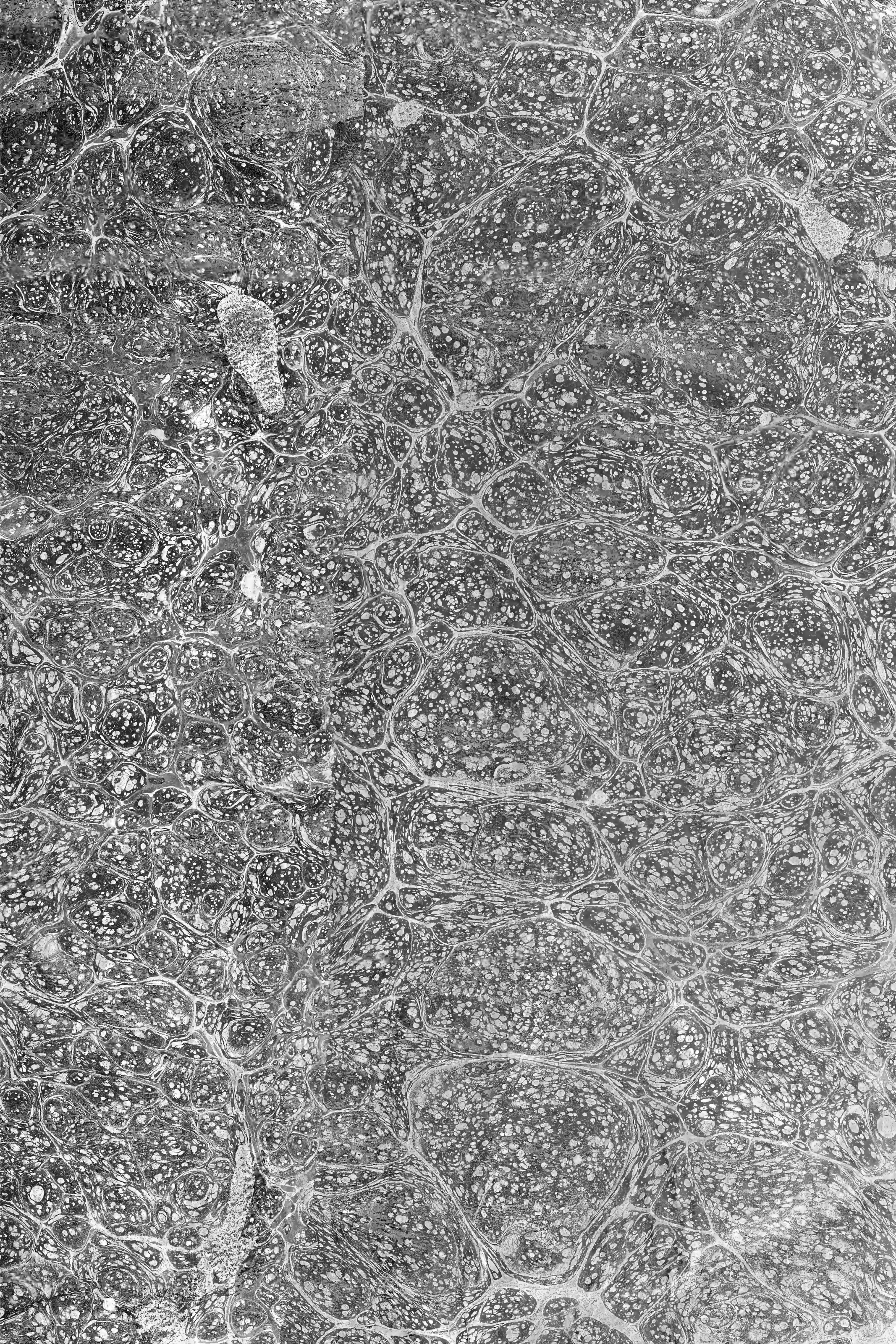


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DESCRIPTIONS AND FIGURES  
OF  
TWO HUNDRED FISHES;

COLLECTED AT  
VIZAGAPATAM ON THE COAST OF COROMANDEL,

BY  
PATRICK RUSSELL, M. D. F. R. S.

PRESENTED TO  
*THE HON. THE COURT OF DIRECTORS OF THE*  
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AND PUBLISHED BY THEIR ORDER,  
UNDER THE SUPERINTENDENCE OF  
THE AUTHOR.

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## P R E F A C E.

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THE following Collection of Fishes, the fruit of many laborious hours, when disengaged from other pursuits of natural history, was completed in the course of several years residence at Vizagapatam, on the coast of Coromandel.

Some time after my return from that country, the Drawings were presented to the East India Company; and to the Honourable the Court of Directors, at all times disposed to promote the cultivation of natural history in the British establishments in the East, the present Work owes its appearance.

An idea of profiting of a maritime situation so favourable to ichthyological pursuits was first excited by the view of fishermen daily dragging the large seine, or angling from boats and catamarans beyond the surf: but my library, besides Belon, Willoughby, Ray, and Linneus, was scantily provided with books on a subject which had before only cursorily interested me, and I should have desisted despondently, had not the Right Hon. Sir Joseph Banks, who honoured me with his correspondence, suggested how defective the history of Indian Fishes was in Europe at that time, and encouraged me to proceed.

A native painter whom I retained in my employment, had made progressive improvement in this new line. Endued by nature with a quick eye, patient and docile, he learned in a short time to delineate so accurately the parts pointed out to him, that his figures, howsoever deficient in art and grace, may in general be relied on in respect to fidelity in representation.

