AUSTRALIAN MUSEUM SCIENTIFIC PUBLICATIONS

Waite, Edgar R., 1899. Appendix. The fishes of Funafuti. (Supplement). *Australian Museum Memoir* 3(9): 537–546. [7 August 1899].

doi:10.3853/j.0067-1967.3.1899.506

ISSN 0067-1967

Published by the Australian Museum, Sydney

APPENDIX.

THE FISHES OF FUNAFUTI.

(SUPPLEMENT.)

By EDGAR R. WAITE, F.L.S.,

Zoologist, Australian Museum.

APPENDIX.

THE FISHES OF FUNAFUTI.

(SUPPLEMENT.)

By Edgar R. Waite, F.L.S., Zoologist.

When Mr. H. E. Finckh was about to leave for Funafuti in order to study living corals, it was suggested that he should collect objects of marine life for the Museum. In order the better to know our requirements, he interviewed my colleagues and myself; among other matters I especially impressed upon Mr. Finckh the desirability of obtaining the "Palu" mentioned in my report on the Fishes (pp. 199 – 201) as frequenting deep water in the neighbourhood of the coral atolls.

It was with considerable satisfaction therefore that on the return of the expedition, we learned that a "Palu" had been obtained. By the kind offices of the Local Funafuti Committee of the Royal Society, the specimen passed into the possession of the Trustees and has been entrusted to me for determination; it proves to be of most exceptional interest.

Owing to the large size of the fish and the difficulty of preserving it, it was cut into three pieces; an unfortunate proceeding, but one which does not interfere with its recognition. It proves to be as follows :—

GEMPYLIDÆ.

Ruvettus, *Cocco*,

Ruvettus pretiosus, *Cocco*.

Ruvettus pretiosus, Cocco, Giorn. Sci. Sicil., xlii., 1829, p. 21; Goode and Bean, Oceanic Ichth., U.S. Nat. Mus. Sp. Bull. No. 2., 1895, p. 196, pl. lvii., fig. 210.

This is a North Atlantic form and the only member of the genus. On the eastern side of the Atlantic basin it ranges from the Canary Islands to Portugal and is found at several stations in the Mediterranean: on the American coast it is common off Cuba and two examples have been taken east of New York. It is therefore distributed in the North Atlantic in twenty-five degrees of latitude, roughly speaking from 20° to 45° N. Its extreme eastern station appears to be Spalatro in the Adriatic 16° E., and its western limit Cuba 85° W; thus it extends over one hundred degrees of longitude.

The specimen now obtained enables us to extend its distribution surprisingly. Not only is it recorded in the Pacific, and south of the Equator, but many definite localities are known widely apart, while inferentially its Pacific range is very extensive indeed.

Taking Mr. Louis Becke's account (p. 199) the Palu is first to be noted as frequenting the neighbourhood of the Line Islands (the Gilberts or Kingsmill Group) thence at the Ellice Group where he describes it as being hooked at Nanomanga. From the same group, namely at Funafuti, we receive the specimen obtained by Mr. Finckh. The next locality is Tokelau or the Union Group, and still proceeding in a south westerly direction we encounter Pukapuka (Danger Island), Manahiki (Humphrey Island), and Suwarrow, and further to the south Niue or Savage Island.

We have thus definite records of the occurrence of the Palu through twenty-six degrees of longitude, that is from the Gilberts 173° E. to Manahiki 161° W., and nineteen degrees of latitude, namely from the Equator (or thereabouts) southwards, to Savage Island, 19° S.

Hedley has published (pp. 272 – 276) an exhaustive account of the so-called "shark-hook" of the Pacific, and has shown that this peculiar wooden hook is not intended for shark but for Palu catching.

As these hooks are so commonly known to Ethnologists, and are found over such a large area, it might be thought that the fish for which they are intended would surely also be known. Palu fishing however, is conducted in a ceremonious and superstitious manner, and the natives are very jealous of their capture, which is "prized above all other fish." It is small wonder then that the Palu has so long remained unknown to Europeans, and indeed Becke writes: "With the exception of an old trader named Jack O'Brien, now living in Funafuti,* in the Ellice Group, I do not think there is among the white traders of to-day another man besides myself who has caught 'Palu.' In the first place, a man must have much experience of deep-sea fishing; in the next, the native inhabitants would strongly resent a strange white man attempting to catch one."

Taking all things into consideration it is not unreasonable to argue that where the Palu hook is found, thence will the fish, sooner or later be recorded.

