has proven difficult. In separate legislation that same year, Scilly and Motu-one were given "sanctuary" status that provided some additional but limited protection for turtles.

In April 1972 67 adult females being held in pens at Scilly were confiscated, tagged (with tags supplied by Hirth), and released by Tahitian officials. Later that year in December, 168 more females and 13 males were tagged and released from the same holding pens. During 1973-74 an additional 131 adult females were tagged at Scilly. Of these 379 turtles tagged during 1972-74 12 long-distance recoveries were made encompassing the island groups of Tonga (1 turtle/2000 km), Fiji (5 turtles/3000 km), Wallis Island (1 turtle/3000 km), New Caledonia (2 turtles/4000 km), and Vanuatu (3 turtles/4000 km). All recoveries were made to the west of Scilly, and none occurred within French Polynesia. Two of the recoveries involved males that were recaptured in Kandavu and Druadrua, Fiji. Also, a female and one of the above males tagged in December 1972 were recaptured nearly two years later within 12 days of one another both in Kandavu, Fiji. All of 12 recoveries were made in coastal waters and can be assumed to involve turtles remigrating or in transit to seagrass/algal foraging pastures where they resided before migrating to Scilly for breeding purposes.

During 1979 42 females were tagged at Scilly by government officials, followed by the tagging of 42 more females in 1983-84 by Lebeau (1985).

One of the turtles from this latter group was recaptured three months later in the Cook Islands 500 km to the southwest of Scilly. All tags used during the years 1972-84 were made of Monel alloy (Size 49) by the National Band and Tag Company, Newport, KY, USA. A single tag was applied to a front flipper of each turtle.

During 1987 a team led by Jacques Couteau visited Scilly by seaplane and helicopter to do a TV film that included scenes of Rene Taputu hand-capturing a large turtle in the water along the seaward fringing reef.

In 1990 hatchlings were collected at Mopelia by EVAAM and transported to the University of Georgia via Honolulu for use in mitochondrial DNA studies of globally distributed green turtle populations (Bowen et al. in press). The black and extensive transitional pigment seen in the plastron of post-hatchlings green turtles from Hawaii (Balazs 1986) was documented by one of us (GHB) as also occurring in the turtles from Mopelia.

## EXPEDITION FINDINGS AT SCILLY

Nesting activity was monitored at Scilly for 10 consecutive nights from 14-23 October 1991 on the islets of Motu Honu and the southern portion of Motu Oia. This relatively high level of coverage, given the difficult terrain, was only possible due to the cooperation of Rene Taputu and several family members who assisted in walking the beaches throughout the night. During this period 11 turtles were tagged on Motu Honu and 39 were tagged on Motu Oia. Two other adult females were tagged and released from a pen where they were being held for local consumption along with eight other turtles. All turtles were triple or quadruple tagged on the flippers

with titanium tags (Stockbrands, Australia) supplied by SPREP, and/or Inconel alloy tags (Size 681, National Band and Tag Co.) supplied by the National Marine Fisheries Service. No tags were encountered that had been applied to turtles during earlier years, nor had Rene Taputu recently seen any of these tags. The number of nesting turtles seen during our available time and the areas we were able to cover appeared to be consistent with Lebeau's (1985) approximation that 300-400 turtles nested annually during the 1982 and 1983 seasons. Rene Taputu stated that relatively few turtles were present during last year's (1990) nesting season.

The curved carapace lengths of 51 of the 52 tagged turtles that could be measured ranged from 95 to 112 cm (mean = 103 cm). Six turtle shells used by Rene Taputu as ornaments at his home on Motu Oia ranged from 94 to 109 cm (mean = 99 cm). Carapace coloration was predominately a mottled brown, amber and black similar to green turtles seen by one of us (GHB) nesting at Rose Atoll in American Samoa and Fakaofo in Tokelau. Plastrons were yellowish orange; however three of the turtles examined had distinct black-pigmented spots ranging from 1-5 cm in diameter. One of these turtles had multiple spots scattered throughout the plaston, while the other two had only several. Rene Taputu indicated that about 10% of the turtles he eats have these spots which he calls, roughly translated, "chicken fecal-drop turtles." Although externally these turtles appear healthy and fat, when butchered the fat layer is found to be thin and excessive water comes from the meat when cooked.

Turtles tagged at Motu Honu were found to nest mainly on the lagoon

side of the islet where the beach consists entirely of fine-grained coral sand with no offshore obstructions. ~~Access to~~ this beach ~~can occur~~ is accessible at all tidal stages. In constrast, at Motu Oia all nesting turtles encountered except one came ashore on the ocean side of the islet, which is bordered by a very shallow fringing reef that drops off abruptly into deep oceanic waters. Access is further hampered along this coastline by ~~the presence of~~ rugged often sharp limestone on shore that a turtle must ~~be~~ crawled over once it ~~a turtle~~ leaves the water. Expanses of this beachrock are ~~ranging from~~ 10-50 m ~~in distance~~ above the high-tide mark and must ~~have to~~ be crossed to reach beach areas suitable for nesting. The lagoon-side beach of Motu Oia is narrow and free of obstructions, but composed of coarse coral sand and rubble. Nevertheless, nesting can successfully occur there, as shown by the one turtle encounter ed and the information supplied by Rene Taputu.