It was my original intention to have had the Drawings, in like manner as the Coromandel Serpents, coloured from nature: but after many fruitless

attempts, I was obliged to relinquish my design. In a hot climate, the colours of fish are more rapidly fugitive after death than in serpents. They escape while the painter is adjusting his palette; and in the fine gradations from the most brilliant to the softer evanescent tints, nature, through boundless variety, ever maintains a certain harmony and characteristic simplicity in her transitions, that required a delicate pencil under more masterly guidance than my artist had pretensions to.

I the rather mention this circumstance for its having led to an exuberance in description which might have otherwise been spared. Yet over minute as I thought I had been in point of colour, it was found upon trial by more than one artist in London, that insuperable obstacles arose to colouring the Drawings from my descriptions.

From a graduated scale of colours marked by figures, the tints selected by myself were marked by correspondent figures on the Drawings, and the written description laid before the painter at the same time. In the returned Drawings the predominant colours were found tolerably exact; but numerous interstices remained blank, which neither the description nor my recollection could supply: if filled up at all, it must have been merely by conjecture.

I am inclined therefore to think that drawings of fish can only be properly coloured from recent subjects; and that in proportion as fancy and conjecture are admitted, or recollection at any distance of time relied on, coloured drawings descend below verbal descriptions.

Language affords definite terms for the prime colours, and many of their shades: and by leaving those interstitial gradations blank which the pencil only can express adequately, the eye is less liable to be misled than when attracted by glaring colours, obtruded sometimes contrary to truth, and often at variance with the harmonious simplicity of nature. The force of this remark will be felt more sensibly on a comparison of some of the plain engravings in Valentine's *History of Amboina*,\* with the illuminated figures of the same fishes in Renard.†

\* Francis Valentine, a Dutch clergyman at Amboina, Banda, &c. in his history of those countries, published in Dutch, in 1726, has given engraved figures, together with short descriptions, of about four hundred and sixty fishes. But in both, the essential characters have been so little attended to, and the caprice of the painter exercised with such uncontrolled licence, that little beyond conjectural information can be derived from most of them.

From what has been said no more is meant to be inferred, than that coloured drawings, in regard to most Indian fishes, can be accurately executed in India only; that such as have been done in Europe from wet or dry specimens are often faulty; and that some figures in Bloch's justly celebrated work, cannot, in point of colour, claim exemption. It may be proper to add, that notwithstanding my own failure, I entertain no doubt of the success of Indian artists under better instruction than I was capable of giving.

In the arrangement of the Collection, there is little deviation from the Linnean classification. Of the genera newly instituted, one only from Bloch has been adopted.

That the large additions made lately to the catalogue of Indian fishes unknown to Artedi and Linneus require new invented genera, can admit of little doubt. Many have been formed by Bloch in his late History of Fishes; and a much more considerable number by La Cèpede in his Continuation of Buffon's Natural History

Of the merit of these late innovations, unknown to me in India, I do not presume to judge. The present collection affording but few instances to sanction innovation, I deemed it better to adhere to the classification long familiar to me; and when in doubt to what genus the subject belonged, to place it nearest the one to which it seemingly bore most affinity: leaving it with more experienced naturalists to transfer each to its proper station.

† Another collection, but of coloured figures, painted by order of M. Balthazar Coyett, when governor of the Molucca Islands, was published at Amsterdam in 1754, and dedicated to his Britannic Majesty. The number of fishes in two volumes amount to above four hundred, and most of them agree in shape with the figures in Valentine: in colour there is frequent variation, which the Editor in his Preface unsuccessfully attempts to account for. In respect to the second volume, the Editor owns that the painter had taken most unjustifiable liberty in colouring; a concession that might safely have been extended to the first.

Eight years before Valentine's history, a collection professing to be of unknown Indian fishes, had been published at Amsterdam by Hen. Ruysch. It contains about four hundred figures, the greater part of which are found in Valentine; they are smaller in size, but equally rude and extravagant.

The style of drawing in the three above-mentioned collections sufficiently denotes the hand of Indian artists. But a resemblance so striking in figures, sketched by different hands at distant periods, must either suppose existing originals from which they drew, or admit a coincidence in the sporting of pure fancy more improbable than the utmost extravagance of the figures represented. To this may be added, that the original of several figures long held as fictitious have lately been well described; justifying an opinion hazarded by the eminent naturalist Pallas, that the originals of all will in time be discovered.

In the genera *Sparus*, *Labrus*, *Perca*, and *Sciæna*, which Linneus left as requiring reformation, and which have confessedly puzzled Forskal as well as other travellers, I flatter myself with an allowance being made for me, which, with more diffidence, I wish to be extended to other instances of error. — For the additions under much doubt made to the genus *Zeus*, a kind of reason, such as it is, has been offered in another place.

I am fully sensible, that the vulgar names affixed to each species, though collected with care, must be liable to error. It is almost inevitable where the collector himself ignorant in the language, must trust to the ear in seizing the pronunciation of words to which he is incapable of affixing a meaning.

Lists of local names written in the country dialects were procured from Ganjam and Ingeram, which differed from each other, while both in most instances differed from the current names at Vizagapatam. The number of fishes in the respective lists, said to comprehend the whole known at each place, amounted in the first to between seventy and eighty, and in the second to near one hundred: but there can be little doubt that many species, not used by the natives as food, were not inserted.