"Tracing the geographical distribution of this hook (writes Hedley, p. 273), we note it recorded from Nanomea, by Brill; from Nukufetau in the Ellice, Nukuor in the Carolines, and Tarowa in the Gilberts, by Dr. Finsch; from Nukulailai, Nieue, Tamana, and the Union Group, and possibly an eccentric type

* Mr. O'Brien died in 1899, since the publication of Part 3 of this Memoir.

from the Louisiades, by Edge-Partington, and the latter also by Macgillivray; a drawing of a Penrhyn Island hook, by Wilkes, may be intended for this type; while a huge form is represented in the Australian Museum from the Mortlock Group, and another variation is pictured from the Trobriands by Finsch." Another Palu hook has been described by Hedley,* as from Milne Bay, British New Guinea.

The distribution may thus be circumstantially extended north of the line to the Marshall Group thence westward to the Caroline Islands. About the same latitude, but south of the Equator, we include eastern New Guinea. The known eastern range may be extended a few degrees from Manahiki to Penrhyn Island.

The natives say that the Palu is never found among the high islands, such as the Fijis, Samoa, New Hebrides, etc.; and that it affects only the low-lying coral atolls. This statement may be explained (as Mr. Hedley suggests to me) as follows: The so called high islands have shelving shores so that a journey of twenty or even thirty miles might have to be undertaken in order to reach the depths frequented by the Palu, on the other hand the shores of the coral atolls are precipitous and deep water is sounded within a few miles of the coast.

When transcribing Becke's account the statement that the jaws are toothless, did not seem in harmony with the appearance of the palu hooks: these exhibit scratchings such as would be made by the teeth of a captured fish, and when examined the teeth of the specimen now received are just the kind to produce such marks. The general form of the hook is shown in the cut here reproduced (Fig. 58). Examples from the Mortlock Group exhibited in the Australian Museum are of enormous size, measuring seventeen and a half inches in length. Such suggest that they were prepared for the capture of much larger fish than those described.

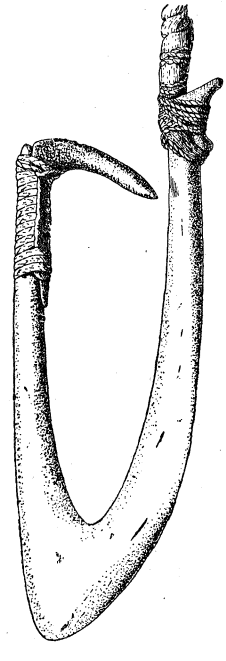

Fig. 58.

The most graphic account of *Ruvettus pretiosus* available to me, is that by Goode and Bean, and the following is extracted from their "Oceanic Ichthyology":—"This form, first described from

* Hedley—Proc. Linn. Soc. N.S.W., xxii., 1898,, p. 288, pl. xiv.

the Mediterranean, occurs about Sicily; here it is so rare at the present time that it does not appear to have a common name among the fishermen, though Canestrini says that its flesh is delicious. Bonaparte refers to it as *Rovetto*, and the fishermen of Catania call it *Pesci Ruvetto*. Dr. Anastasio Cocco first described it from Messina. Giglioli has observed it at Genoa, Naples, Palermo, Malta, and Spalato (Dalmatia) and at Nice. It was subsequently found by Lowe at Madeira, and by Webb and Berthelot at the Canaries. It occurs rarely on the Portuguese coast, where it is called *Escolar*, and doubtless also in Spanish waters. About the Canaries the fish is known as the *Escolar*, a name which is said to be applied to members of the family *Gadidæ* by Spanish fishermen. The Escolar occurs in great schools about the Canaries in winter, and the fishermen capture it with hook and line at a depth of a hundred fathoms or less, and its flesh is highly prized. Cantraine states that it is taken at considerable depths about Malta. Lowe found it at Madeira at depths as great as 300 and 400 fathoms. It was found by Poey in the waters of Cuba before 1854. Poey tells us that it is rarely seen in the markets because of the difficulty attending its capture, for it can be caught only at a depth of 300 fathoms on dark nights in September and the early part of October. Poey further states that when one of these fishes is brought to the surface it appears to be surrounded by a globe of phosphorescent light. The Cuban fishermen go "a scholaring" *(à escolarear)* after the fishing for the Spearfish *(Tetrapturus)* has ceased, and before that for the Red Snapper *(Lutjanus aya)* begins. According to Canestrini it grows to the weight of 100 pounds in Sicilian waters."

