
The Fauna of Rennell and Bellona, Solomon Islands

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The fauna of Rennell and Bellona, Solomon Islands

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[Plates 48 to 53]

INTRODUCTION

The present survey of the fauna of Rennell and Bellona Islands is based on personal acquaintance during three visits to Rennell, over 2 months' duration in all, as well as on published records. These are first and foremost to be found in *The natural history of Rennell Island, British Solomon Islands*, published by Danish Science Press on behalf of the University of Copenhagen and the British Museum (Natural History) London. Vol. 1 (1958) contains five introductory papers and seven papers on the vertebrate animals, vol. 2 (1959) and vol. 4 (1962) two additional papers on the vertebrates and 26 papers on invertebrates, and vol. 3 (1960) contains six papers on botany and geology. Another 18 papers, which will be published in 1968 in vol. 5, and are based on recent expeditions to Rennell (see below) have also been utilized in the present survey.

Literature referring to early visits to Rennell and Bellona (before 1951) is listed by Wolff (1955*a*). The most comprehensive of these papers are those on birds (Mayr 1931*a, b*), reptiles (Slevin 1934), ants (Wheeler 1934), vascular plants (Fosberg 1940), and geology (Stanley 1929).

SCIENTIFIC INVESTIGATIONS ON RENNELL AND BELLONA

Rennell and Bellona have a short history of contact with the white man. Rennell was discovered in 1794 by Captain Butler of H.M.S. *Walpole*. The first recorded visit was that of two bishops of the Melanesian Mission in 1856. Undoubtedly traders, whalers and recruiters have called there during the nineteenth century, but lack of safe anchorage, the isolation and infertility of the island and shortage of easily obtainable fresh water prevented European settlement and establishment of trading stations. Rennell and Bellona were declared a British Protectorate in 1898 and one is not allowed to land on the islands without permission from the Government.

The first extensive study of the fauna of Rennell was made by the American Whitney South Sea Expedition (August–September 1928 and May 1930) which particularly concentrated on birds, but also made minor collections of reptiles and snails. In June 1933 the American Templeton Crocker Expedition paid a short visit to the island and the collections of birds, reptiles, fishes, flies, ants, algae, and vascular plants were later reported on. A few other visitors (particularly the geologist G. A. V. Stanley) also brought back odd specimens of animals and a single orchid.

In October–November 1951 four members of the Danish *Galathea* Deep-Sea Expedition 1950–2 spent almost 5 weeks on Rennell. The main object was an investigation of the hitherto unstudied Polynesian population by the ethnologist Dr K. Birket-Smith. He

was accompanied by a photographer and two zoologists, H. Knudsen and the present author, who collected both vertebrates and invertebrates (Wolff 1955*b*). However, as this zoological reconnaissance had been arranged at a late date before arrival in the Solomons, more sophisticated equipment for collecting and drying insects was not brought. Thus the insect collections had to be restricted almost entirely to specimens preserved in alcohol.

Two years later, in October–November 1953, Mr J. D. Bradley of the British Museum (Natural History) and Mrs Diana Bradley visited Rennell and Bellona Islands for 6 weeks (Bradley 1955). They collected mainly insects, but in addition other animals were secured, particularly bats and birds.

Immediately prior to this expedition Dr M. Laird and Mrs E. Laird stayed on Rennell and Bellona for a few days, studying mosquito larval ecology and malaria distribution (Laird & Laird 1956).

In June and July 1954 Dr F. R. Hollins paid two short visits to Bellona, collecting a limited number of butterflies, while Mr E. S. Brown of the Commonwealth Institute of Entomology, London, stayed on Bellona and Rennell for 11 days in November 1955, particularly collecting aquatic Hemiptera but also specimens of several other insect groups. Dr P. J. M. Greenslade and Mrs P. Greenslade, Department of Agriculture, Honiara, had Berlese samples collected for them by an assistant in April 1965.

The last part of the Danish *Noona Dan* Expedition, which otherwise visited the Philippines and the Bismarck Archipelago, was devoted to 2½ weeks study of Rennell, carried out in August 1962 by Mr W. Buch (entomology), Mr H. Dissing (botany), Dr S. Christiansen (mainly hydrography and sounding of Lake Tegano), and the present author. However, on arrival at the island I was seriously attacked by epidemic hepatitis which reduced my working capacity considerably.

The work left undone in 1962 was carried out in March–April 1965 during a 3-week stay on Rennell prior to my participation in the American *Te Vega* Expedition (Wolff 1968). I studied the fauna and other particulars of the lake and collected bats, invertebrates (including insects), and flowering plants. On arrival of the *Te Vega* at Rennell, marine fishes were collected.

In addition to the ethnological studies on Rennell in 1951 (Birket-Smith 1956), the language, folklore and religion of the Rennellese and Bellonese have been extensively investigated by Professor S. Elbert, Honolulu (for 6 months in 1957–8 and 3½ months in 1962) and by Dr T. Monberg, Copenhagen (4 months in 1958–9, 6 weeks in 1962, and 2 months in 1963) (Elbert & Monberg 1965; Monberg 1966). Finally, Mr L. Christensen studied social organization on Bellona for 6 weeks in 1962 and Dr S. Christiansen studied economic subsistence of the Bellonese for 3 months in both 1965 and 1966.

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SHORT DESCRIPTION OF RENNELL AND BELLONA

Rennell Island and the neighbouring smaller Bellona Island are located south of the main Solomon Group (figure 33). The distances to the closest Solomon Islands (San Christobal and Guadalcanal) and to other surrounding islands and island groups are as follows:

	(km)	(miles)		(km)	(miles)
San Christobal	168	(104)	Australia	1600	(1000)
Guadalcanal	181	(112)	New Caledonia	1020	(630)
Louisiade Group	610	(375)	New Hebrides	745	(460)
New Guinea	1040	(640)	Santa Cruz Is.	575	(355)

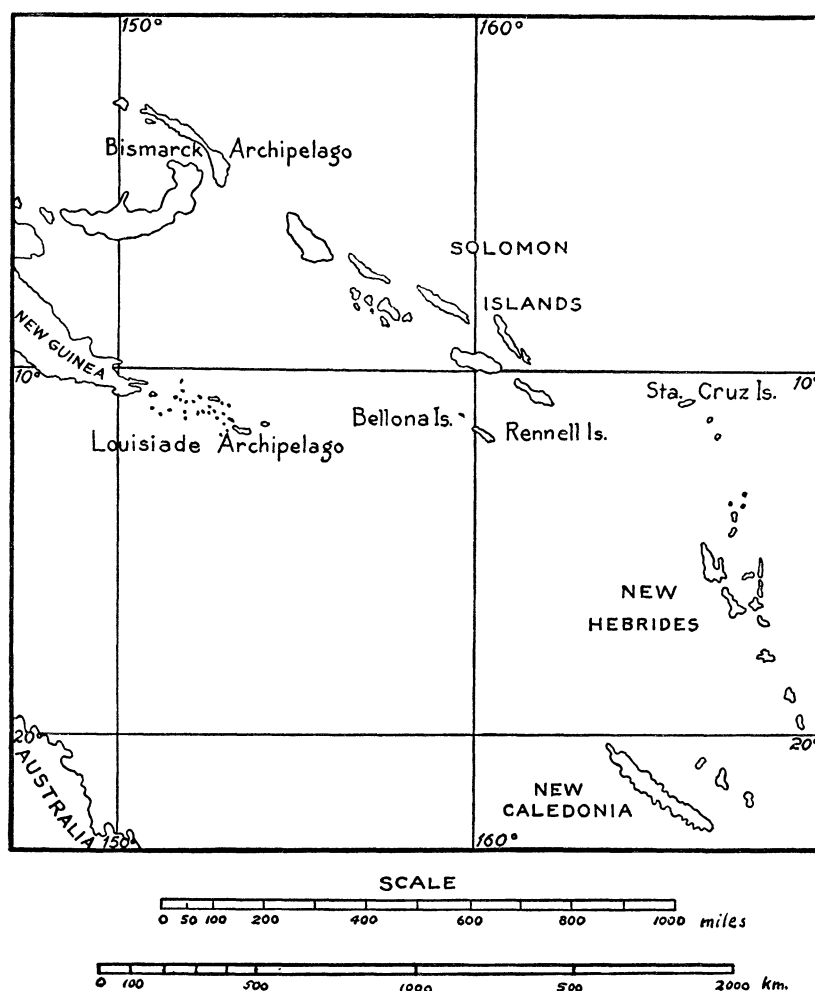


FIGURE 33. Rennell and Bellona and surrounding islands. (After Mayr.)

The length of Rennell is 86 km (53.5 mi), the maximum width only 15.6 km (9.7 mi) and the area approximately 825 km² (320 mi²). Bellona, which lies 22 km (13.6 mi) north-west of Rennell, is 11.4 km (7.1 mi) long and 2.6 km (1.6 mi) wide and its area is about 21.6 km² (8.4 mi²).

Rennell is the world's largest raised atoll. According to Grover (1958) its origin dates back to the close of the Pliocene. The original shape of a great annular sea-level coral reef, alined along the direction of the trade wind, has preserved its general outline after the elevation, and the previous lagoon is partly maintained as a lake (figure 34). The present form can be compared with that of a long and narrow dish with a central depression surrounded by a rim, the outer part of which forms the precipitous coastline with more or less conspicuous terrace formations.

The profiles of both Rennell and Bellona, which latter has an origin similar to Rennell, are remarkably uniform, rising to a height of 110 m (Rennell, figure 35, plate 48) and 79 m (Bellona, figure 36, plate 48), in places interrupted by sea-eroded canyons or broader gaps.

Physiography

The interior of Rennell is extremely rough and uneven. The general topography is hilly and undulating, in places forming ridges or boulder-like outcrops several metres high. The surface of the ground is of the 'Makatea' type, consisting of cavernous pinnacle limestone which shows all the characters of karst weathering (figure 37, plate 49). It is only in fissures and small pockets in the limestone that a blackish soil of mould and plant debris can be retained. The tree roots wind their way across the pinnacles and deep into the fissures. In places the naked coral rock is substituted by patches of a stiff clayey soil, derived from the weathering of the impure limestone, or of a dark brown to black soil. In these areas the native gardens are found or the patches are covered with shrub or with secondary forest where cultivation has now been given up.

Bellona is much more fertile than Rennell, the majority of the central depression being covered with a dark chocolate concolourous humic soil and with occasional outcrops of the underlying limestone.

There are no water courses on Rennell and Bellona, rain water being quickly absorbed in the fissured coral rock or porous soil which seems to retain the water for a considerable period of time. However, in a few places along the rim on Bellona and throughout the central depression on Rennell small rock-pools are found, the water of which is entirely fresh. Their size is from less than 1 m to several metres across and they may be up to 2 m deep.

Lake Tegano

The most remarkable feature of Rennell is the huge lake which takes up most of the eastern third of the island and is the biggest enclosed body of water in the Pacific (figure 38, plate 49). Lake Tegano (previously spelled Te'Nggano or Tunggano) is 28.9 km (18.0 mi) long and 10.0 km (6.2 mi) wide, with an area of 155 km² (60 mi²). Echo-soundings (Christiansen 1964) have shown the lake bottom to consist of a large central depression with depths rarely exceeding 40 m (43 m is the maximum recorded depth). The bottom contour is remarkably plain and the surface apparently consists mainly of the same 'Makatea' formation as that dominating the dry land. In places, however, the cavities of the bottom are filled with a soft organic material which has decayed to a brown jelly. Around the central depression are found two bordering zones with generally more jagged profiles. They have their greatest extension in the western, islet-filled part of the lake.