The fishes caught at Vizagapatam, or in the vicinage, are most of them probably common to other places on the coast. Having occasion to make a short visit to Madras, I took the opportunity of showing my Drawings to some of the principal fishermen assembled on purpose, who readily recognized and named them; a few excepted. Soon after, on a fishing party at St. Toma, in the vicinity of Madras, where several large nets were dragged, I found some species of *Scomber* and of *Clupea* quite new to me; but most of the other Fishes were the same as at Vizagapatam. In Bloch's General History also are several Coromandel Fishes which I had not before met with. The present collection may therefore be said to contain a large portion, though not the whole, of the fishes found on that coast.

Of the Indian fishes delineated by Bloch, he acknowledges himself indebted for many to the Rev. Mr. John at Tranquebar: and it is with pleasure I take this public opportunity of expressing my own obligations to the same respectable Missionary, for Specimens and Drawings of Serpents received formerly, as well as within these few months.

The Drawings of this Collection, as before mentioned, were executed by a native of India; and, by the advice of artists at home, have undergone only a few slight corrections. Of the Engravings some are by Heath, others by Neele, and two or three by Skelton: but the greater part by Reeve, a young diligent artist, who in the course of this Work has made progressive improvement. The initials of the artists are engraved on the respective plates.

*Weymouth Street,*  
*Dec. 10, 1802.*

ERRATA IN VOL. I.

Page 14. No. 21. prelongus,	<i>read</i>	prælongus.
— 26. — 29. last,	—	tail.
— 28. — 39. unita,	—	unitæ.
— 31. — 42. falcata,	—	falcataæ.
— 46. — 58. filiformis,	—	filiformibus.
— 55. — 70. Oblonga ovato	—	Oblongo-ovato.
— 70. — 88. narrow edging	—	narrow <i>yellow</i> edging.

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No figures accompany the descriptions of the following numbers in this volume :

No.  
XVII.  
XXXIII.  
XXXIV.  
XXXVI.  
LV.

# INDIAN FISHES.

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## AMPHIBIA NANTES.

### RAJA.

#### GENERIC CHARACTER.

*Spiracula v. subtus ad collum. Corpus depressum; os sub capite.* || Five spiracles on each side, on the under part of the neck; the body flat; the mouth underneath.

#### No. I.

*RAJA ocellata, corpore glabro; oculis minimis, foraminibus pone oculos lunatis; dorso dipterygio; cauda brevi pinnata.*

The ocellated RAY, with a smooth body; very small eyes, the apertures behind them lunated; two fins on the back; a short pinnated tail.

Called by the Natives TEMEREE.

THE form of this fish is that of a flattened orb; to which the expanded pectoral, or lateral fins, form a broad appendage. The flat head is hardly to be distinguished from the body. The small oval eyes, with the lunated aperture behind them, are about two inches and a half behind the edge of the rounded rostrum. Beneath, or on the other side, (as in all this genus,) are placed the mouth and nostrils; the former, about two inches from the rostrum, transverse, and furnished with numerous granular teeth; the latter large, open, and advanced half an inch before the mouth. On each side, behind the mouth, are five branchial spiracula.

The sides extending circularly, form the pectoral, or lateral fins. The ventral fins on each side of the anus, with the broad tail, which is at its rise, give the appearance of an apron-like appendage to the body. The two fins on the ridge of the tail, (or dorsal fins,) are oblong, and obtuse. The tail, from the first dorsal fin, is short, broad, compressed, but diminishes and grows rounder, as it approaches to the caudal fin, which is broad, oblique, blunt, and on the lower edge slightly fringed.

The colour of the upper part, a dusky brown, spotted with equal, round, or oval, black spots; the under part of the body white.

The length, from the rostrum to the beginning of the tail, ten inches; the tail, to the tip of the fin, nine inches.

## No. II.

RAJA *ocellata*, corpore rotundo-ovato, lævi; foraminibus pone oculos oblongis; dorso dipterygio, cauda inermi, pinnata.

The ocellated RAY, with a smooth, round-ovate body; oblong apertures behind the eyes; two dorsal fins; the tail without spine, pinnated.

Called by the Natives NALLA TEMEREE.

THE *head* hardly distinguishable from the flat orbicular body, which assumes somewhat of an oval form towards the rostrum. The eyes and the apertures behind them, two inches from the point of the rostrum. The mouth, nostrils, branchial spiracula, and lateral fin, as described in the preceding fish. The ventral fins, situated as usual, at the beginning of the tail, obtusely triangular, and also fringed on the under side. There are two dorsal fins, that is, two fins on the upper side of the tail; the first, rising opposite to the end of the ventral fins, the second, half an inch lower; both are oblong and round-pointed. The tail is at first broad, a little compressed, but soon becomes narrower and rounder, terminating in a broad, oblique, round-pointed fin.

The *colour* above, white, spotted universally with round black spots: a remarkable triangular mark, an inch behind the eyes, and a smaller, at half the distance, in front. The belly white.

The *length*, from the rostrum to the tail, seven inches. The length of the tail to the point of the fin, eight inches.

## No. III.

RAJA *capite vix convexo*, dorso tuberculis minutis; cauda ter quam corpus longiore, spina, non serrata, armata, subtus pinnata.

The RAYA with a head hardly convex; very small tubercles on the back; a tail three times longer than the body, pinnated beneath, and armed with a spine not serrated.

Called by the Natives WOLGA TENKEE.

THE *body* of a rhomboidal form; the rostrum slightly pointed. The eyes large, oval, protuberant, two inches distant from the rostrum; the foramina or apertures, wide, cordate. The jaws rough like a file, and seem to possess a freedom of motion unusual in this genus.