Owing to mutilation the relative proportions of our specimen cannot be well ascertained, the following description is however not affected, excepting where the length of the body is concerned. As the body has been examined with the sawn vertebræ in proximity, such error as would be made in measuring the shrunken skin is avoided.

B. VII. D. XV. 18 + 2; A. 17+2; P. 14; V. I. 5; C. 9 + 8; L. lat. 94. L. tr. 14+28.

Length of head 3·7, height of body 4·6 in the total length, (caudal excluded). Eye large, nearly round, 4·8 in the length of the head; interorbital space slightly convex, 3·7 in the head: snout 3·0 in the same. Anterior nostril vertically oval, situated one half nearer the eye than its distance from the end of the snout; posterior nostril, a deep vertical slit with a large valvular flap in front, one half nearer the eye than its distance from the anterior nostril. Two weak flat spines on the opercle of which the lower is the longer; at the angle of the preopercle are a number of minute soft denticulations. The maxilla measures half the length of the

head and extends to nearly beneath the posterior margin of the orbit, in the diameter of which its distal extremity is contained rather more than twice, and is rounded. Lower jaw the longer and very powerful. The skin covering the bony arch of the gills is studded with rough scales, and gill rakers are developed as needle-like spines most pronounced on the lower part of the upper and posterior part of the lower limb. The spines arise from a broad flattened base embedded in the skin on the outer side of the limb and moveable thereon, being attached each by a ligament. These bases bear from one to three spines and are placed at some distance apart, the scales between them are also minutely spiny. In the angle of the first and second arch is a large and strong obtuse process surmounted by two or more slender spines directed inwards.

The teeth are small, canine-like, set at some distant apart and curved inwards, red at the base; in the jaws they are arranged in a single row, those of the mandible being the larger. There are four comparatively large teeth on the premaxillary and three on the head of the vomer; a single row of teeth on the palatines similar to, but smaller than those of the jaws. The anterior pair of mandibular teeth are set forward and are entirely in front of the upper jaw. No teeth on the tongue.

The longest spines of the dorsal fin are equal in length to the diameter of the eye. The soft dorsal is similar to the anal, very high anteriorly; the rays one-third the length of the head. The pectoral is contained 2·2 and the ventral 3·4 times in the length of the head. The upper caudal lobe is slightly longer than the lower and is nine-elevenths the length of the head, the least depth of the pedicel is 5·9 in the same.

Scales. The whole head (including the lips and maxilla) and body are clothed with minute scales which average six or seven between each bony tubercle; these tubercles are rooted by long irregular rays, two or three in number, and the portion projecting from the skin is bi- or more usually trifurcate; surrounding the base of each tubercle is a number of pores, two being immediately in front. The lateral line is not very marked, but beneath the skin it is more easily traced; along this line the bony tubercles are much smaller, closer, and more deeply imbedded, producing a rather naked appearance. There are ninety-four plates along this line and fourteen and twenty-eight above and below it respectively, counting the transverse series.

Colours. Dark reddish-brown throughout, the bony scutes naked and white.

The dorsal and anal finlets are not separate as described and figured in Oceanic Ichthyology, and the last dorsal and anal rays not so completely attached as the preceding ones, a character correctly illustrated in the figure quoted. The anal fin commences further behind the origin of the dorsal than there shown. If the pores above referred to emit light, it seems very probable that the plates or tubercles serve as reflectors, and one may therefore readily believe Poey's statement *(fide* Goode and Bean) that when one of these fishes is brought to the surface it appears to be surrounded by a globe of phosphorescent light.

"Dr. Lütken calls attention to the fact that the *Gempylidæ* possess a system of dermal ribs or subcutaneous ribs, composed of slender bony filaments close-set, directed backward and upward, and backward and downward from the median line. This character has been verified in *Thyrsites*, *Nealotus*, and *Gempylus*."*

Our example of *Ruvettus* possesses similar bones but apparently of simpler type: they extend from behind the head to nearly the middle of the spinous dorsal beyond which point they cannot be traced. Situated immediately beneath the lateral line they are directed backwards and upwards, and appear to be the ossified terminations of the ligaments which arise from the vertebræ.

How nearly the habits of the fish in the Pacific coincide with the accounts of writers on Atlantic specimens the following comparison will show.