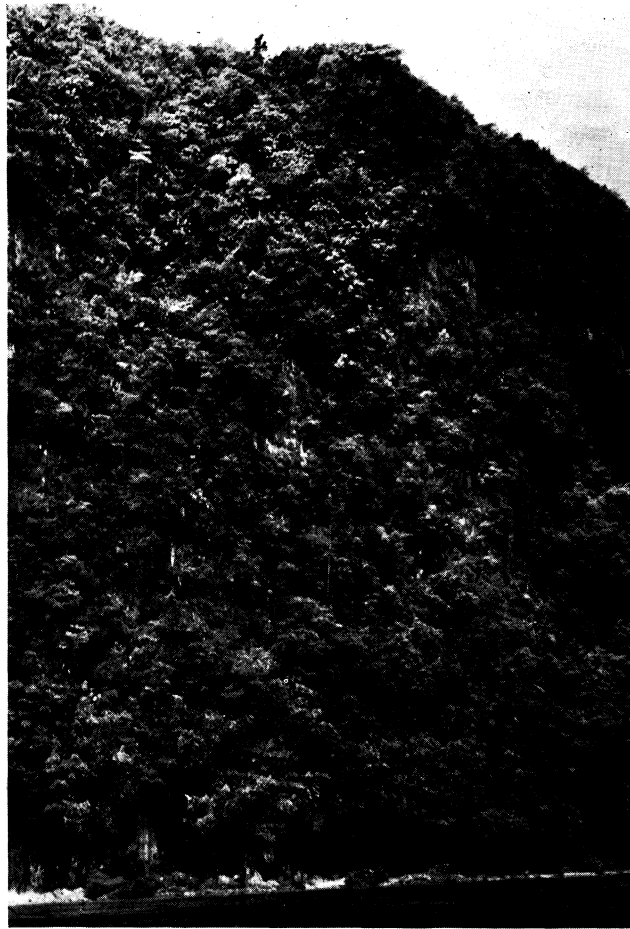


FIGURE 35. Steep coral cliff (the former reef face) at Tuhugago, Rennell Island.
(T. Wolff, phot.)

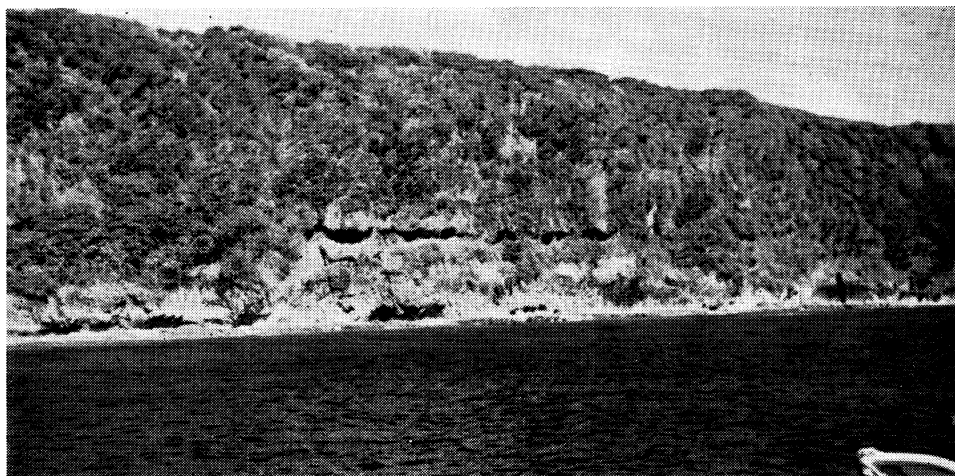


FIGURE 36. Part of the north coast cliffs of Bellona. Sea-etched caverns are seen immediately above present sea level and at about 30 m above sea level, indicating uplift or previous higher sea level.
(After Grover.)

(Facing p. 324)



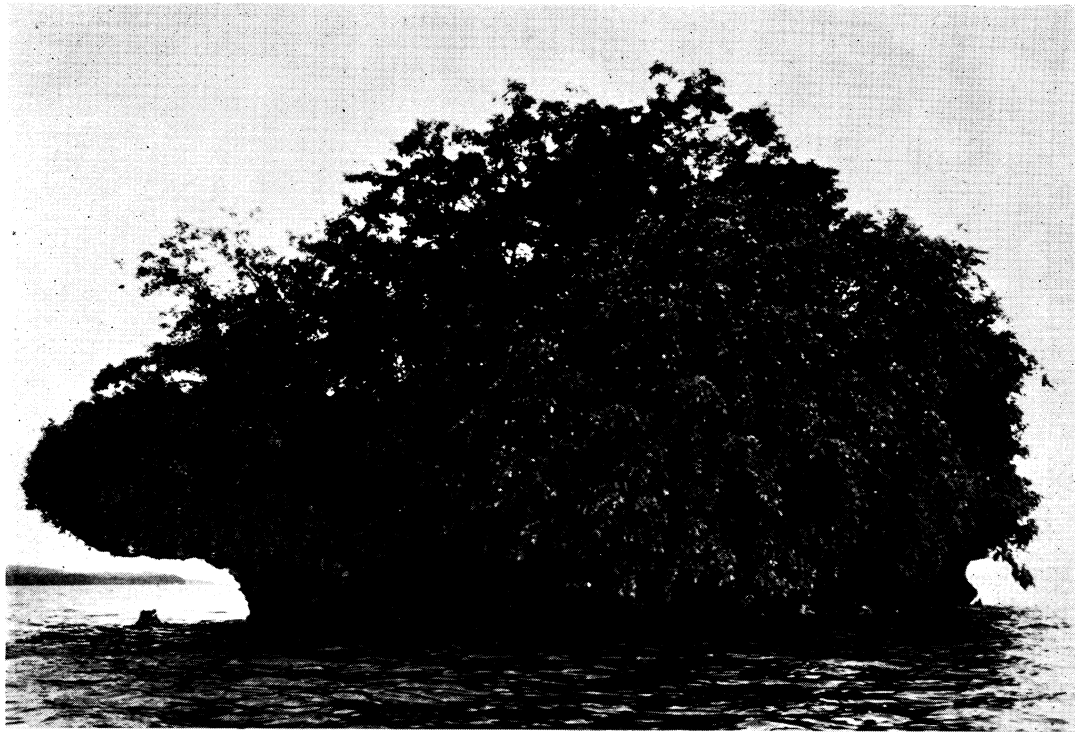
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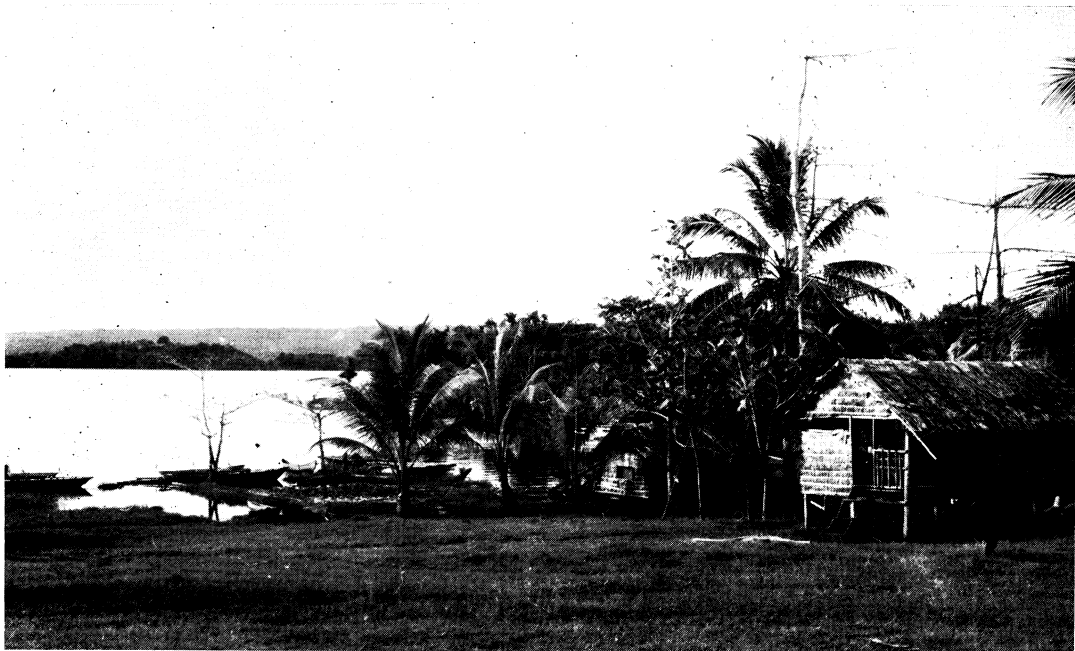
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FIGURE 37. Fissured coral rock surface in forest near Ahanga, Rennell Island. (T. Wolff, phot.)

FIGURE 38. View of eastern half of Lake Tegano from Kasipa Hill at Hutuna. Entrance to the bay at Tigoa in the far distance (extreme left). (T. Wolff, phot.)



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FIGURE 39. Overhanging cliff on the islet Halogu in the central part of Lake Tegano. Nesting place for the starling *Aplonis cantoroides*, in holes in the coral rock and in the trees. (T. Wolff, phot.)

FIGURE 40. Low, grassy shore in sheltered bay at Niupani. (S. Christiansen, phot.)



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FIGURE 41. Drainage at Teaba on the north coast of Lake Tegano. The water flows into sinkholes where straw and leaves have gathered. (T. Wolff, phot.)

FIGURE 42. In a discussion on a possible connexion between the sea and Lake Tegano the Rennellese described three species of marine fish which they had once encountered in the lake. Shown here is one of the species, the saddled coralfish *Chaetodon ephippium* Cuvier (right), when it was later captured on the reef at Kagaba on the south coast. The species on the left is *Naso lituratus* (Forster). (T. Wolff, phot.)



FIGURE 43. A large specimen of the endemic subspecies of sea snake in Lake Tegano, *Laticauda laticaudata crockeri* Slevin. (T. Wolff, phot.)

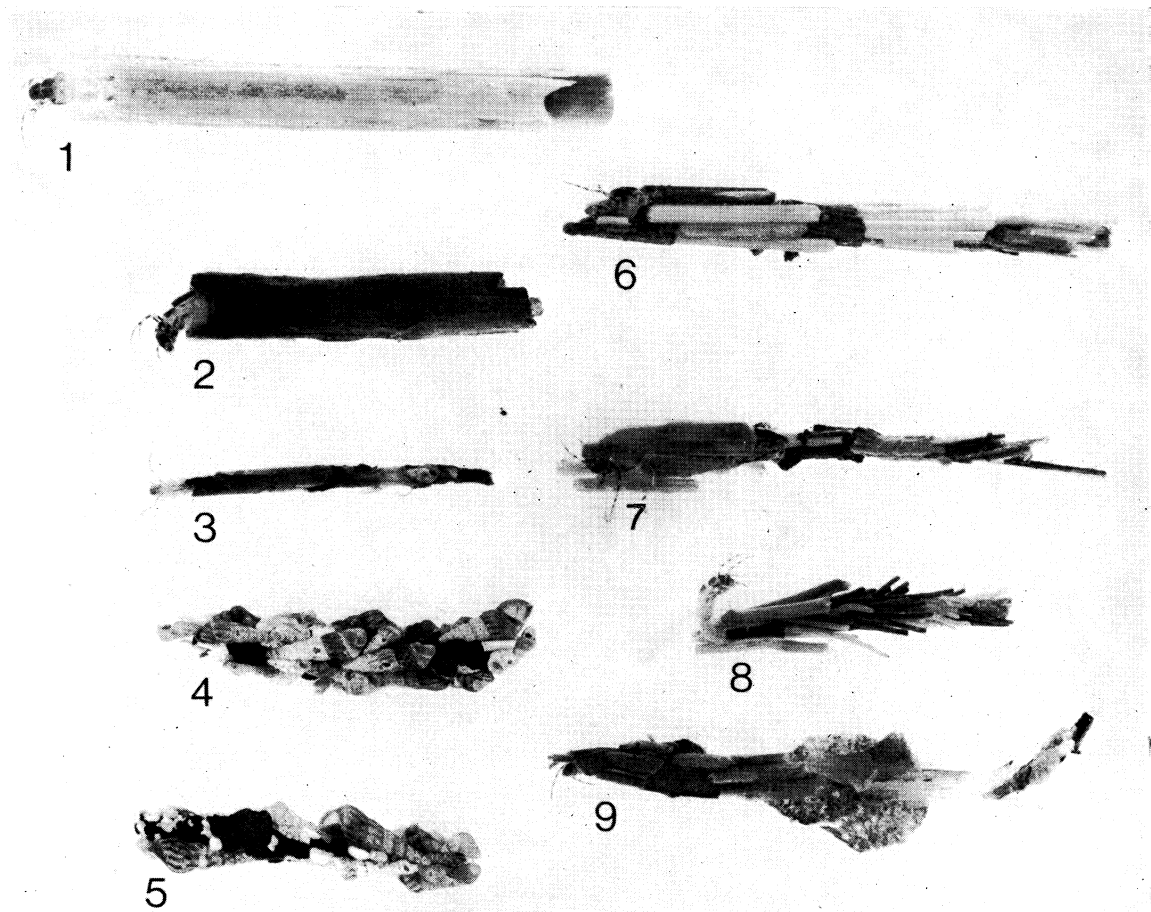


FIGURE 44. Larval tubes of *Notanatolica magna* (Walker) from Lake Tegano. 1, stem of aquatic plant; Frw. St. 7. 2, twig; St. 4. 3, bark and aquatic plants; St. 4. 4, gastropod shells, a little bark; St. 4. 5, gastropod shells, bark, coral; St. 6. 6, aquatic plants; St. 32. 7, the same; St. 33. 8, shoots and roots of aquatic plants; St. 10. 9, the same and leaf fragments; St. 10.