During one of the nightly surveys hatchlings were found from a newly emerged nest on Motu Oia close to Rene Taputu's home. ~~This was~~ reported ~~to~~ ~~from the result of~~ shelled oviducal eggs removed from a butchered turtle and buried as a conservation effort about ~~two~~ 2 months earlier. No predation on these hatchlings was observed, nor ~~were~~ was the presence of potential terrestrial or marine predators noted in abundance anywhere in or around the atoll. However, during a visit in 1984 ~~one of us (JPL) saw~~ large numbers of hermit crabs were sighted on Motu Honu. (Landret unpubl. data)

A partially filled stomach from a nesting female butchered a week earlier was salvaged from a garbage pit near Rene Taputu's. The contents were found to consist of 50% Microdictyon japonicum, 25% Caulerpa serrulata, and 25% Turbinaria ornata. ~~None of~~ these benthic algae were not

noted in abundance in the lagoon or along the fringing reef. However, Caulerpa racemosa, an alga sometimes grazed by green turtles elsewhere, commonly occurs in the lagoon at Scilly and is often eaten by human inhabitants.

On two different occasions mating turtles were seen both in the lagoon and just outside the seaward edge of the fringing reef where courtship and copulation are reported by Rene Taputu to most commonly occur. Turtles mating in this latter area are openly suspectible to capture by high-speed 12-m bonito fishing boats visiting the three atolls for such a purpose. During the month prior to our arrival, seven turtles and a bonita boat were taken into custody at Maupiti for violating the closed season for turtles. Considerable incentive exists for poaching, in view of the fact that an adult turtle can be illegally sold in Tahiti for about US$1000. Turtles inside the lagoons at Scilly, Motu-one and Mopelia are safe from hunting by bonita boats because it is impossible for vessels this size to enter through the narrow and extremely hazardous passes. In addition, turtles in the lagoons at Scilly and Motu-one are legally protected under the 1971 sanctuary designation.

A nesting turtle that we tagged on Motu Oia on October 18 was recaptured five months later in a fishing net near Suva, Fiji. A photograph taken shortly after capture showed an otherwise healthy turtle with numerous partially healed deep gouges in the plastron. Injuries to this extent were not seen when the turtle was originally tagged, nor on any of the other turtles examined. Possibly they were caused by the effects of cyclone Wasa that passed by the three atolls on December 9-10, 1991 with

winds of 180 km/h.

Ends abruptly; no conclusions drawn? Future work? Perhaps the conservation recommendations?

References?

(3) (8) (9) (12)

7 rules (13)

~~Photo Exhibit~~

Doumen
Aron
Henry
Hutton 71
Lebeau
Leach

Tag and release young ones

4 ~~5~~
~~6~~ 6
~~10~~
~~15~~ 4
~~16~~ ~~13~~
~~17~~
~~18~~
~~19~~ ~~14~~
~~20~~
~~21~~
~~23~~
(26) ~~22~~
~~24~~
~~25~~

Limit number for ~~eggs~~ hatchlings

For example, in the Hawaiian Islands it is

For examples, based on tag and recapture studies of ~~green~~ green turtles in the Hawaiian Islands,

Leave tagged

The number of ~~eggs~~ eggs and hatchlings ~~eggs~~ removed from Scilly for experimental capture rearing and restocking efforts should not exceed

**FIGURE 1.** Tag recoveries across the Pacific basin documenting the migrations of green turtles breeding at Scilly Atoll. These westward movements represent the return of adult male and female green turtles to their resident foraging pastures, following the seasonal eastward voyage to Scilly for copulation and lay eggs.

**FIGURE 2.** Migration map illustrating the eastward movements of adult male and female green turtles from their resident foraging pastures to the breeding site of Scilly Atoll. The migrations shown here are the converse of those documented by direct tag recoveries, as presented in Figure 1.

**FIGURE 3.** Map of Scilly Atoll (Manuae) 16°30´S, 154°40´W. The greatest distance across the lagoon is about 13 km, or 7 nautical miles.

| | | | | | |
|---|---|---|---|---|---|
| Motu Honu | Motu Honu | Motu Honu | Motu Oia | Motu Oia | Motu Oia |
| Motu Rahi | Motu Rahi | Motu Rahi | Pass | Pass | |

**FIGURE 4.**

FIGURE 4.

**FIGURE 5.**

FIGURE 5.