The *back* is roughened by minute, whitish tubercles, and in the middle, two whiter than the rest, exactly round, but of unequal size, are remarkable for their resemblance to fine pearls.

The ventral fins small, roundish. No dorsal fin. The tail, at the rise, flattish, thick, compressed, but gradually becomes roundish, and tapering more sensibly from the dorsal spine, is hardly thicker than a hair, at the point.

The dorsal spine two inches and a half in length, not serrated, rises at the distance of ten inches from the ventral fin, and on the opposite part, half an inch higher than the root of the spine, a fin narrow at each extremity, but broad in the middle, runs along nine inches of the lower part of the tail.

The *colour* above, of the head and body, a dull-leadен; the parts on the other side of the belly, a dusky-white. The tail a dark-blue.

The *length*, from the rostrum to the beginning of the tail, about nine inches and a half; of the tail two feet four inches.



## No. IV.

RAJA corpore ob-ovato; rostro parum exerto, acuto; tuberculis parvis inter oculos, congerie campaniforma; spinis duabus in cauda apterygia.

The RAJA with an ob-ovate body; the rostrum sharp, and somewhat projecting; a bell-form cluster of small tubercles between the eyes, and two spines on a finless tail.

Called by the Natives ISACURRAH TENKEE.

THE body broad, ob-ovate, the rostrum channelled, roughish. The eyes large, oval, protuberant, looking sidewise; the foramina pear-shaped. Head and back a little convex; the belly, and all below, flat. The tubercles between the eyes, are disposed in the form of a bell; others in the middle of the back, form a pyramid, from the base of which a long tapering train runs down to the first dorsal spine. The ventral fins are small and rounded; at the beginning of the tail there is a short soft appendage on each side. The two dorsal spines were an inch and a half long, but neither of them serrated.

The colour, in this young subject, was whitish on both sides, but whitest on the under side.

The length, from the rostrum to the tail, seven inches; the tail six.

## No. V.

RAJA corpore glabro; rostro brevi, acuminato; foraminibus ovalibus pone oculos; cauda apterygia; spina dorsali laevi.

The RAJA with a smooth body; a short, pointed rostrum; oval apertures behind the eyes; the tail without fin; the dorsal spine smooth.

Called by the Natives TENKEE SHINDRAKI.

THE body of the same shape with that of the fish last described. The head rather more convex, but the vertex depressed; the rostrum channelled. The eyes large, oval, turned towards the sides; the foramina oval, not large; behind the foramina are five transverse, curved lines, studded with minute tubercles of the same light colour with the rest of the skin, and correspondent with the branchial spiracula on the under side.

The ventral fins are small, as in the former fish, but there is no appendage at the top of the tail. The dorsal spine is proportionally long, but not serrated.

The colour the same with that of the preceding fish.

The length, from the top of the rostrum to the tail, is four inches and a half; the tail four inches.

## No. VI.

RAJA corpore transverso-ovale, glabro; rostro brevi, parum acuminato; pinna pectorali ultra extensa; cauda brevior, fasciata, inerme, apterygia.

The RAJA with a transverse-oval, smooth body; a short, somewhat-pointed rostrum; the pectoral fin widely extended; a very short tail, without spine and fin, and variegated black and white.

Called by the Natives TENKEE KUNSUL.

THE head flat, not distinguishable from the body, which is scarcely convex; the rostrum short, grooved, with a very small sharp point. The eyes small, near the rostrum; the foramina harp-form. The mouth and nostrils below, near the rostrum, and the spiracula behind, as usual.

The lateral fins extend to a blunt, fringed point, being internally (in respect to the body) lunated; the ventral fins short. The tail small, tapers to a hair-like point, and is marked with cross bands, alternately black and white, resembling the quill of a porcupine.

The colour of the head and back a dark-gray; the belly white.

The length, from the rostrum to the tail, six inches and a half. The tail four inches; the breadth, from the tip of one lateral fin, to the tip of the other, one foot.

## No. VII.

RAJA corpore fasciis latis cæruleis, pinna dorsali ad initium caudæ; cauda longissima, gracili, inermi, apterygia.

The RAJA with broad, cærulean cross bands, on the back; a short fin on the upper part of the tail, or back; the tail very long, slender, without spine and fin.

Called by the Natives MOOKARAH TENKEE.

THE head, which in many species of the Raja, can hardly be distinguished from the body, is here, not only considerably raised or convex, but from the eyes, projects forward beyond the body. It is depressed on the crown, and flattened on the sides; the rostrum rounded. The eyes large, oval, protuberant; the foramina behind oblong. The nostrils and mouth beneath; the mouth not large; the teeth granulous.

The lateral extended fins, slanting to a sharp point from the cheeks, and the posterior edges, being slightly falcate, give exactly the appearance of wings expanded. The ventral fins, close to the anus, are rounded. The dorsal fin, at the origin of the tail, is small, and square-form. The tail very long, without spines, and at the point as small as a hair.

The colour of the head and body, a dark-gray, with six broad, transverse, blue bands, of different shades: the tail is of a dark-gray, with a mixture of brown.

The length, from the rostrum to the beginning of the tail, six inches; the tail, one foot six inches and a half.

No. VIII.

RAJA ocellata; capite magno, exerto; rostro breve, sub-trigono; corpore glabro, lateribus (ut in R. Aquila) in angulum acutum desinentibus; pinna dorsi unica; cauda longissima, apterygia, spina munita.

The ocellated RAJA, with a large projecting head, and short, sub-trigonal snout; the body smooth, and the sides expanding, as in the R. Aquila, end in a sharp angular point: one dorsal fin; the tail extremely long, without fin, but armed with a spine.