FIGURE 45. Endemic subspecies of the song parrot, *Geoffroyus heteroclitus hyacinthinus* Mayr.
(T. Wolff, phot.)



FIGURE 46. The endemic Rennell shrikebill *Clytorhynchus hamlini* (Mayr).
(T. Wolff, phot.)

Generally, the shore line is very abrupt and, in places, particularly on several of the islets, overhanging cliffs are present (figure 39, plate 50). Swampy areas are mainly found in the shallow western end of Lake Tegano (figure 40, plate 50). Altimeter recordings have shown the lake level to be the same as—or very close to—that of the sea.

The salinity recordings of the lake water are summarized in table 14. Based on an estimated annual excess of precipitation over evaporation, Christiansen (1964) showed very convincingly that a subterranean drainage of the lake must take place and that the salinity can only be maintained through influx of sea water.

TABLE 14. SUMMARIZED SALINITY RECORDINGS FROM LAKE TEGANO, RENNELL ISLAND

month	year	locality	depth (m)	recorded by	salinity (‰)
June	1933	?	?	Slevin (1934)	6.21
Oct.	1951	Niupani	0	Wolff (1955 <i>a</i>)	4.56
Aug.	1962	north of Niupani	0	Christiansen (1964)	3.66, 4.09
Mar.	1965	Hutuna	0	Wolff (1968)	3.86, 3.96
Mar.	1965	Tigoa	0	Wolff (1968)	3.96, 4.00
Mar.	1965	Halogu Islet	0	Wolff (1968)	4.11
Aug.	1962	ca. 150 m east of Halogu Is.	0	Christiansen (1964)	4.00
Aug.	1962	north of Niupani	5	Christiansen (1964)	4.11
Aug.	1962	ca. 150 m E of Halogu Is.	25	Christiansen (1964)	4.09
Mar.	1965	ca. 2 km NNE of Tautiage	ca. 30	Wolff (1968)	6.15

In 1965 I was shown the main (and according to the Rennellese only) source of influx and drainage. This occurs through a subterranean canal of unknown extent at Teaba on the north coast. At the time of my visit (23 March) there was a conspicuous outward-directed current (about 5 m/min), the water disappearing into the ground through a great many sinkholes in a swampy area (figure 41, plate 51). The open connexion with the sea was also demonstrated by records of marine fishes having been caught in the lake (figure 42, plate 51).

According to the Rennellese, the exchange of water is particularly large twice a year. At New Year when shifting winds between north-west and south-west and a heavy surf prevail on the north coast of Rennell both large and small eels (*Anguilla obscura*) are caught at Teaba. This is apparently the season when elvers migrate into the lake and the mature eels leave it. In August to September, during strong trade winds, the only true lake fish, *Eleotris fusca*, is extensively fished for at Teaba. At both seasons the wave action on the north coast can be traced just off the lake opening of the subterranean channel, and inward- and outward-directed currents are so strong that the fishermen's canoes have to be tied to trees along the lake shore.

Evidently the variation in salinity (table 14) is a result of both particularly heavy rain-fall and the influx of salt water. The deep record near Halogu Islet shows that a total mixing of water from surface to bottom may occur; this is understandable considering the shallowness of the lake and its great extent which give rise to the formation of waves of up to 1 m height during heavy winds. On the other hand, the other deep record further to the south-east may indicate a (? seasonal) stratification.

Laird & Laird (1959) recorded a pH of 7.8, while I measured 7.3 in 1965.

Climate

Rennell and Bellona lie in the area of the SE Trade Wind which prevails from April to the end of November. During the rest of the year winds from west and north-west are almost as frequent as those from north-east, east, and south-east, but the westerly winds are usually somewhat stronger (especially around New Year). Two south-east-directed hurricanes have struck the southern Solomons in recent years (March 1952 and 1967).

Daily temperature measurements from 25 Oct. to 26 Nov. 1953 at Hutuna (Rennell) showed the maxima to vary between 32.2 and 27.2 °C with a mean of 30.4 °C. The minima varied between 27.2 and 22.7 °C (one record only) with a mean of 26.2 °C (Wolff 1955 *a*).

Elbert & Monberg (1965) record the following measurements of rainfall on Rennell in 1957–8 (daily average rainfall in the period in parentheses): 17–31 Oct., 485 mm (32 mm); 1–24 Nov., 173 mm (7 mm); 1–30 Dec., 191 mm (6 mm); 10–31 Jan., 54 mm (3 mm); 1–26 Feb., 359 mm (14 mm); 2–7 Mar., 24 mm (4 mm); 28 Mar.–10 Apr., 328 mm (24 mm). At this rate the annual rainfall would be more than 4300 mm, but the middle of the Trade Wind season (May–July) is probably drier than the rest of the year so that the annual rainfall may rather be estimated to be about 3000 mm, which is still a very significant precipitation.

Vegetation

The greater part of Rennell is covered with a rather dense forest which owing to the infertility of the soil is not nearly as dense as on, e.g. Guadalcanal. The average height of the trees is also much less, mainly about 20 m, but much higher trees occur here and there. Cultivated are the coconut, paw-paw (*Papaya*), betelnut (*Areca*), *Morinda citrifolia*, yams and taro. Fruits of *Pandanus* are eaten and the tree is probably cultivated. At least two species of Malvacea (*Hibiscus*) are also cultivated.

Fosberg (1940) enumerated 25 species of vascular plants from Rennell and seven from Bellona; two of these were found on both islands. Based on about 45 % of the material collected by the *Noona Dan* Expedition and part of the additional material collected by me in 1965, Hansen & Sandermann Olsen (1967) recorded another 53 species from Rennell and two from Bellona. With a few additional records, a total of 81 species of vascular plants are at present known from Rennell and nine from Bellona. None are endemic. Five species of mosses, 28 species of marine algae, and 13 species of fungi have also been recorded from Rennell.

Finally, in a detailed study of mud samples from rock-pools and Lake Tegano and from stomach contents of fishes and a duck, were found 61 genera, 343 species and 427 forms of diatoms (Foged 1957). While the rather few species of the rock-pools are almost exclusively freshwater forms, the lake population is extraordinarily heterogeneous: the sediment samples show a dominance of freshwater species (54 out of 73), while haline forms are somewhat more frequent in stomach content samples; alkaline water forms predominate, but in one sample nearly 50 % of the valves belonged to more or less 'acid' forms; plankton forms or bottom forms proper are much less frequent than forms living in the littoral region of lakes. The occurrence of forms from the marginal areas of the various ecospectra

seems considerably more frequent than in other localities with a similar salinity. Most forms are cosmopolitan in distribution. The number of endemic forms is not particularly great and they are found within all the groups of the diatoms.

THE FAUNA

Although the study of significant groups, particularly of insects, has not yet been terminated and much additional material from the recent collecting on Rennell in 1962 and 1965 is yet under consideration, it should now be possible to outline the general picture of the faunal composition of this remote and remarkable island.

1. *The lake fauna*

In view of its origin as an entirely marine lagoon before the elevation of Rennell, the fauna of Lake Tegano is of special interest.

The age of the lake as a body of almost fresh water is unknown, although it seems probable that the lagoon was cut off from the sea not long after the elevation started in late Pliocene. The size of the lake was certainly considerably less in the glacial periods when the level of the surrounding sea was lowered, but it seems improbable that the whole of its central depression was dried out at such a comparatively recent time, as the lake apparently contains several endemics which can hardly be expected to have developed since the end of at least the last glacial period.

Reptiles

Two species of sea snakes occur in the lake. Of the one, *Laticauda colubrina* (Schneider), four rather small specimens have been collected. They agree in all details with two other specimens collected in the marine environment of Rennell. The other, more common, sea snake is an endemic melanistic subspecies of *L. laticaudata*: *L. l. crockeri* Slevin (figure 43, plate 52), the only *Laticauda* known to live in almost fresh water. It is a puzzling fact that while *L. colubrina* is indistinguishable from the marine form, *L. laticaudata crockeri* has become clearly differentiated from the ancestral form. This seems to indicate that *colubrina* is either a recent invader to the lake or for some unknown reason is the only one of the two species which migrates to and from the lake through the subterranean channel, thus mixing the gene pool with the marine population, while *crockeri* is restricted to the lake.* The possible migration through the channel by *colubrina* indicates the presence of air-filled caves enabling the sea snakes to breathe while underway through the channel, the length of which is at least 1 km.

No amphibians have been found on Rennell or Bellona. The slight brackishness of Lake Tegano and the absence of surface water (except in scattered rock-pools) have probably prevented the establishment of an anuran fauna, which otherwise flourishes in the Solomon Archipelago.

* If *colubrina* was unable to migrate to the sea I can see no reason why it should not have had the same capacity of developing into a separate subspecies as *crockeri*.

Fishes

Although five species of *Anguilla* are known to occur in the Solomons–Louisiade area, all collected eel specimens (10) have proved to belong to *A. obscura* Günther. Nine are from the lake while one large specimen was caught in a rock-pool of a few metres circumference at Teavamagu in the centre of the western part of Rennell. In 1965 I listed 17 different Rennellese names of *te upo*, the eel, assigned according to occurrence in the lake or in recognition of well-marked superficial distinctions developing during maturation. One name, *upo magaghugha*, is used for the only spotted form; this might be *A. marmorata*, of which both adults and elvers have been recorded from the Solomons area, but no specimens are available to confirm this hypothesis.

The only resident fish is a goby, *Eleotris obscura* (Bloch & Schneider) which has a wide, distribution in both fresh and salt waters. Here, again, specimens have been collected both from rock-pools and from the lake, where it is very common and grows to a total length of 120 mm. The three known specimens from a rock-pool at Teavamagu (Rennell) and one specimen (of a total of 57) from the lake show a higher number of transversal scales against the number of lateral line scales than the remaining lake forms and forms outside of Rennell. In view of this fact the rock-pool population may be considered a relic from a time when the lake covered a much larger portion of the central depression, the presence of terraces indicating that the elevation of Rennell occurred step-wise. The find in the lake of one individual with the higher scale counts may indicate an occasional subterranean migration of rock-pool forms into the lake. Possibly, an exchange of the lake and the marine populations occurs regularly as in *Anguilla* and probably in *Laticauda colubrina*. The extensive fishing for *Eleotris* at Teaba in August to September (cf. p. 326) may even indicate a seasonal migration. The record from the lake of many juvenile specimens shows, however, that *Eleotris*—as opposed to *Anguilla*—breeds in the lake.

About 1957 the Government introduced *Tilapia mozambica* into Lake Tegano where it now forms an important source of food for the local population (already by 1962 it was so common that ten large specimens could be speared in an hour).

Molluscs

Four species of freshwater gastropods and one brackish water species have been recorded from Lake Tegano. The former, which all belong to the Melaniida (Thiaridae), are *Melanoides guppyi* Smith, *M. tuberculata truncatula* (Lamarck), *Tarebia granifera* Lamarck, and *Stenomelania fuscata undulata* Gmelin. The first is otherwise recorded only from a lake on Santa Ana Island in the Solomons while the remainder have a wide distribution. This is also the case with the brackish water species, *Onchidina australis* Semper, which belongs to the shell-less, slug-like Onchidiidae.