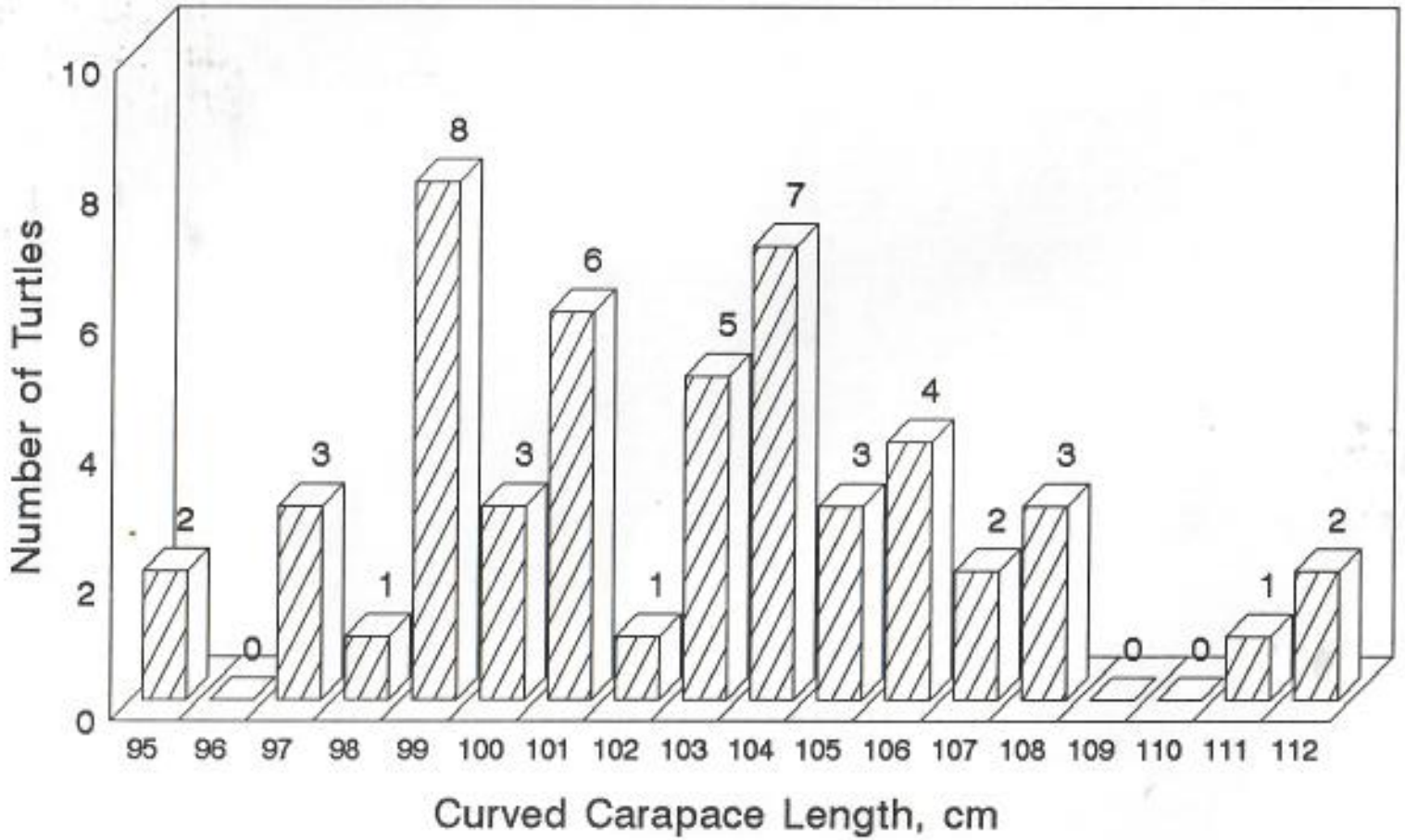
**FIGURE 6.** Photograph of 101 cm adult female green turtle recaptured in a fishing net at Toberu Island near Suva, Fiji on 23 March 1992. Partially healed injuries are visible in the plastron. The turtle was originally tagged (with tags S17-S19) while nesting at Motu Oia, Scilly Atoll on 18 October 1991. A migration of approximately 3000 km was accomplished by this turtle, from its nesting site at Scilly to its resident foraging pasture in Fiji.

**FIGURE 7.** Map of Motu One (Bellingshausen) 15°49´S, 154°31´W. The greatest distance across the lagoon is about 3.7 km, or 2 nautical miles.

Motu Poromutou Motu Poromutou Motu Poromutou

Pass Pass

# Carapace Lengths of 51 Green Turtles Nesting at Scilly Atoll, French Polynesia, During October, 1991



# Number of Nesting Green Turtles Tagged Nightly at Scilly Atoll, French Polynesia, During a 10-day Period in October, 1991