Called by the Natives EEL TENKEE.

THE body of this large Raja is exactly of the form of the Raja Aquila; but the head is flatter, projects more from the body, and, together with the rostrum, is somewhat trigonal: the rostrum short, soft, turning up a little at the point. The eyes large and protuberant, the pupil with a lateral direction; the foramina of a horn-form, with the crooked ends downwards. The mouth and nostrils below. The jaws dissimilar: the lower arched, narrow, and projecting beyond the wider immovable upper jaw; the edges of both are smooth, without teeth.

The wings, or lateral fins, on the posterior edge are fringed. The orbicular ventral fins, and the small dorsal fin, are also fringed. The solitary spine is at the top of the tail, immediately below the dorsal fin.

The tail, is of great length, tapering to a very fine point, and of a darker colour than the body. The colour, of the head and body, a dark ash; the latter spotted with numerous small, round, white spots, edged with black; the belly white.

	Feet.	Inches.
The length, from the rostrum to the tail, - - -	0	10
of the tail - - - - -	5	2
from tip to tip, of the wings - - -	2	10
distance of the eyes - - - - -	0	5½

No. IX.

RAJA capite lato, depresso, rostro lunato, inter duos processus cartilagosos, ab capitis lateribus (velut aures) exertos; corpore glabro, alato; dorso monopterygio; cauda brevissima, gracile, inermi.

The RAJA with a broad, depressed head; a lunated rostrum, between two cartilaginous processes projecting from the sides of the head, in the manner of long ears; the body smooth, winged; a single dorsal fin; the tail most remarkably short, slender, without spine.

Called by the Natives EREGOODOO TENKEE.

THE sides, extended in the form of wings, resemble the Raja Aquila, but the head and other parts are widely different.

The back is more convex, while the head can hardly be distinguished from the back. It is broad, flat, scarcely convex, and terminates in a thin, broad, lunated rostrum, between two singular processes, which, rising from the side of the head, project about two inches beyond the crescent of the rostrum. These,

when stretched out, are flat, oblong, lanceolate, consisting of a white cartilaginous substance, striated like the lateral fin, and on the inside checkered black and white; exteriorly, they are of the same colour with the back. When half curled up, they bear a resemblance to two ears; but, when more closely contracted, to two horns.

The eyes lateral, near the base of the above processes, round, flat, proportionally not large; the pupil perpendicular, oblong-oval, narrow. The usual foramina behind the eyes, are here wanting.

The nostrils beneath, gaping, a little more advanced than the eyes. The mouth three-fourths of an inch behind, more than three inches long, straight, linear, with a narrow stripe of granular teeth, in each jaw.

Two oblong, rounded, ventral fins; a triangular dorsal fin situated high at the beginning of the tail; the tail remarkably short, slender, and without either spine or fin.

The *colour* of the back, an uniform dark-brown, the belly whitish.

	Feet.	Inches.
The <i>length</i> , from the rostrum to the dorsal fin - - -	1	1
from tip to tip of the lateral fins - - -	4	5
length of the tail - - - - -		8
distance between the eyes - - - - -		5

#### REMARKS.

The specimen now described was brought to me in the month of February, 1788. I never saw another. The fishermen asserted that it was very rarely met with, which they are very apt to say, by way of enhancing the value of what they bring. In the present instance, however, I have reason for thinking they spoke the truth.

I have since my return to England, received a drawing from St. Helena, of a fish caught there which appears to be exactly the same species, only much larger in size. It was sent to me by Mr. Brooke, the Governor. In order to show the mouth, and under parts of the fish, I had Mr. Brooke's drawing reduced, and have given an engraving of it.

The only account I have met with, of this singular fish, is in the Third Volume of Duhamel. *Traité general des Pesches*, Sect. ix. p. 293. Pl. XVII.

#### No. X.

*RAJA corpore oblongo; rostro productione; aculeis reflexis ordinatim in medio dorso macula, nigra aliis albis circumdata, prope pinnae pectorales; cauda pinnata, inermi.*

The RAJA with an oblong body, the rostrum elongated and pointed; a series of reflex prickles on the middle of the back, and a black spot, surrounded by three or four white spots, near each pectoral fin; the tail pinnated, unarmed.

Called by the Natives WALAWAH TENKEE.

THE *body* oblong, roundish, the lateral fin on each side slanting towards the tail, angular, not rounded, the posterior angle and interior edge distinctly separate from the body, and distant from the ventral fin.

The *head* broad, very little convex; the rostrum very long, trigonal, channelled, pointed. The eyes small, oval, in deep orbits, the anterior edge of which is set with small prickles; the foramina behind, oval, with a small dent. The mouth and nostrils beneath; the teeth granulous.

The *trunk*. A regular line of prickles, runs along the ridge of the back, and others, on each side, are disposed in opposite pairs; behind which, are three round white spots, at equal distances, on each side of the prickly line. On each lateral fin, is a larger oval, black spot in the middle of three or four white spots, like those on the back.

The *fins*. The two distinct ventral fins are rather distant from the lateral, and of the same triangular form; The first dorsal is nearly opposite to the ventral, the second two inches lower down: both are falcate, at the anterior as well as posterior edge, but the posterior point is obtuse. The tail becomes rounder below the first dorsal, and tapers rapidly to the caudal fin, which is long, broad, and obliquely falcate.

The *colour* of the fish a light brown. The skin, when stroked upwards, has a harsh rough feel, but a soft, velvet-like feel, when stroked downwards.