Crustaceans

There are two species of prawns in the lake. One is probably a new species of the freshwater and brackish water genus *Macrobrachium*. It is extremely common and its larvae constitute the main part of the lake plankton. It has not been recorded from the rock-pools.

The other prawn is a postlarval form (only a few mm long) from a plankton sample. It is perhaps referable to the Pasiphaeidae. The eyes seem to have undergone a certain reduction similar to that found in many cave-dwelling species. This may indicate that the adult lives subterraneously. At any rate the adult is unknown to the natives, only *Macrobrachium* bearing a Rennellese name. This could of course also be explained by the fact that the larva recently entered the lake from the sea, although this appears improbable. For the possible occurrence of larvae of *Coenobita*, cf. p. 324.

The lake contains four species of amphipods. They are being studied by Dr E. L. Bousfield who has informed me that one belongs to a new genus and probably a new family, and is remarkable in being perhaps the smallest amphipod known, mature females reaching barely 1.0 mm in length and carrying only one or (at most) two relatively enormous eggs. Another is a new species of *Melita* which Bousfield has also found in *Noona Dan* material from brackish and almost marine localities on Mussau and Manus Islands in the Bismarck Archipelago. The two remaining species belong to *Orchestia*. One is otherwise recorded only from the Marquesas while the second is widespread. It was collected in shallow water in Lake Tegano, on coral rocks near the lake and on the beach at Ahanga.

The only tanaid was described as a new genus and species, *Nesotanais lacustris* Shiino due to the peculiarly specialized male chelipeds and the mouthparts. The genus is most closely related to *Nototanais* and *Telotanais* in Antarctic and Brazilian waters. The largest specimens are only 2.6 mm long. Specimens lodged in jelly-like tubes and those collected in August are on an average larger than free-living specimens and those collected in March.

Four new species of very small ostracods of the genera *Pontoparta*, *Paracyprina*, *Candonopsis* and *Darwinula* and one new genus and species (*Mungava munda* Harding) were described from stomach contents of the goby. Later additions are another species of *Darwinula* (*D. serricaudata* Klie) which otherwise occurs in West Africa, and a yet unidentified species of *Paracyprina*.

In the plankton occur four species of cyclopoid copepods of the genera *Mesocyclops* and *Cyclops*. There are also at least four species of harpacticoid copepods, three of which belong to the Canthocamptidae and one probably to the Stenocaridae.

Insects

Adults of four species of zygopterous Odonata or damsel flies (genera *Pseudagrion*, *Teinobasis*, *Xiphiagrion* and *Agriocnemis*) are known from localities at the lake and nymphs of the three former have been collected. Seven species of adult Anisoptera or dragon flies (genera *Ictinogomphus*, *Agrionoptera*, *Orthetrum*, *Neurothemis*, *Tholymis*, *Macrodiplax* and *Hemicordulia*) are recorded, as well as nymphs of the first three. In addition, fragments of unidentifiable aeschnid nymphs (genus *Anax* or *Anaciaeschna*) were found in *Eleotris* stomach contents.

The aquatic Hemiptera (water striders, water boatmen, and back-swimmers) include three species of Gerridae (genera *Limnogonus*—with two species, one of which is endemic—and *Limnometra*), two species (one endemic) of *Microvelia* (Veliidae), one species of *Mesovelina* (Mesoveliidae), one species of *Micronecta* (Corixidae), and two species (one endemic) of *Anisops* (Notonectidae).

Larvae of one species of *Anopheles* (*Myzomyia*) and two species of *Culex* (*Culex*) were collected exclusively in the lake. The four remaining mosquito species were taken only in tiny pools of stagnant water both on Rennell and Bellona. Fly larvae were represented in the lake by two or three species of Stratiomyidae (Clitellarinae) and larvae of *Eristalis* (Syrphidae). The latter may belong to *Lathyrophthalmus punctulatus* (Macquart), adults of which have been collected at Kagaba.

Notanotolica magna (Walker) is the only species of caddis fly (Trichoptera) recorded from Rennell. The larvae are very common in the lake and have also been found in stomachs of ducks and gobies. The larval tube consists of an unusually broad variety of materials (figure 44, plate 52).

Aquatic Coleoptera are represented by one species of *Lasioderma* (Anobiidae) and four Hydrophilidae or water beetles (genera *Cybister* (endemic species), *Coelostoma*, *Paracymus* and *Enochrus*).

Arachnida

One species of water mite has been recorded, namely *Neumania diversiseta* Viets, which is otherwise known only from the New Hebrides.

Annelida

An amphinomid polychaete, *Eurythoë djiboutiensis* (Gravier), was recently recorded from the lake. It has a wide distribution throughout the Indian Ocean and along the Atlantic coast of Africa. In Chilka Lake in India it also occurs in brackish water.

Two mud samples from shallow water contained a naid oligochaete (genus *Dero*, subgenus *Aulophorus*) which is being studied.

Nematoda

One species of free-living nematode and one species parasitizing the stomach of the eel have been collected.

The lake fauna can be summarized as follows (* denotes species of marine origin):

	species		species
*Sea snakes	2	Odonata	12
*Fishes	2	Hemiptera	9
*Gastropods (Onchidiidae)	1	Diptera	6
Gastropods (Melaniidae)	4	Trichoptera	1
*Prawns	2	Coleoptera	5
*Amphipods	4	Arachnids	1
*Tanaids	1	*Polychaetes	1
Ostracods	6	Oligochaetes	1
Copepods	8	*Nematodes (one marine)	2

This gives a total of 68 species which have been recorded from Lake Tegano. In view of the marine origin and the apparently fairly easy access from the sea it is remarkable that

no more than 14 species (21 %) are of marine origin, the remaining 54 species originating from a pure freshwater environment.

Up to now 54 of the species have been identified; twelve are endemic species and one is an endemic subspecies.

2. *The marine fauna*

As it could be anticipated that the land and the lake fauna of Rennell might prove more interesting than the marine fauna, only occasional collections have been made of the latter, most of which still remain unstudied.

Reptiles

In addition to two marine specimens of *Laticauda colubrina* (cf. p. 328), another sea snake (*Pelamis platurus*) and the green turtle were also obtained.

Fishes

The Templeton Crocker Expedition collected 36 species of marine fishes on Rennell, 20 on Bellona and three on both islands, including a new flying fish of the genus *Cypselurus* from Rennell. The Danish Expedition, 1951, added another 19 species to the Rennell list; two small blenniid species and one small *Kraemeria* were new. Laird & Laird (1959) recorded eight more species. To this list can be added the three species which recently invaded the lake (cf. p. 326) and—with some uncertainty—more than 200 additional species of fish which from plates in T. C. Marshall's (1964) *Fishes of the Great Barrier Reef* were pointed out to me by two Rennellese to be inhabitants of the reefs of Rennell Island.

Invertebrates

So far only one species of chiton, 95 species of gastropods, 22 species of bivalves, and one species of water strider (*Halobates*) have been identified from the marine environment of Rennell.

Mammals

3. *The land fauna*

There are ten species of bats on Rennell, all of which—except for the two species of flying foxes—were collected in caves with narrow entrances. No species and only one (or probably two) subspecies are endemic which is a much lower percentage than in the avifauna (see below). According to local information, at least six of the species also occur on Bellona.

The only non-flying mammal is the Polynesian rat. It is held as a separate subspecies but is closely related to the nominate subspecies on other South Pacific islands. Three subadult specimens from Bellona are probably referable to the Rennell subspecies.

Birds

With the addition of a few, yet unpublished new records, there is a total of 46 species of breeding birds on Rennell and ten species of stragglers or migrants. A suggestion of the

peculiarity of the Rennell avifauna was given as early as 1906 when North described the first specimen of a bird brought back from Rennell as a new genus and species of a white-eye (*Woodfordia superciliosa*). Later publications (particularly Mayr 1931 *a*) increased the number of endemic species and subspecies to a remarkable degree. According to our present knowledge no less than four species and 16 subspecies (43 % of the breeding birds and 36 % of all birds) are endemic.

Eight of the breeding birds are associated with the lake (a loon, a dabchick, an ibis, a cormorant, a teal, a duck, a spoonbill, and a bittern). The first five of these are endemic subspecies. Other species of breeding birds include two boobies, one reef heron, three birds of prey, one swamphen, one rail, three terns, five doves or pigeons, one lory and two parrots (figure 45, plate 53), one cuckoo, one owl, three swiftlets and one tree swift, one kingfisher, one greybird, one thrush, one warbler, one fantail, one shrikebill (figure 46, plate 53), one flycatcher, one whistler, two starlings, one honey-eater and two white-eyes. The stragglers include a pelican, a frigate-bird, an egret and a tern, while five species of wading-birds and one kingfisher are migrants.

One bird, the cuckoo *Cacomantis pyrrhophanus*, has been collected only on Bellona where it apparently occurs as a migrant; strangely enough it seems to be unknown to the Rennellese. Seven of the species found on Rennell have also been collected on Bellona (two non-residents) and another ten species have been seen there by various visitors (one or two non-residents). According to local information, another three species are also found on Bellona, which gives a total of 20 known species, 16 or 17 of which are resident. In 1965 a Bellonese informant helped me to provide a list of Rennellese birds not occurring on Bellona. It comprised 23 species (of a total of 58), in particular the majority of the lake species and all passerines except the greybird and one of the starlings. However, as it also included the cuckoo (*Chalcites lucidus*), which I later found had been collected on Bellona by the Whitney Expedition, I hesitate to lay too much weight on this list.

Reptiles

The number of land reptiles on Rennell is 13, but there are probably several more awaiting discovery. The known species include five geckos, four skinks, one monitor lizard (*Varanus*), two boas (*Enygrus*) and one blind-snake.

One skink has been recorded from Bellona but not from Rennell. Species in common are one of the geckos, two of the skinks, the varanus and both the boas.

Land Gastropods

With the recent addition of five species the Rennell land snails now comprise 27 species belonging to 15 families. Only the Helicinidae, Assimineidae, Ellobiidae, Endodontidae, Ariophantidae, and Camaenidae have more than one species each.

Seven species are endemic and two more species are restricted to Rennell and Bellona. The genus *Quirosella* (Ariophantidae), which shows relationship to the Admiralty Islands north of eastern New Guinea, is endemic. That it comprises no less than three species (one of which also occurs on Bellona) is difficult to explain, considering the low relief of Rennell

and its fairly uniform general ecology. At two stations (on mould and coral rocks in rain forest in the western and central part of Rennell) they were all even found together and two of them occurred together in open land. Clench (1957) suggested that perhaps *Quirosella* is a relict genus on Rennell, having previously occurred on other islands in the Solomons, or else has escaped the collector in spite of its rather large size (15 to 25 mm).

In addition to the two endemic species mentioned above, only three species have been recorded from Bellona.

Crustaceans

The Decapoda are represented by the robber crab, *Birgus latro*, and two or three other species of land hermit crabs (*Coenobita*). At least one of the species is commonly found far inland, and also near the lake. According to the Rennellese it comes down to the shore at certain times of the year and at certain moon phases, dipping its abdomen into the water. There can probably be no doubt that it actually spawns in the lake—in spite of the present low salinity—but so far this has not been proven by collection of *Coenobita* larvae in the plankton. Two large species of gecarcinid land crabs and two species of grapsid land crabs (*Sesarma*) are found throughout the forest.

On the upper part of the beach on Rennell are found two species of talitrid amphipods (*Talorchestia* and *Orchestia*—cf. p. 330). Several species of woodlice (Isopoda, Oniscoidea) have been collected but they are still under examination. They include a species of Ligiidae (of marine origin) from coral rocks on the shore of Lake Tegano.

Insects

As practically all of the extensive collections from the two latest expeditions to Rennell are still being studied it seems premature to go into details with the insects. At present only the presence of one of the larger orders (Lepidoptera) appears to be reasonably well documented. The Odonata, Trichoptera and aquatic Hemiptera, Diptera and Coleoptera were dealt with above (pp. 330–1).