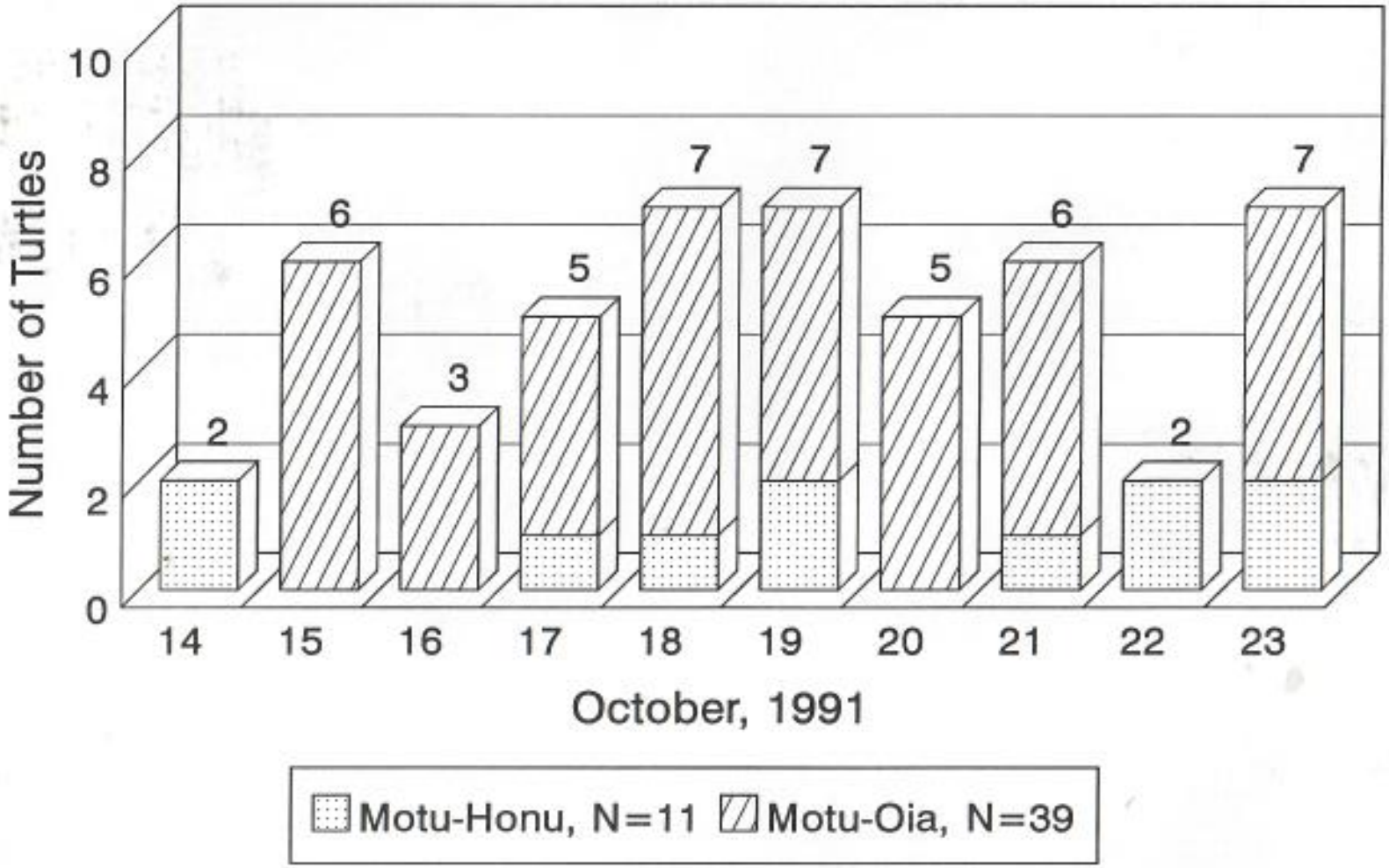
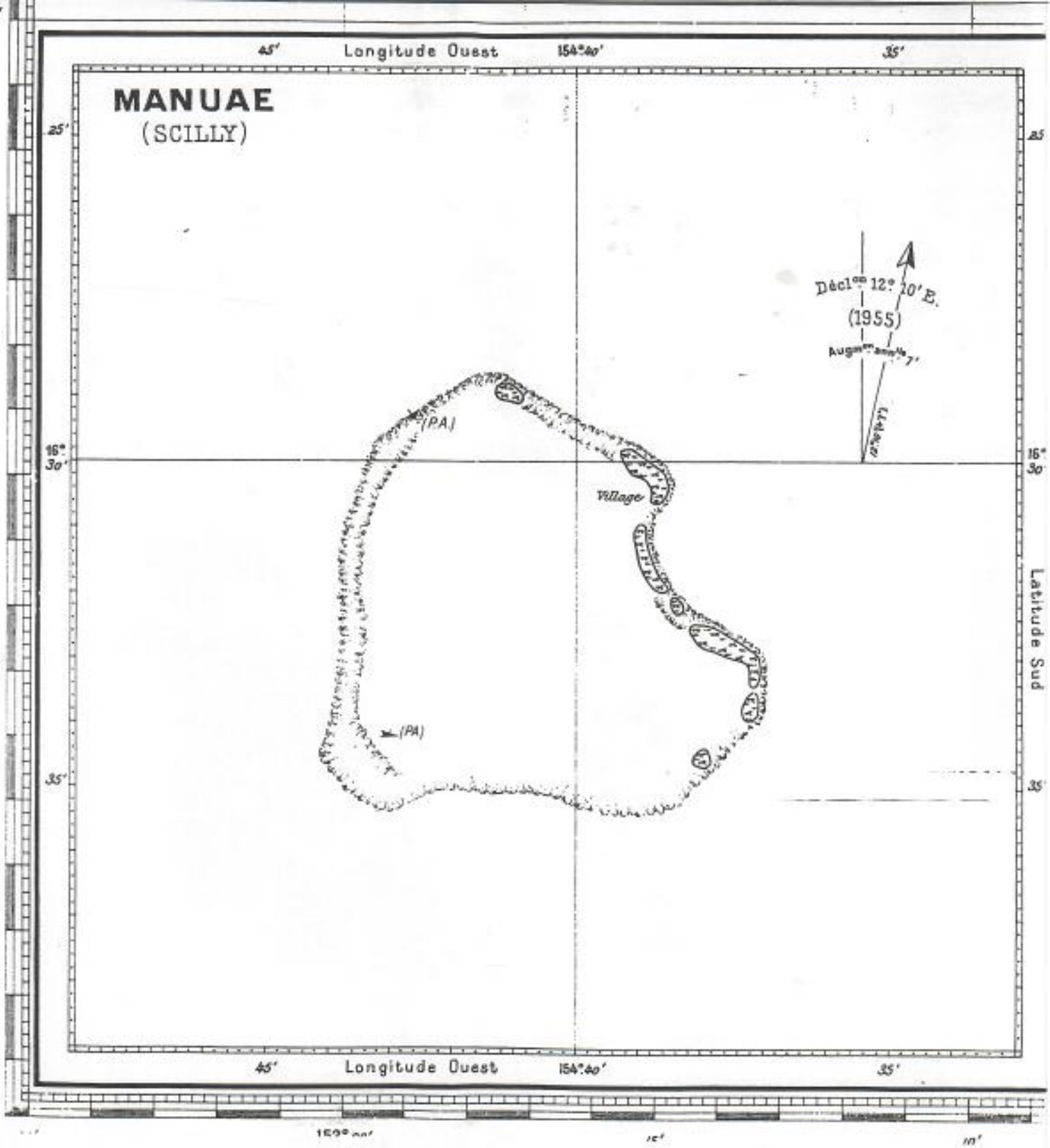