The <i>length</i> , from the point of the rostrum to the dorsal fin	- - -	Inches.	$8\frac{1}{2}$
from the dorsal fin to the point of the tail	- - - - -		9
from the orbit to the point of the rostrum	- - - - -		$4\frac{1}{4}$

REMARKS.

This fish, in some respects, resembles the Raja rhinobatos, but is widely different in others. The spots on the lateral fins, and on the back, render it remarkable.

No. XI.

RAJA corpore oblongo; rostro productiore, acuto, aculeis reflexis duplice serie exasperato, tuberculis spinosis, ordine unica in medio dorsi dipterygii; cauda pinnata.

The RAJA with an oblong body; an elongated, pointed rostrum, armed with a double row of reflex prickles; a single row of spinous tubercles along the middle of the back, and between the two dorsal fins; the tail pinnated.

Called by the Natives SUTTIWARAH.

THE *body* oblong, depressed.

The *head* broad, and flat, but raised sufficiently from the surface to be distinguished from the body, and lines corresponding to the spiracula, are visible behind. The rostrum long, trigonal, pointed, with two diverging rows of prickles in the middle, extending from near the edge of the foramina; similar prickles are thick set between the eyes, and on the sides. The eyes and foramina, the mouth, teeth, and nostrils, as described in the last subject. The *trunk*. A row of spinous tubercles, on the middle of the back, are continued as far as the second dorsal fin: small prickles and smooth tubercles being interspersed.

The *fins*. The lateral fin, rising higher than the eyes, at first bends gently in, but soon bellying outwards, forms a lobe nearly semicircular on each side. The ventral are immediately behind, much smaller, but of the same shape, and form a second circular expansion. The two dorsal fins are on the middle of the tail, with two spinous tubercles between them; the caudal is oblique, and entire.

The *colour*, a light brown, the underside as usual, white.

The <i>length</i> , from the point of the rostrum to the tail	- - - - -	Inches.	8
of the tail	- - - - -		7
from the eyes to the point of the rostrum	- - -		$3\frac{1}{4}$

REMARKS.

The spinous tubercles on the back, somewhat resemble those on the Raja oxyrinchus.

## SQUALUS.

## GENERIC CHARACTER.

<i>Spiracula v. ad latera colli, corpus oblongum, teretiuseulum. Os in anteriore parte capitis.</i>		Five spiracles at the side of the neck; the body oblong, roundish; the mouth in the anterior (and under) part of the head.
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## No. XII.

*SQUALUS capite latissimo, transverso, malleiformi.*

The SQUALUS, with a very broad, transverse, hammer-like head.

*Squalus Zygena, Linn. S. N. p. 399.*

Called by the Natives, KOMA SORRA.

THE singular form of the balance, or hammer-headed shark, sufficiently distinguishes it, not only from others of the same genus, but from all other fish whatsoever. It has five spiracles on each side; the mouth is furnished with several rows of teeth; the eyes large, and the apertures behind them oblong; the anal and hinder dorsal fins small.

The subject drawn, measured twenty-two inches.

## REMARKS.

They are seldom found of a larger size at Vizagapatam; but are said, in other parts, to arrive to the size of four or five feet.

## No. XIII.

*SQUALUS rostro longo, ensiformi, osseo, plano, utrinque dentato, denticulis semisagittatis.*

The SQUALUS with a long, sword-form, bony, flat rostrum, denticulated on each side, the denticles half-barbed.

*Squalus Pristis, Linn. S. N. p. 241.*

Called by the Natives YAHLA.

THE teeth on each side of the long rostrum, are not exactly opposite to each other; all of them are bearded on the posterior side. The mouth beneath, and the five spiracula on each side, as in the rest of the genus. Teeth granular. The eyes large, oval, prominent. Nostrils oblique, near the base of the rostrum; the foramina behind the eyes, linear, slanting.

The back and sides convex, the breast and belly flat. The trunk from the first dorsal fin, diminishing rapidly, becomes rounder towards the tail. The anus is situated between the ventral fins, and partly covered by a membrane.

The situation and shape of the fins, as expressed in the figure; the inferior lobe of the caudal fin somewhat falcate.

The upper part of the head, back, and sides, dusky; the belly and parts below whitish.

	Inches.	Lines.
<i>Length</i> , from the root of the rostrum to the caudal fin - - - - -	14	6
to the first dorsal fin - - - - -	7	6
from the first to the second dorsal fin - - - - -	2	8
of the rostrum - - - - -	7	6
of the caudal fin - - - - -	2	8
distance between the eyes - - - - -	1	0

REMARKS.

This and the *Zygæna* are rather rare at Vizagapatam, and are seldom brought larger than twenty inches, or two feet, in length. I never happened to meet with either at sea.

No. XIV.

*SQUALUS corpore sub-rotundo; foraminibus ad oculos nullis; dentibus acutis.*

The SQUALUS with a roundish body; no apertures behind the eyes; the teeth sharp.

Called by the Natives PALA SORRA.

THE *head* oblong, depressed; rostrum obtuse, thin, pellucid. The mouth, about an inch and a half from the point of the nose, set with teeth in several rows.

The *fins*. The pectoral or lateral fins, close to the posterior spiracula; the first dorsal rises half an inch farther back, and the second (which was very small) two inches from the first; the anal, a little before the second dorsal; the slanting extremity of the caudal fin emarginate.

The *colour*, of the upper parts, darkish; of the belly, a dull white. The skin appears to be smooth, but feels rough when stroked upwards.