Orthoptera

The Orthoptera include three species of mantids from Rennell (one of which is endemic) and one from Bellona, three species of tregigoid, five species of acridoid, and one (new) species of tettigonioid grasshoppers.

Dermoptera

Six species of Dermoptera (earwigs) have been recorded from Rennell.

Mallophaga

A total of 25 species of Mallophaga (10 referable to genus only) have been collected from 18 bird species. The ibis and the grey duck were infested with four species each. One species on the ibis was described as new.

Hemiptera

Of the land Hemiptera, the Lygaeidae and Aradidae have been studied. The former include nine species from Rennell (two endemic), one from both Rennell and Bellona and three from Bellona. Both species of Aradidae are so far unknown outside Rennell. Three species of aphids (Homoptera), three species of ant lions (Myrmeleonidae) and larvae of goldeneyes or Chrysopidae (Neuroptera), have been recorded from Rennell.

Diptera

In addition to the Diptera mentioned on p. 331, six species (one endemic) of mosquitoes (Nematocera) and 18 species (one endemic) of flies (Brachycera) are so far known from Rennell and Bellona. Of the former, one species from Bellona belongs to the Tipulidae and five to the Culicidae, all of which (except one) were taken both on Rennell and Bellona. The flies are distributed in ten families, of which only the Asilidae, Muscidae and Metopiidae include more than two species each. Ten are from Bellona, seven from Rennell and one from both islands.

Lepidoptera

The most numerously recorded insect order is Lepidoptera. Sixty-seven species of Microlepidoptera were reported from Rennell by Bradley (1957). They mainly belong to the Tortricidae (19), Cosmopterygidae (9), Gracillariidae (8), Helionidae, Lyonetiidae and Tineidae (7 species each). Nine of the species also occur on Bellona. Sixteen species and three subspecies are so far known only from Rennell, and two species only from Rennell–Bellona. In addition, the Pyraloidea comprise 71 species, six of which are also recorded from Bellona. Twelve species and five subspecies are restricted to Rennell and one species and one subspecies to Rennell–Bellona.

Fletcher (1957) reported 84 species of Macroheterocera from Rennell, mainly belonging to Agrotidae (41), Geometridae (19) and Arctiidae (8). Nine of the species also occur on Bellona, and three more species are recorded from that island only. Seven species and nine subspecies are endemic to Rennell, one subspecies to Bellona and two species to both islands. The Rhopalocera include another 24 species from Rennell (8 Nymphalidae, 7 Lycaenidae and 5 Danaidae). Seven of the 24 species have also been taken on Bellona, while another 11 are known from Bellona only. There are eight endemic subspecies on Rennell, six on Bellona and five on both islands. It is interesting that in spite of the closeness of Rennell and Bellona, four species (*Euploea nemertes*, *Phalantha alcippe*, *Hypolimnas pithoeka* and *H. alimena*) have developed different subspecies on the two islands. Many of the Rennell Rhopalocera are darker than usual.

Coleoptera

In addition to the five species of aquatic beetles, another 82 Coleoptera have at present been recorded from Rennell, four from Rennell and Bellona, and 13 from the latter island only. They belong to 24 families, but only the following comprise more than five species each from the two islands: Curculionidae (20), Chrysomelidae (14), Tenebrionidae (12) and Scolytidae (8). Nine species and one subspecies are endemic.

Hymenoptera

Of Hymenoptera, only one (endemic) species of Chalcidoidea and the ants of the early expeditions have so far been reported on. Fifteen species of ants have been found on Rennell and Bellona, and four on Bellona only. One species and one subspecies are restricted to Bellona. Several species of particularly small forms from Berlese samples are still under study.

In addition to material of the insect groups mentioned above, material of *inter alia*, the following groups from the two latest expeditions is being examined by specialists: Protura, Collembola, Blattoidea, Fulgoroidea, Cicadellidae, Coccoidea, Schizopteridae and Ceratocombidae, Psocoptera, Vespiidae and Scoliidae.

Diplopoda and Chilopoda

From Rennell is known one (very commonly found) species of the former and ten of the latter (including one endemic genus and species).

Scorpiones, Uropygi, Pseudoscorpiones, Opiliones

These orders are represented on Rennell by two or three, one, five, and one species, respectively.

Acari

In addition to one species of Hydrachnellae (p. 331), one new species of a bat-infesting ixodoid mite (family Argasidae) has been taken on Rennell. Moreover, an extensive collection of analgoid feather mites (Sarcoptiformes) has been studied. It was obtained from 15 bird species, 10 of which are passerines, and comprises 30 species, four of which could only be referred to genus. Twenty of the remaining species are so far unknown outside of Rennell. Five of these species belong to one, apparently endemic, subgenus (*Proterothrix*).

Araneae

The preliminary list of spiders from Rennell includes about 38 species but only 25 of these could be identified. Twelve species belong to the Argiopidae, six to the Tetragnathidae, and five to the Theridiidae.

Annelida

In addition to the aquatic forms (p. 331), at least one species of land leech (Hirudinea) occurs on Rennell. Seven species of earthworms have been recorded, three of which (genus *Pheretima*) were described as new. One of these has later been recorded from Guadalcanal also, and another is considered a synonym by Dr K. E. Lee, who believes all six Rennell species to have been introduced by man (personal communication).

Nematoda

One new *Microfilaria* was found in the blood of a kingfisher. One yet undescribed species was taken from a flying fox.

Cestoda

One tapeworm (genus *Raillietina*) was recorded from the eye cavity of the Pacific pigeon.

Protozoa

Five species of *Trypanosoma*, *Haemoproteus* and *Atoxoplasma* were found in the blood of the ibis, the honey-eater and both white-eyes.

The occurrence of land and freshwater animals recorded thus far from Rennell and Bellona can be summarized as follows:

	Rennell	Bellona*	Rennell and Bellona	total	inclusive of Lake Tegano
mammals	10	—	1	11	11
birds	49	1	7	57	57
reptiles	7	1	6	14	16
fishes	—	—	—	—	2†
gastropods	22	—	5	27	32
crustaceans	9	—	—	9	30
insects	391	46	52	489	522†
arachnids	90	—	—	90	91
annelids	7	—	—	7	9
nematodes	2	—	—	2	4
cestodes	1	—	—	1	1
protozoans	5	—	—	5	5
totals	593	48	71	712	780

* The Bellona records do not include observations and local information, only species actually collected.

† The goby and some of the insects are also found in rock-pools on both islands.

*Relationships of the land and freshwater fauna**Possible endemism*

A better knowledge of particularly the fauna of the neighbouring Solomon Islands will no doubt reduce the number of species and genera which are at present known only from Rennell and/or Bellona. However, the origin, comparative isolation and different ecological environments of these two islands (in contrast to the volcanically built larger islands to the north) must certainly cause a higher degree of endemism than in other islands of the Solomons.

This is demonstrated by the Rennell bird fauna, with 43 % of the breeding birds being endemic species or subspecies (cf. p. 333). In this case the fauna of the surrounding area is so well known that it seems very improbable that any of the endemics will be encountered outside Rennell–Bellona. Admittedly, a percentage as high as that of the birds is found in no other major group, as appears from table 15.* No endemic representatives have yet been recorded in the following major groups (number of identified species in parentheses): Odonata (11), and Araneae (25). With the addition of these and other minor groups, a total of 668 identified species are known from Rennell–Bellona. At present 109 of these (16 %) are recognized as endemic species and another 61 (9 %) as endemic subspecies.

* The high percentage of the ostracods and feather mites (Acari Sarcoptiformes) certainly reflects the present fragmentary knowledge of these animal groups.

TABLE 15. SPECIES AND SUBSPECIES (IN ITALICS) OF LAND AND FRESHWATER ANIMALS KNOWN ONLY FROM RENNELL AND/OR BELLONA

	total	579	92+41	7+11	3+9	102+61	28
total no. of species							
Rennell only							
Rennell and Bellona							
Bellona only							
total							
per cent							
Mammalia	11	2	—	—	—	2	18
Aves (breeding)	46	4+11	5	—	—	4+16	43
Reptilia	16	1	—	—	—	1	6
Gastropoda	32	7	2	—	—	9	29
Ostracoda	6	5	—	—	—	5	83
Orthoptera	10	2	—	—	—	2	20
Hemiptera	24	7	—	1	—	7+1	29
Mallophaga	15	1	—	—	—	1	7
Diptera	20	—	—	2	—	2	10
Lepidoptera	251	35+25	5+6	7	—	40+38	30
Coleoptera	85	9+1	—	—	—	9+1	12
Hymenoptera	23	1	—	1+1	—	1+2	13
Chilopoda	10	1	—	—	—	1	10
Acari-Sarcoptiformes	25	20	—	—	—	20	80
Oligochaeta (earthworms)	5	1	—	—	—	1	20

Insecta

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According to our present knowledge, the following eight genera and two subgenera appear to be endemic:

Aves	<i>Woodfordia</i>
Gastropoda	<i>Quirosella</i>
	<i>Rennellia</i> (subgen.)
Ostracoda	<i>Mungava</i>
Lepidoptera	<i>Pseudoclitia</i>
	<i>Periphoeba</i>
	<i>Hutuna</i>
Coleoptera	<i>Pycnorhinus</i>
Hymenoptera	<i>Willowsiella</i> (Bellona)
Chilopoda	<i>Phanothereua</i>
Acari Sarcoptiformes	<i>Proterothrix</i> (subgen.)

All are monotypic, except *Quirosella* (with 3 spp.) and *Proterothrix* (with 5 spp.).

Relationships of endemic Lepidoptera and birds

Two well-defined groups, the Lepidoptera (butterflies and moths) and the breeding birds, contain a sufficient number of endemic species and subspecies to justify a survey of the occurrence of their closest relatives. This could, however, only be done for 57 of the 78 endemic Lepidoptera due to lack of sufficient information regarding the 21 remaining species or subspecies.

Tables 16 to 18 clearly demonstrate the strong eastward (oceanic) affinity of the endemic birds which was discussed in detail by Braestrup (1956).^{*} The mainly westward distribution of the closest relatives of the endemic Lepidoptera is very obvious (table 18). The limited number of close relatives occurring in the Solomons is remarkable and can probably not only be explained by an insufficient knowledge of the Lepidoptera from that area (particularly Guadalcanal), but also by some species and subspecies having a closer affinity with New Guinea and surrounding smaller islands than with the Solomons.

Relationships of non-endemic species and subspecies

Tables 16 to 18 have been compiled from all available literature, part of which is still in print (cf. p. 321). The number of species and subspecies is considerably less than the total number given on p. 337 as the tables do not include: (1) species which were referred to genus or higher taxon only; (2) identified species of a few minor groups (ostracods, annelids, etc.); and (3) about 10 identified species of otherwise included groups where I was unable to establish their general distribution, not being a specialist in the said groups.

The number of species and subspecies occurring on Rennell–Bellona and one or more of the neighbouring island groups is given in table 16. One third of the non-endemic species have this restricted distribution. With a better knowledge of the fauna of the neighbouring islands their total share will probably be somewhat increased. It is, however,

^{*} The distances to surrounding islands and island groups are given on p. 323.

not likely that their relative share will be much altered as these islands appear to be equally fragmentarily known (except perhaps New Guinea).

Table 17 shows the distribution of species and subspecies occurring farther west and east of Rennell–Bellona (the Moluccas and farther westward, Fiji and farther eastward).

TABLE 16. DISTRIBUTION OF RENNELL–BELLONA SPECIES AND SUBSPECIES ON NEIGHBOURING ISLANDS AND CLOSEST AFFINITY OF LEPIDOPTERA AND BIRDS

	+ Sol.	+ Sol. + Bsm.	– Sol. + Bsm.	+ Sol. + N.G.	– Sol. + N.G.	+ Sol. + S.C. + N.H.	– Sol. + S.C. + N.H.	+ Sol. + N.G. + S.C. + N.H.	species and subspecies total number of non-endemic	% on neighbouring islands
Lepidoptera	31	3	2	7	17	2	2	2	173	38
<i>Lep. endemics</i>	15	—	1	1	11	—	—	1	—	—
other insects	15	1	1	6	10	7	1	2	163	26
other land arthropods	9	—	—	2	2	—	3	—	43	37
Gastropods	10	1	—	1	—	—	—	—	23	52
breeding birds	8	—	—	—	—	1	—	—	26	35
other birds	—	—	—	—	—	—	—	—	11	0
<i>bird endemics</i>	7	—	—	—	—	1	—	—	—	—
other vertebrates	3	—	—	1	1	1	—	2	26	27
total	76	5	3	17	30	11	6	6	465	33

Notes. Other insects do not include the Mallophaga. Other land arthropods do not include Acari Sarcoptiformes or any crustaceans. Marine species are not included.