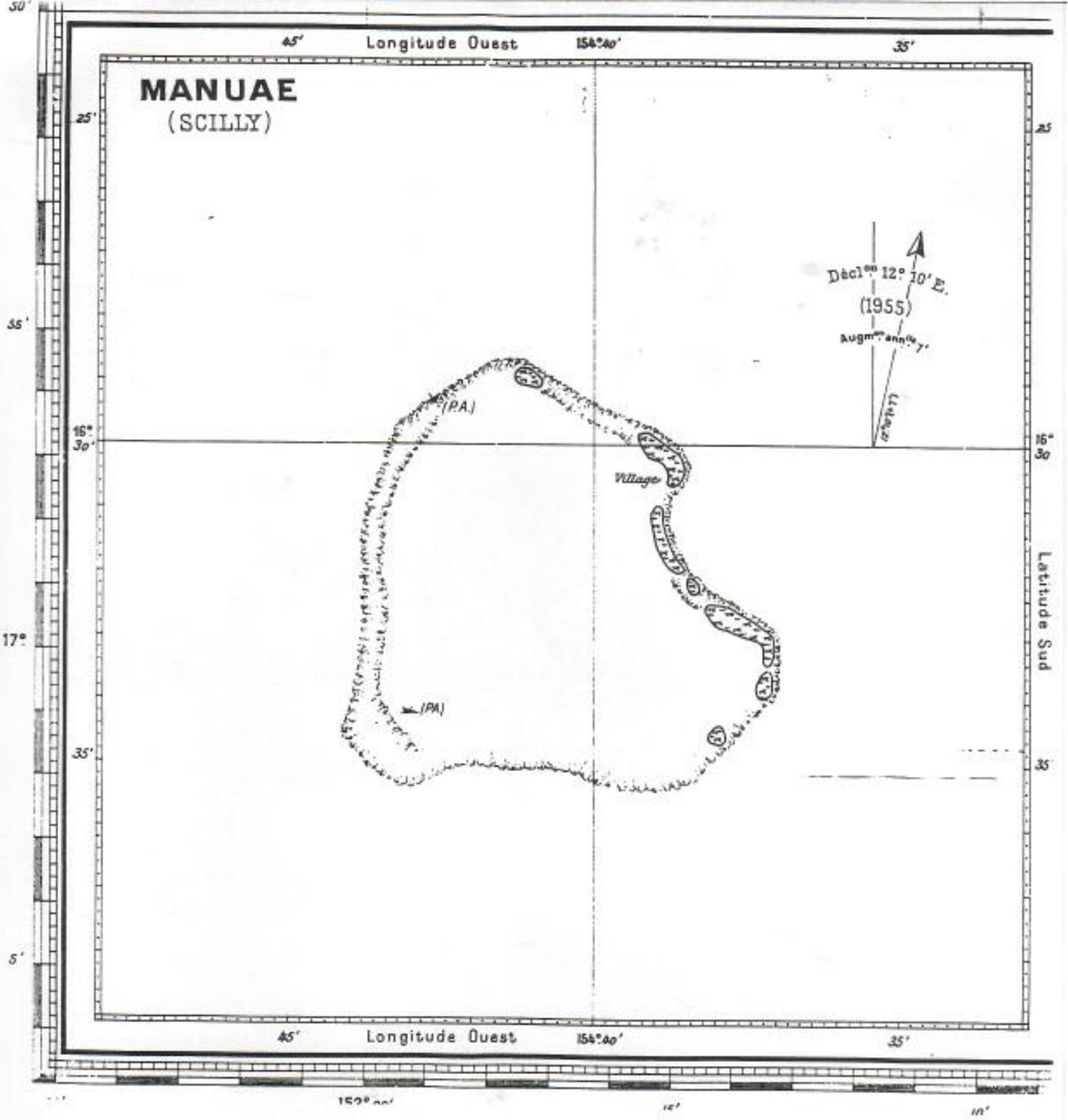