The subject measured eight inches, from the point of the rostrum to the tail; the caudal fin three inches.

No. XV.

*SQUALUS foraminibus nullis ad oculos; naribus remotioribus; pinna caudali obliqua, integra.*

The SQUALUS with no apertures behind the eyes; the nostrils distant; the oblique caudal fin entire.

Called by the Natives SORRA KOWAH.

THIS differs chiefly from the last in the distance of the nostrils from the eyes; and the size and shape of the caudal fin. In the want of the foramina, in the mouth, teeth, the disposition of the fins, and roughness of the skin, they agree. There is no visible lateral line.

The *colour*, is a little lighter than the former.

	Inches.	Lines.
The <i>length</i> to the tail - - - - -	9	0
of the caudal fin - - - - -	3	6

## No. XVI.

*SQUALUS cirro ad nares ; corpore fasciato ; pinna ani nulla ; cauda quam corpus longiore.*

The SQUALUS with a cirrus at each nostril ; the body variegated by cross bands ; no anal fin ; the tail longer than the body.

Called by the Natives BOKEE SORRA.

THE *head* nearly as broad as the body, compressed, convex above, flat beneath ; the crown a little depressed, rostrum soft, not transparent. The mouth, (as in the genus) beneath, three-fourths of an inch from the point of the rostrum ; the nostrils close to the mouth, wide, with a short cirrus pendent from the interior edge of each ; the eyes oval, pupil linear, transverse : behind each, there is a lunated aperture. The fifth spiraculum is covered by a membrane from the fourth, in a manner to be easily overlooked.

The *trunk* short, oblong, tapering from the pectoral fin ; the sides a little compressed, but becoming round at the dorsal fin, and tapering gently, it terminates in the long, flat tail. The skin rough.

The *fins*. The pectoral large, nearly orbicular, extending as high as the second spiraculum ; the roundish ventral fins rise about an inch and a half behind them ; the first dorsal rises nearly two inches from the left spiraculum, and the second about two and a fourth from the caudal ; the spinal portion of the caudal fin, thin, and narrow, uniting with the acuminate, angular, terminal portion ; the lower portion is seemingly divided into two lobes, of which the posterior is the longest and broadest.

The *colour* above, a dusky brown, intersected, from the root of the rostrum to the point of the tail, by twelve or thirteen broad fasciæ of a brighter brown. The belly a dusky white.

The *length*, from the nose, to the point of the tail, thirteen inches.

## No. XVII.

*SQUALUS cirro ad nares ; corpore non fasciato ; pinna anali nulla ; cauda quam corpus longiore.*

The SQUALUS with a cirrus at each nostril ; no anal fin ; the tail longer than the body ; no fasciæ on the body or tail.

Called by the Natives RA SORRA.

THIS in its form and all the other characters agreeing with the species last described, was not drawn : the only difference was in the *colour*, which was a darkish gray, without any fasciæ ; the belly whitish.

The *length*, nineteen inches.



## No. XVIII.

*SQUALUS corpore sub-rotundo, brevi, vario; pinna anali; pinna caudæ longissima, apice rotundata, emarginata.*

The variegated SQUALUS, with a short, roundish, body; an anal fin; the caudal fin extremely long, rounded, and emarginated at the point.

Called by the Natives POOLLEE MAKUM.

THE *body* oblong, short, somewhat depressed, till near the dorsal fin, where it becomes rounder, without diminishing much in thickness, and terminates in a long flattish tail. The skin when stroked downwards, feels like velvet, but harsh when stroked in a different direction.

The *head* broader than the body, depressed above, flat beneath, sides convex. Mouth small, less than an inch distant from the edge of the rostrum; lips thickish. The jaws rough like a file.

Eyes very small, oval; the foramina behind them, also small, kidney-shape. Nostrils close on the edge of the rostrum, wide, gaping, with a small cirrus from the posterior, interior, edge.

The spiracula high, in respect to the pectoral fins, the fourth, on each side, is divided in the middle.

The *fins*. The pectoral large, oblong-ovate; the first dorsal opposite to the ventral, the second opposite to the anal; both are oblong and obtuse; the small ventrals are about an inch behind the pectoral, and about the same distance from the anal, the point of which nearly touches the inferior portion of the caudal fin: both ventral and anal are in shape similar to the dorsal fins. The caudal is very long, the spinal or upper portion thin, narrow, the point rounded, and emarginate; the ventral portion thicker and broader, notched four inches from its rise near the anal fin, and a second time near the point.

The *colour* of the upper part of the head and back almost black; that of the tail a dusky brown; both remarkably variegated, with whitish fasciæ, marks, and spots, which look at first sight like an Egyptian inscription. They were seldom found to vary in shape, and, being accurately copied from life, are exactly represented in the figure: as they approach the tail, they grow fainter. The under parts of the fish are of a yellowish white.

The *length*, from the rostrum to the end of the tail, thirteen inches.

## REMARKS.

The three last-described species seldom appear at Vizagapatam, and were never found larger than above mentioned.

The present species is the 19th in Gmelin's edition of Linnæus, and named Tigrinus; by Bloch it is named Fasciata.

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## LOPHIUS.

## GENERIC CHARACTER.

<i>Spiracula solitaria pone brachia; dentes plurimi minuti; pinnae pectorales brachiis insidentes; branchiae tres tantum.</i>		Solitary spiracles behind the arms; numerous small teeth; the pectoral fins seated on the arms; the branchiae three only.
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## No. XIX.