Abbreviations: Aust. = Australia, Bsm. = Bismarck Archipelago, N.G. = New Guinea and adjacent small islands, N.H. = New Hebrides, S.C. = Santa Cruz Islands, Sol. = Solomon Islands, excl. of Rennell and Bellona.

The mainly westward or mainly eastward distribution of the Rennell–Bellona fauna is summarized in table 18. The significant eastern affinity of the endemic birds is less pronounced in the non-endemic breeding birds. However, both the birds and the other vertebrates have considerably higher percentages of eastward distributed species than those found in the invertebrates, probably owing to a greater ability of long distance dispersal.

Between 15 and 23 % of the non-endemic species and subspecies have a wide distribution, occurring far east and west of Rennell and Bellona.

SUMMARY

Rennell and Bellona are the southernmost of the Solomon Islands. Intensive collecting, particularly on Rennell, has been carried out on several occasions since 1928, mainly in 1951, 1953, 1962 and 1965, by one British and three Danish expeditions.

Rennell and Bellona are long and narrow (86 and 11.4 km in length, respectively). The distance between them is 22.5 km. Both islands are raised atolls whose origin dates back to the close of the Pliocene. They rise abruptly to a uniform height of 110 and 79 m,

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TABLE 17. WESTERN OR EASTERN AFFINITY OF MORE WIDELY DISTRIBUTED RENNELL-BELLONA SPECIES AND SUBSPECIES
(For notes and abbreviations, see table 16.)

	mainly westward				mainly eastward			
	+ Sol. westward	- Sol. westward	Aust. only	Sol. - N.G. - Aust. - S.C.	S.C. - N.H. westward	+ Sol. eastward	- Sol. eastward	N.G. (Aust.) eastward
Lepidoptera	27	26	5	—	8	2	12	1
<i>Lep. endemics</i>	—	11	3	—	—	—	9	1
other insects	28	25	8	1	5	2	5	8
other land arthropods	6	10	—	—	1	1	2	—
gastropods	5	—	3	—	—	—	—	1
breeding birds	1	4	1	—	—	2	3	2
other birds	4	—	—	1	1	1	—	—
<i>bird endemics</i>	—	—	1	1	—	—	9	—
other vertebrates	2	1	—	2	3	2	2	2
total	73	66	17	4	18	10	24	14

TABLE 18. GENERAL DISTRIBUTION OF THUS FAR IDENTIFIED RENNELL-BELLONA SPECIES AND SUBSPECIES

(For notes and abbreviations, see table 16.)

	Rennell-Bellona only	+ Sol. only	+ Sol., mainly westward	- Sol., mainly westward	% westward distributed*	+ Sol., mainly eastward	- Sol., mainly eastward	% eastward distributed*	N.G. (Aust.) to N.H.	widely distributed	total
Lepidoptera	78	31	44	50	72	3	14	10	4	27	251
<i>Lep. endemics</i>	—	15	1	26	74	1	9	18	1	4	57
other insects	25	15	40	44	61	10	6	10	10	38	188
other land arthropods	1	9	9	12	70	—	5	12	—	8	44
gastropods	9	10	7	3	63	—	1	3	—	2	32
breeding birds	20	8	1	5	54	4	3	27	1	4	46
other birds	—	—	5	—	46	1	—	9	1	4	11
<i>bird endemics</i>	—	7	—	1	40	—	9	45	2	1	20
other vertebrates	3	3	6	2	42	2	4	23	5	4	29
total	136	76	112	116	51	20	33	9	21	87	601

* Only non-endemic species and subspecies—cf. table 16.

respectively, and have a large central depression (the lagoon bottom of the former atoll). The rims of both islands and most of the interior of Rennell consists of extremely uneven and fissured coral rock. Only patches with a stiff clayey soil can be cultivated, but the forest thrives remarkably well on the infertile coralline ground. There are no water courses but several small rock-pools.

The majority of the eastern half of Rennell is covered by Lake Tegano which is the largest lake in the Pacific (29×10 km). It is only about 40 m deep. It has an open, although subterranean, connexion with the sea which causes a salinity of 4 to 6 ‰. There is no evidence of a pronounced stratification.

From April to November the south-east trade wind prevails. Westerly winds are about as frequent as easterly winds during the rest of the year. Daily temperature records in November 1953 showed a mean maximum of 30.4°C and a mean minimum of 26.2°C . The highest recorded precipitation for a 2-week period (last half of October 1957) is 485 mm. The annual rainfall is probably at least 3000 mm.

The fauna of Lake Tegano consists of 68 species (four vertebrates, five gastropods, 21 crustaceans, 33 insects or insect larvae, one water mite and four worms). Only 14 species (21 %) are of marine origin. Thirteen of the 54 identified species are endemic. There are no amphibians on the islands.

Collecting and study of the marine fauna has not been very intensive. So far only 79 species of fish and 118 molluscs have been recorded from Rennell and another 20 fish species from Bellona.

The land fauna numbers—according to the present knowledge—664 species from Rennell, 71 of which have also been taken on Bellona—in addition to 48 species not (yet) recorded from Rennell. The number of species of the more significant groups are as follows: Ten bats and one rat, 57 birds (46 breeding), 14 reptiles, 27 land snails, 489 insects (260 Lepidopterans and 95 beetles) and 90 arachnids.

A total of 668 animals have been referred to species or subspecies. Sixteen per cent of them have been found only on Rennell and/or Bellona. No less than 43 % of the breeding birds are endemic (4 species and 16 subspecies). While almost half of the endemic birds have their closest relatives towards the east, 74 % of the endemic Lepidoptera show a westward affinity. Eight genera and two subgenera are restricted to Rennell and one to Bellona.

A mainly westward distribution is also apparent for the various groups of non-endemic species and subspecies, being, however, considerably stronger in invertebrates than in birds and other vertebrates. The distribution of one third of the non-endemic species and subspecies is limited to Rennell–Bellona and one or more of the neighbouring islands. A great number of species of almost all groups have not been recorded from the other Solomons. A wide distribution is found in 15 to 23 % of the various groups.

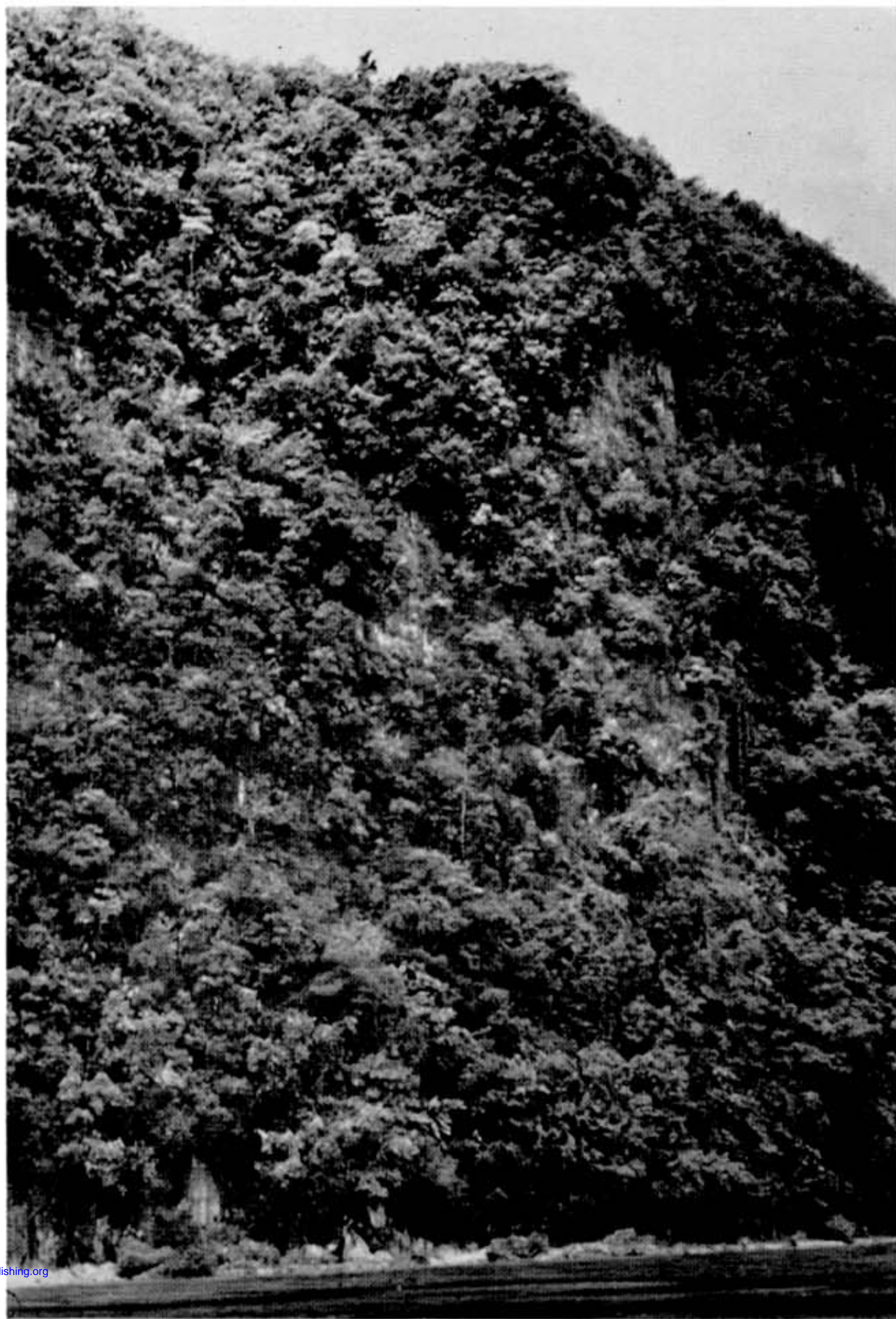
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FIGURE 35. Steep coral cliff (the former reef face) at Tuhugago, Rennell Island.
(T. Wolff, phot.)