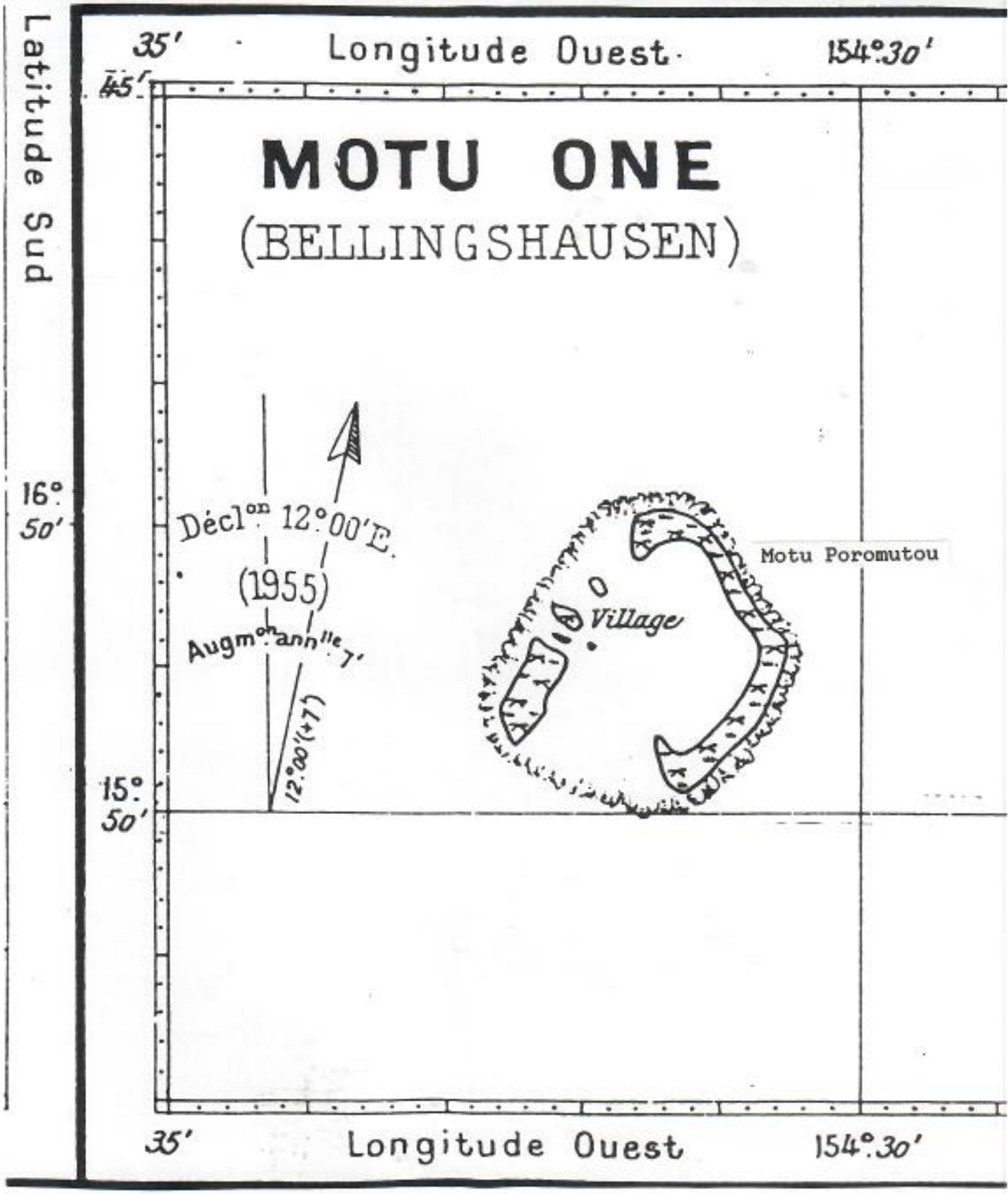
**FIGURE 7.** Map of Motu One (Bellingshausen) 15°49′S, 154°31′W. The greatest distance across the lagoon is about 3.7 km, or 2 nautical miles.