In the "Atoll of Funafuti" the Palu is described as being caught only in the deepest water and while Mr. Louis Becke remarks that it is not unusual to fish in one hundred and fifty to two hundred fathoms, he cites as remarkable that he once caught five Palu in one night, in *eighty fathoms* only. All Palu are fished for at night.

The Escolar, (Atlantic name) has been taken at depths as great as three hundred and four hundred fathoms, and can be taken only at night in September and the early part of October.

The Palu or Oil Fish as it is also called (both in the Pacific and the Atlantic) is prized above all other fish, and its effect as a purgative has earned for it the name 'Te icka ne peka' by the Line Islanders. Of the Escolar, Lowe† writes:—"The flesh of this very singular species is said to be extremely rich, and the bones, it is affirmed, abound in an oil or marrow, which, when they are sucked incautiously, produces speedy diarrhœa."

* Jordan and Evermann—Bull. U. S. Nat. Mus., No. 47, 1896, p. 877.

† Lowe—Fishes of Madeira, Trans. Zool. Soc., ii. p. 181.

Additional fishes not obtained by the original expedition are as follows :—

SERRANIDÆ.

EPINEPHELUS, *Bloch.*

EPINEPHELUS FUSCOGUTTATUS, *Forsk.*

Epinephelus fuscoguttatus, Forsk., *sp.*, Descr. Anim., p. 42; Playf. and Günth., Fish. Zanzibar, p. 6, pl. i., figs. 2 and 3.

The species is represented by a single immature example measuring only 50 mm. in length. Funafuti forms another station for this widely distributed form, connecting the Marshall Group with the Samoan and Friendly Isles, whence it has been previously recorded.

GRAMMISTES, *Artedi.*

GRAMMISTES SEXLINEATUS, *Thunb.*

Grammistes sexlineatus, Thunb. *sp.*, Vetensk. Ac. Handl. Stockh. xiii., 1792, p. 142, pl. v.; Day, Fishes of India, p. 28, pl. ix., fig. 1.

Though the only example received measures but 21 mm. in length, the striking features of the species (the only one of its genus) renders identification unmistakable. The usual longitudinal white lines are broken up into spots, and all the anal rays are articulated, a character which separates it from *Pogonoperca*, wherein anal spines are noticeably developed.

CHÆTODONTIDÆ.

ZANCLUS, *Cuv. and Val.*

ZANCLUS CORNUTUS, *Linn.*

Zanclus cornutus, Linn., *sp.*, Günth., Fische der Südsee, p. 142, pl. xcii.

The solitary specimen obtained is about the size of the young figured by Günther. The anterior black band is however continued to the ventral profile, as in the adult.

BLENNIIDÆ.

SALARIAS, *Cuv.*

SALARIAS PERIOPTHALMUS, *Cuv. and Val.*

Salarias periopthalmus, Cuv. and Val., Hist. Nat., xi., p. 311, pl. cccxxviii.; Günth., Fische der Südsee, p. 207, pl. cxiv., figs. D and E.

Two examples are to hand, each about the size of Günther's fig. D. The only variation is in the markings of the fins. The

red dots on the dorsal are not observable and the spinous portion is ornamented near its edge with a series of black blotches, one to each spine. These did not occur in Günther's specimens neither did a dark vertical mark at the base of every third spine and ray throughout the whole length of the dorsal fin.

PLEURONECTIDÆ.

PLATOPHRYS, *Swains.*

PLATOPHRYS PANTHERINUS, *Rüpp.*

Platophrys pantherinus, Rüpp., Atlas Fische, p. 121, pl. xxxi fig. 1; Day, Fishes of India, p. 425, pl. xcii., figs. 3 and 4.

The small specimen obtained differs from Day's figure (fig. 3) by having the anterior dorsal rays free for half their length, and by having white spots on the vertical and caudal fins, a feature however mentioned in the description. In addition, the vertical fins have small black spots at intervals near the base of the rays, apparently similar to *P. nebularis*, Jord. and Gilb.* In April, 1898, I obtained *P. pantherinus* at Lord Howe Island.

DIODONTIDÆ.

TETRODON, *Linnæus.*

TETRODON MARGARITATUS, *Rüpp.*

Tetrodon margaritatus, Rüpp., Atlas Fische, p. 66; Richards, Voy. Samarang, Fish, p. 20, pl. ix., figs. 1 and 2.

This widely distributed and variable species is represented by two small examples; they agree most nearly with the variety described as *T. papua.*

---

* Jordan and Gilbert—Proc. U.S. Nat. Mus., vii., 1884, p. 31.