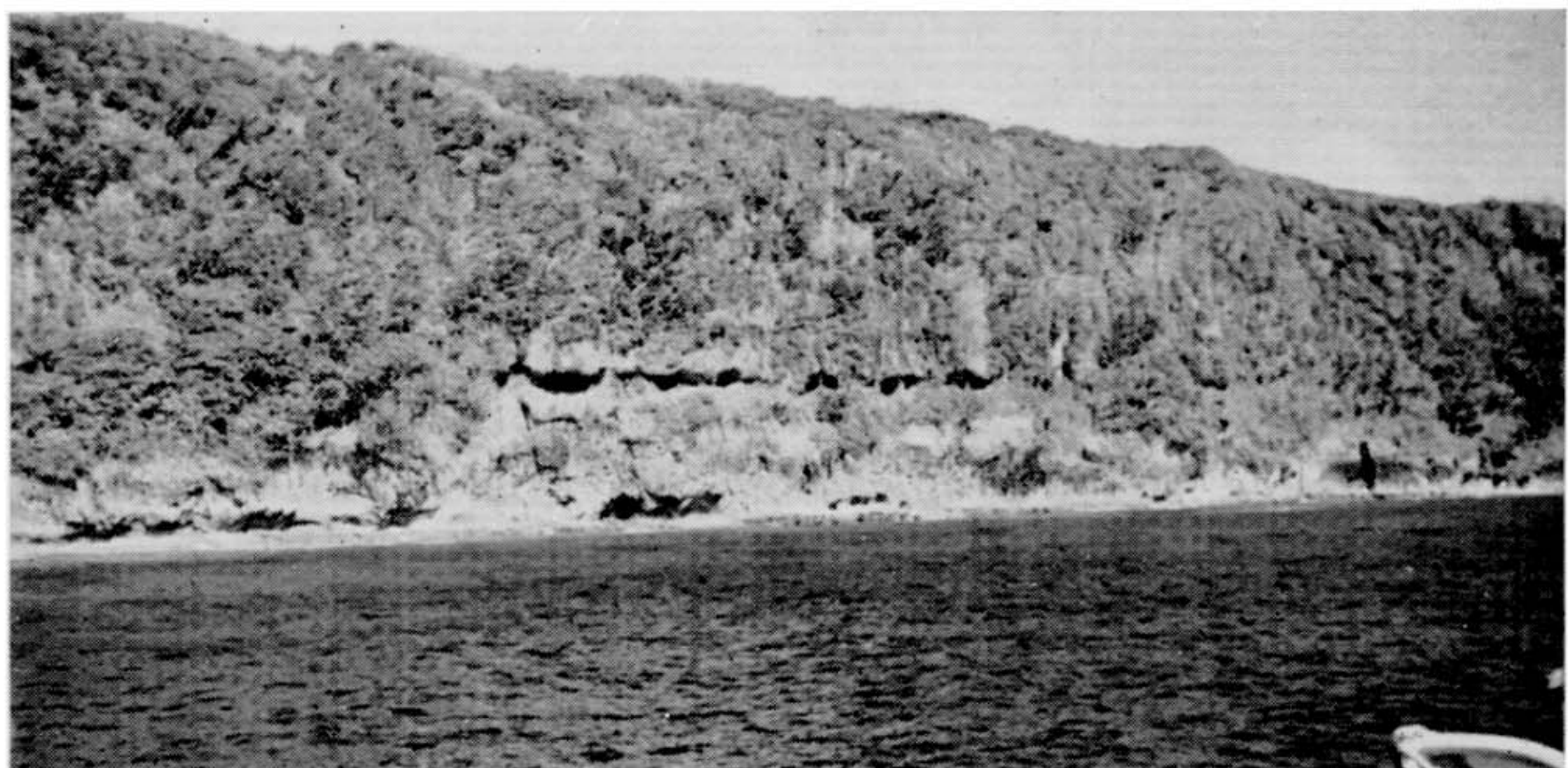


FIGURE 36. Part of the north coast cliffs of Bellona. Sea-etched caverns are seen immediately above present sea level and at about 30 m above sea level, indicating uplift or previous higher sea level.
(After Grover.)

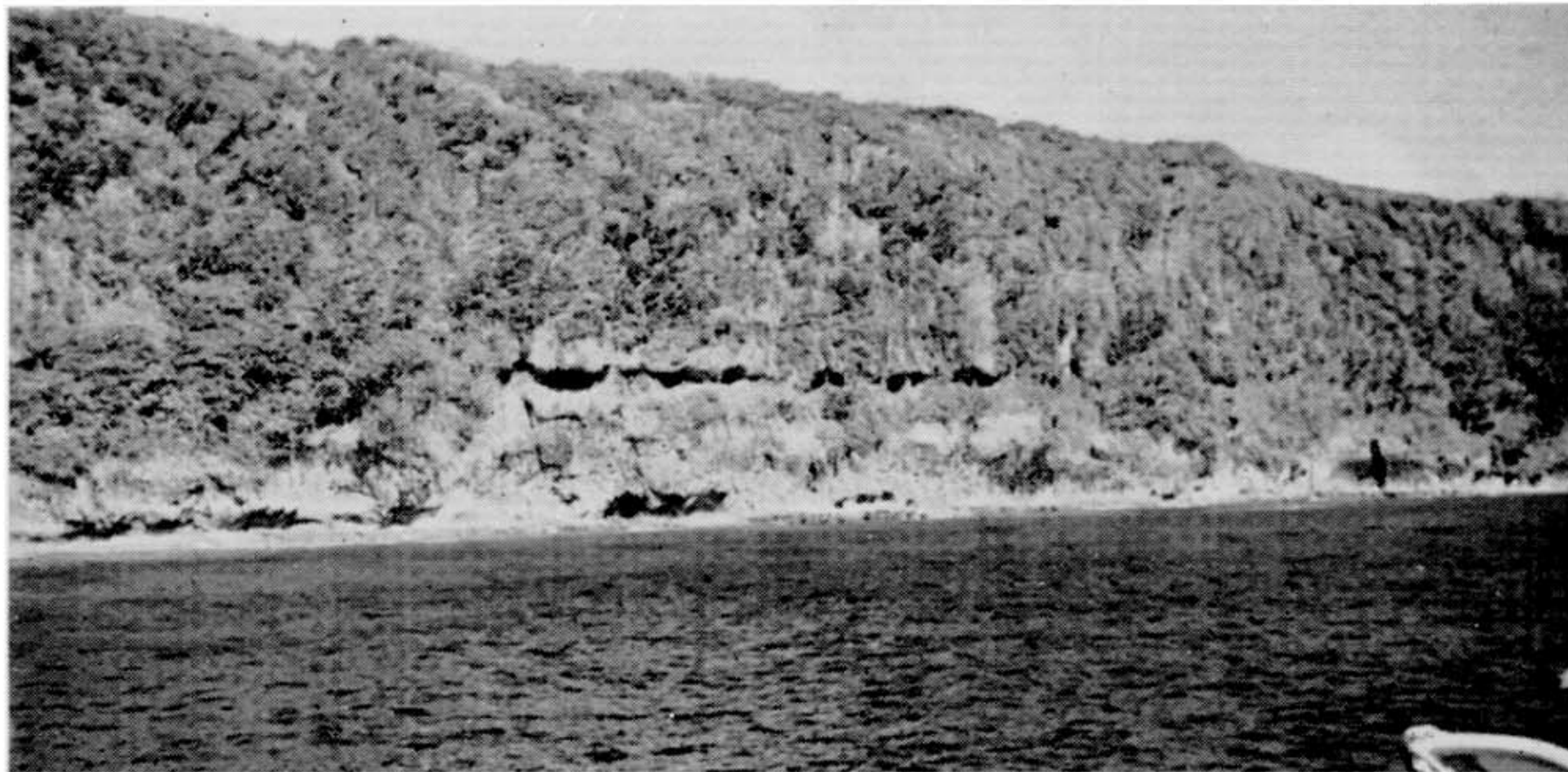


FIGURE 36. Part of the north coast cliffs of Bellona. Sea-etched caverns are seen immediately above present sea level and at about 30 m above sea level, indicating uplift or previous higher sea level. (After Grover.)



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FIGURE 37. Fissured coral rock surface in forest near Ahanga, Rennell Island. (T. Wolff, phot.)
FIGURE 38. View of eastern half of Lake Tegano from Kasipa Hill at Hutuna. Entrance to the bay at Tigoa in the far distance (extreme left). (T. Wolff, phot.)



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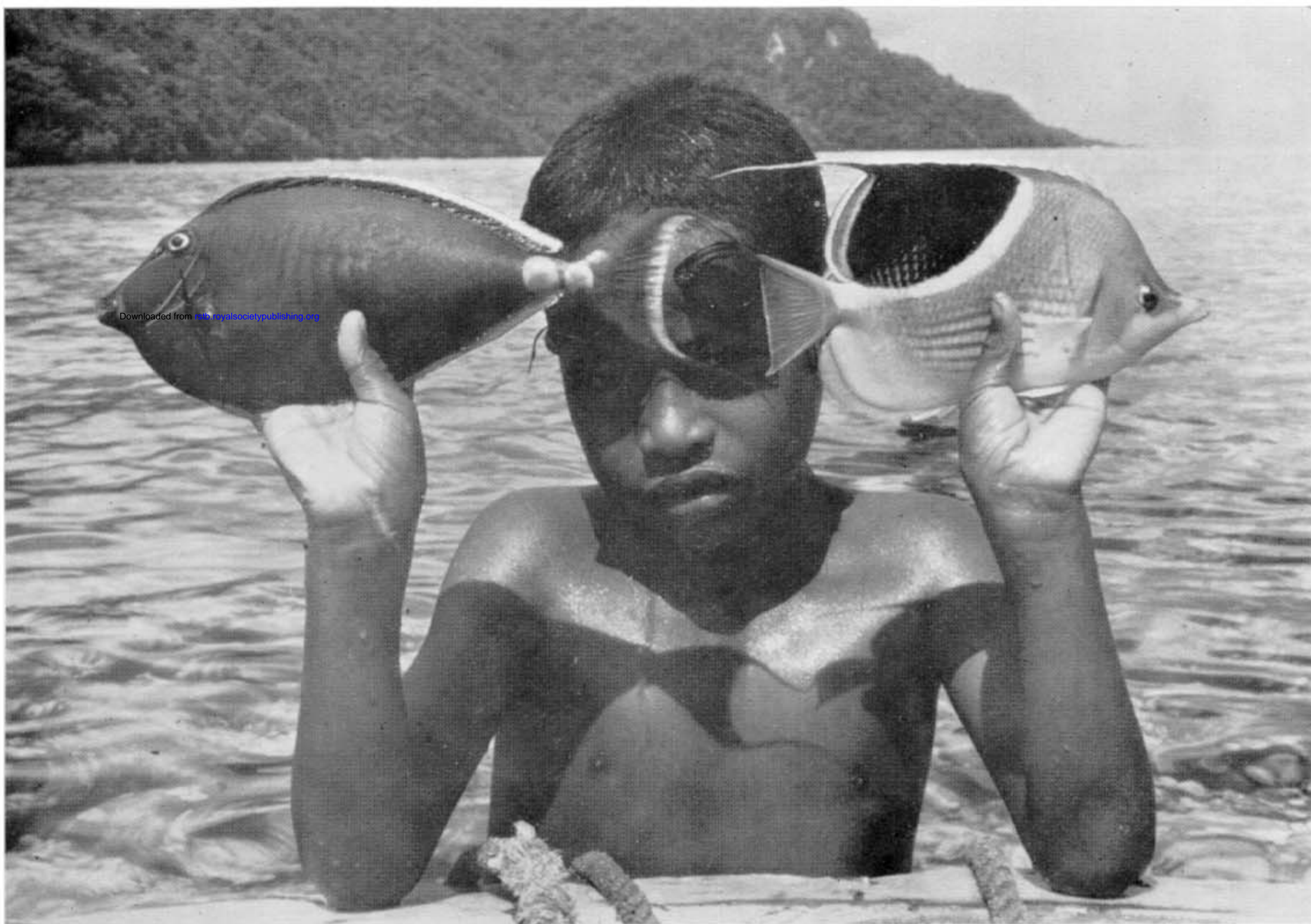
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FIGURE 39. Overhanging cliff on the islet Halogu in the central part of Lake Tegano. Nesting place for the starling *Aplonis cantoroides*, in holes in the coral rock and in the trees. (T. Wolff, phot.)

FIGURE 40. Low, grassy shore in sheltered bay at Niupani. (S. Christiansen, phot.)



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FIGURE 41. Drainage at Teaba on the north coast of Lake Tegano. The water flows into sinkholes where straw and leaves have gathered. (T. Wolff, phot.)

FIGURE 42. In a discussion on a possible connexion between the sea and Lake Tegano the Rennellese described three species of marine fish which they had once encountered in the lake. Shown here is one of the species, the saddled coralfish *Chaetodon ephippium* Cuvier (right), when it was later captured on the reef at Kagaba on the south coast. The species on the left is *Naso lituratus* (Forster). (T. Wolff, phot.)