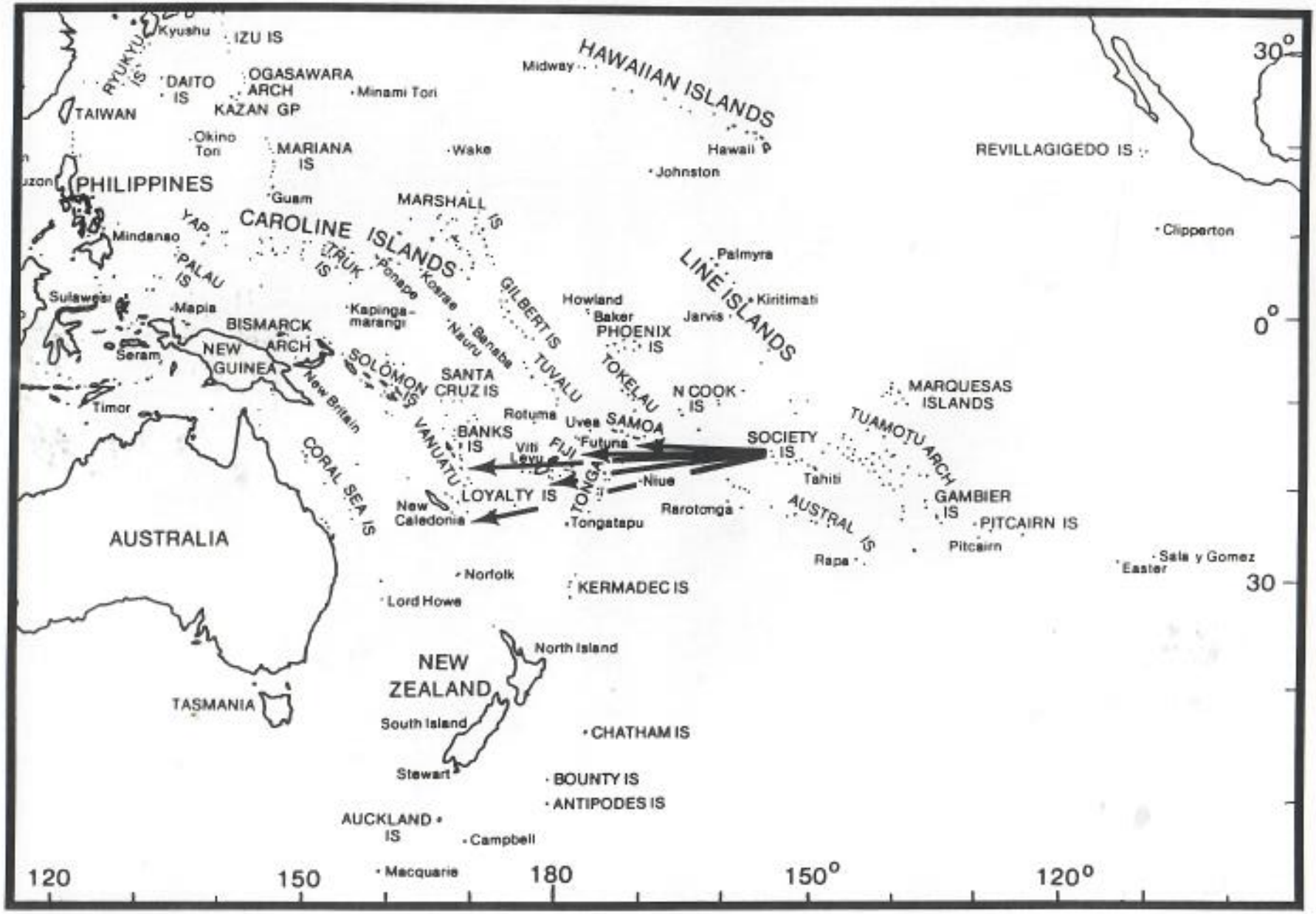
Motu Poromutou Motu Poromutou Motu Poromutou