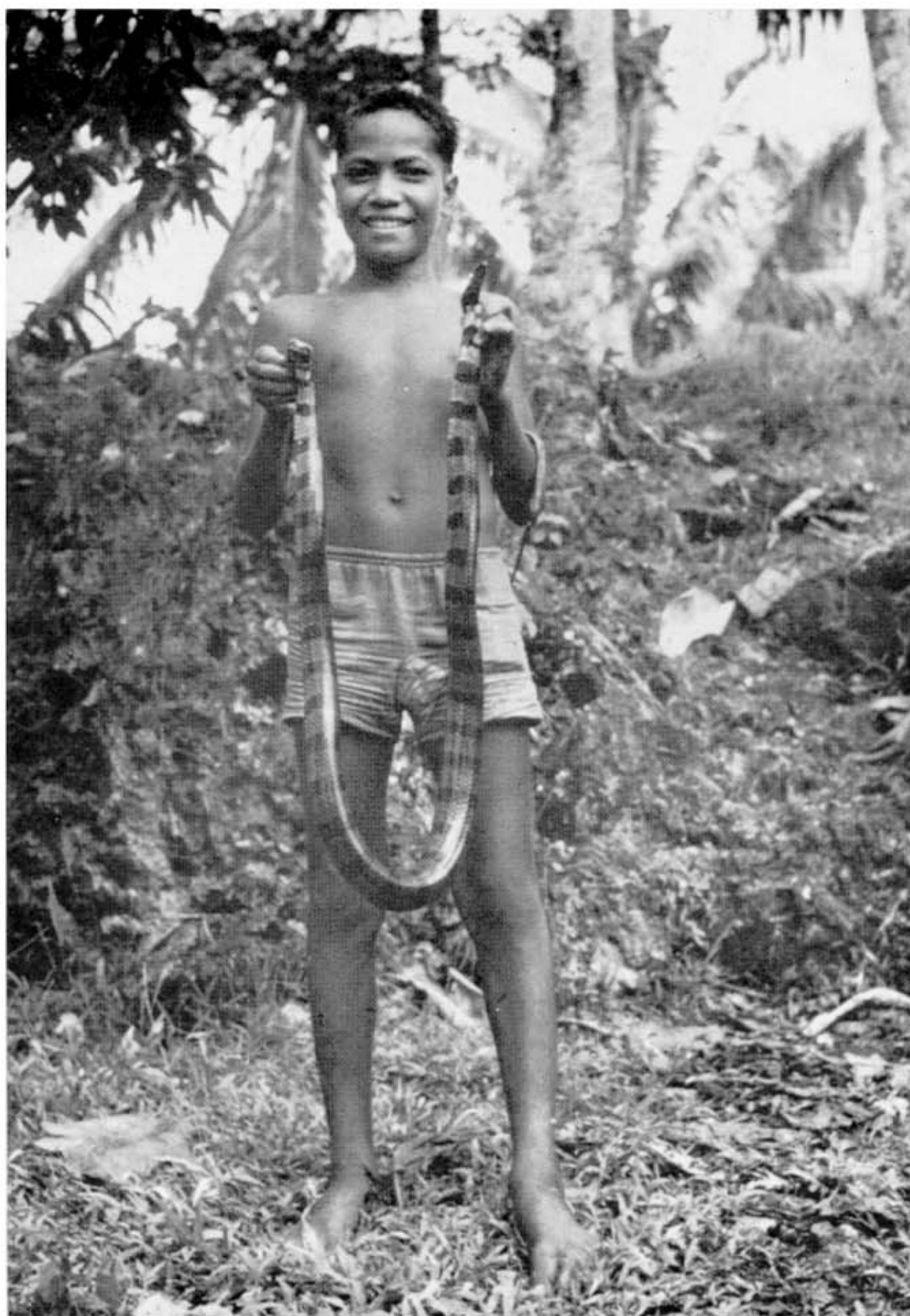


FIGURE 43. A large specimen of the endemic subspecies of sea snake in Lake Tegano, *Laticauda laticaudata crockeri* Slevin. (T. Wolff, phot.)

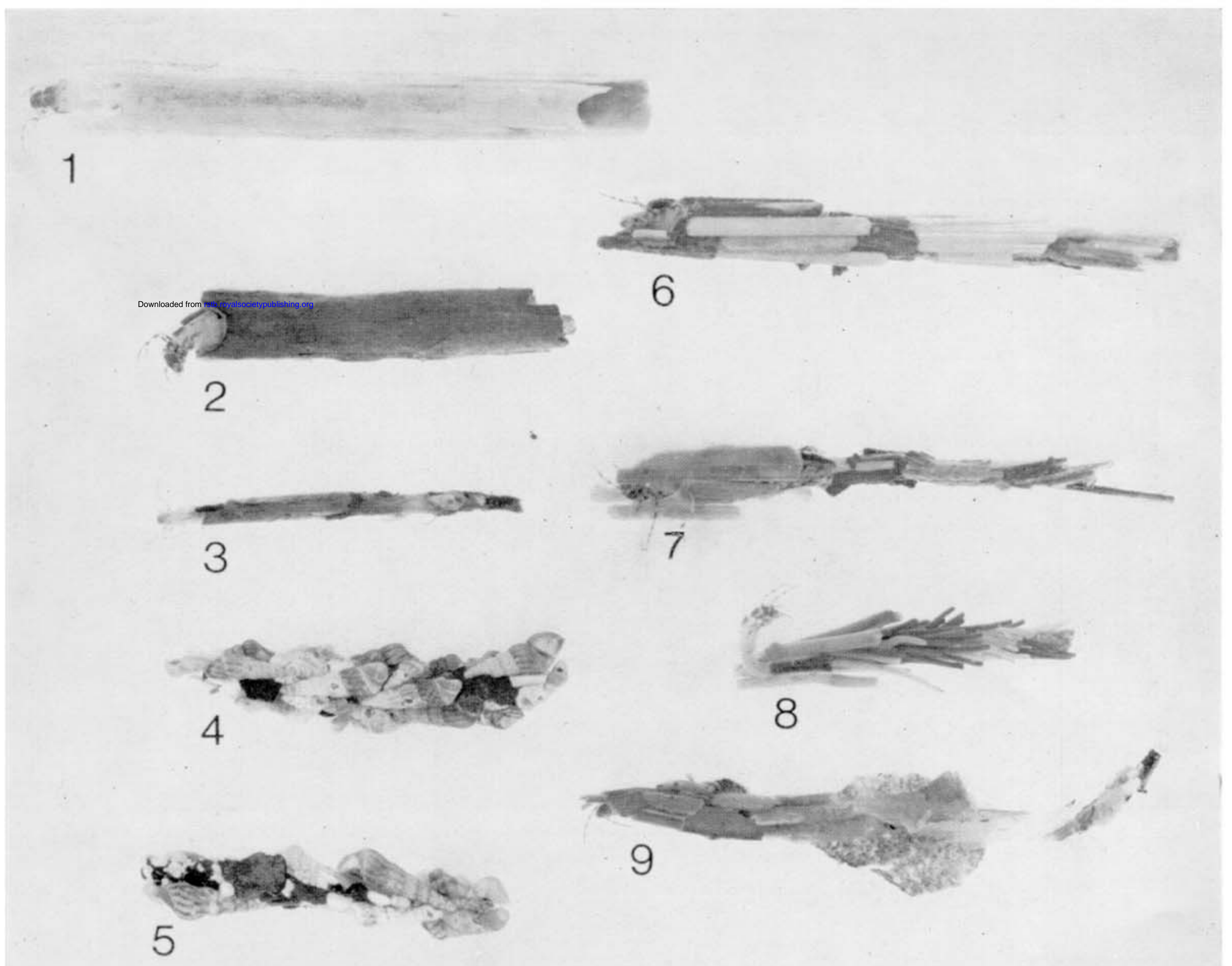
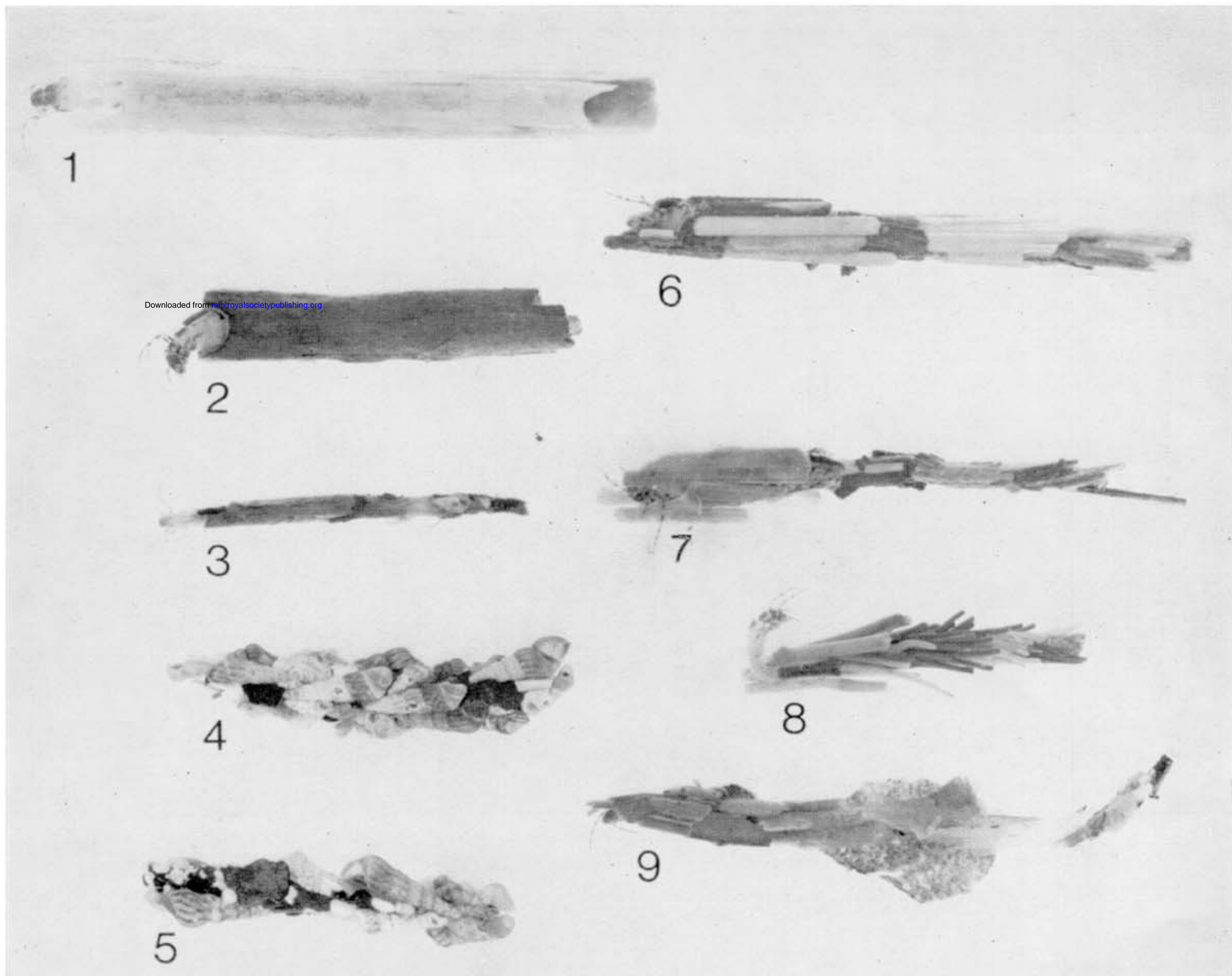


FIGURE 44. Larval tubes of *Notanatolica magna* (Walker) from Lake Tegano. 1, stem of aquatic plant; Frw. St. 7. 2, twig; St. 4. 3, bark and aquatic plants; St. 4. 4, gastropod shells, a little bark; St. 4. 5, gastropod shells, bark, coral; St. 6. 6, aquatic plants; St. 32. 7, the same; St. 33. 8, shoots and roots of aquatic plants; St. 10. 9, the same and leaf fragments; St. 10.



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FIGURE 44. Larval tubes of *Notanatotica magna* (Walker) from Lake Tegano. 1, stem of aquatic plant; Frw. St. 7. 2, twig; St. 4. 3, bark and aquatic plants; St. 4. 4, gastropod shells, a little bark; St. 4. 5, gastropod shells, bark, coral; St. 6. 6, aquatic plants; St. 32. 7, the same; St. 33. 8, shoots and roots of aquatic plants; St. 10. 9, the same and leaf fragments; St. 10.

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FIGURE 45. Endemic subspecies of the song parrot, *Geoffroyus heteroclitus hyacinthinus* Mayr.
(T. Wolff, phot.)



FIGURE 46. The endemic Rennell shrikebill *Clytorhynchus hamlini* (Mayr).
(T. Wolff, phot.)