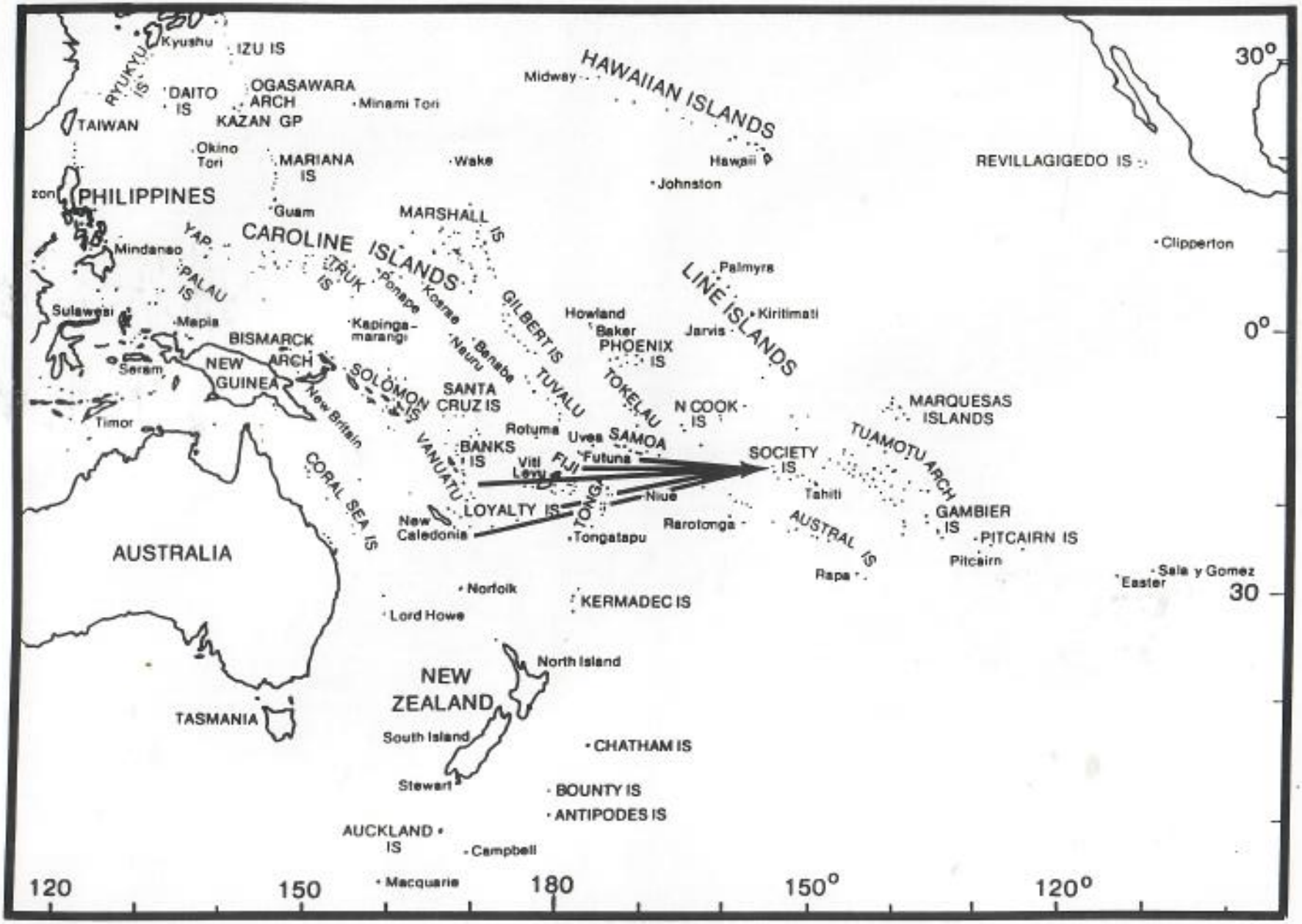
Pass Pass


MANUAE
(SCILLY)
45' Longitude Ouest 154°40' 35'
25'
55'
16° 30'
17°
35'
5'
Latitude Sud
Déclin 12° 10' E.
(1955)
Augmentation 7'
(PA)
Village
(PA)


MANUAE
(SCILLY)
45' Longitude Ouest 154°40' 35'
25'
35'
16° 30'
17°
35'
5'
Décl.on 12° 10' E.
(1955)
Augm.n annuelle 7'
(P.A.)
Village
(PA)
Latitude Sud


35'
Longitude Ouest
154°30'
45'
MOTU ONE
(BELLINGSHAUSEN)
Latitude Sud
16°
50'
Déclon 12°00'E.
(1955)
Augmon annuelle 7'
12°00'(+7')
Motu Poromutou
Village
15°
50'
35'
Longitude Ouest
154°30'


Kyushu
IZU IS
RYUKYU IS
DAITO IS
OGASAWARA ARCH
KAZAN GP
Minami Tori
TAIWAN
Okino Tori
MARIANA IS
Guam
PHILIPPINES
Mindanao
YAP
PALAU IS
CAROLINE ISLANDS
TRUK IS
Ponape
Kosrae
MARSHALL IS
GILBERT IS
Nauru
Banaba
Sulawesi
Mapia
Kapingamarangi
BISMARCK ARCH
NEW GUINEA
Seram
Timor
New Britain
SOLOMON IS
SANTA CRUZ IS
TUVALU
Howland
Baker
PHOENIX IS
TOKELAU
Palmyra
LINE ISLANDS
Kiritimati
Jarvis
N COOK IS
Rotuma
Uvea
SAMOA
Futuna
VANUATU
BANKS IS
Viti Levu
FIJI
TONGA
Niue
SOCIETY IS
Tahiti
MARQUESAS ISLANDS
TUAMOTU ARCH
GAMBIER IS
PITCAIRN IS
Pitcairn
AUSTRAL IS
Rapa
Rarotonga
Tongatapu
LOYALTY IS
New Caledonia
CORAL SEA IS
AUSTRALIA
Norfolk
Lord Howe
KERMADEC IS
North Island
NEW ZEALAND
South Island
Stewart
TASMANIA
CHATHAM IS
BOUNTY IS
ANTIPODES IS
AUCKLAND IS
Campbell
Macquarie
HAWAIIAN ISLANDS
Midway
Wake
Johnston
Hawaii
REVILLAGIGEDO IS
Clipperton
Sala y Gomez
Easter
30°
0°
30
120
150
180
150°
120°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