LOPHIUS, *processu erecto, setaceo, apice clavata, mobile, ab labio superiore; corpore alepidoto, cute tenui, laxa, tecto; pinnis pectoralibus in brachiis longis.*

LOPHIUS, with an erect, setaceous, moveable process, clubbed at the point, rising from the upper lip; the pectoral fins on long arms.

Called by the Natives KAPPA MURA MOIA.

*Lophius Histrio* Linn. *S. N.* p. 402.

*D.* 1. 1. 12. *P.* 10. *V.* 5. *A.* 7. *C.* 10.

THE shape of this singular animal will be better collected from the figure, than from a description. The mouth large, oblique; the upper jaw longer than the under, both have a double row of close-set, small teeth; the tongue hard, obtuse. From the middle of the upper lip arises an erect cirrus, half an inch in length, with an oblong, pappy, club head, streaked (like a porcupine quill) alternately dusky and white; from the rostrum, a little behind this, arises a small rough, somewhat-curve, cartilaginous process, growing thicker gradually towards the end, which is set with short hairs; and a second of the same kind, but a little longer and more curved, lies reclined upon the ascending ridge of the back; between these, and immediately above the eye, is a deep depression of the crown. The eyes are remarkably small, and of a beautiful emerald colour.

The dorsal fin consists of twelve rays, rendered less distinct by the rough skin, which is without scales, and every where hangs very loose. The ventral fins are very small, but like the others adipose at the roots. The ten rays of the pectoral fin at the end of the arm, resemble fingers. The caudal fin is round. The solitary branchial spiracula are behind the arms.

The *colour* a yellowish white variegated with black streaks, the fins also are streaked, or spotted. The belly reddish.

The *length*, three inches and a half.

## REMARKS.

What I have described as a process, I find is reckoned by Gronovius, the first dorsal fin.

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## BALISTES.

## GENERIC CHARACTER.

*Caput compressum; dentes utriusque 8; horum anteriores 2 longiores; utrinque 3 interiores intra totidem laterales, adpressi; apertura supra pinnas pectorales. Corpus compressum, squamis corio coadunatis. Abdomen carinatum.*

The head compressed; eight teeth in each jaw, of which two in front are longest, the three interior, on both sides, rest between an equal number of lateral teeth; the branchial aperture above the pectoral fins. The body compressed, the belly carinated; the scales fixed on a coriaceous skin.

## No. XX.

*BALISTES pinna dorsali anteriore triradiata, radio primo osseo, breve, crasso, aspero, retuso, antice serrato; pinna caudali integra, sub-flexuosa.*

The BALISTES with a three-rayed anterior fin, of which the first ray is a short, rough, thick bone, with a ragged point, and serrated on the fore part; the tail undivided, somewhat flexuous.

Called by the Natives RAHTEE YELLAKAH.

*D.*  $\frac{3}{3}$ . 30. *P.* 15. *V.*  $\frac{14}{14}$ . *A.* 28. *C.* 14.

THE *body* very compressed, thin, broad, and short; the skin rough, reticulated, with a few contiguous square scales, on the rostrum. The head, at first, of equal breadth with the body, and not less compressed on the sides, declines in an oblique line from the dorsal fin to the mouth, from which, in another oblique line, but rather shorter, it declines to the ventral fin. The mouth is situated at the point of the triangle, very small, the lips thickish; the two fore teeth in each jaw remarkably long. The eyes near the vertex, distant from the rostrum. No visible nostrils.

The back slanting from the first dorsal fin to the tail, with the opposite ascending line from the ventral fin, compose a triangle somewhat longer than that of the head. The tail, at the termination of the dorsal fin, is much contracted, but expands somewhat towards the fin. There is no lateral line. The anus remarkably long.

The *fins*. The first spine of the dorsal is thick, strong, serrated, with a rough point, as if broken; the other two rays are small and short, but sharp pointed; the second dorsal is situated three fourths of an inch behind on the declivity of the back; the short roundish pectoral is placed nearly in the middle between the eye and ventral fin; the first spine of the ventral exactly resembles that of the first dorsal; the white points of the others just appear above the edge of the connecting black membrane; the anal is opposite to the second dorsal; the caudal is undivided, rounded somewhat in the middle, and situated on each side.

The *colour* of the body darkish; the second dorsal, anal, and caudal fins, bluish; the membranes feel to the touch like thin leather.

	Inches.	Lines.
The <i>length</i> , from the rostrum to the end of the caudal fin - - -	8	0
greatest breadth - - - - -	3	8
from the eye to the point of the rostrum - - - -	2	8

### No. XXI.

*BALISTES spinis binis verrucosis loco pinnarum ventralium; pinna prima dorsi macula atra, radiis spinosis 4-5, quorum anterior prelongus, verrucosus, serratus, sub-rectus, acutus, sub-retroflexus; pinna caudali profunde bifida.*

The *BALISTES* with two rugged spines in place of ventral fins; the anterior dorsal fin marked with a large black spot, and consists of four, or five, spinous rays, the first of which is very long, rugged, serrated, nearly straight, sharp, bending a little backwards; the tail deeply forked.

Called by the Natives BOWREE, or ABATOO.

*D.*  $\frac{5}{5}$ . 25. *P.* 14. *V.*  $\frac{2}{2}$ . *A.* 20. *C.* 16.

The *body* compressed, thin, very broad, between the first dorsal fin and ventral spines, narrowing gradually to the end of the second dorsal fin, where it tapers rapidly, and from flat becomes round. There are no scales but the skin is harsh and rough like shagreen.

The *head* nearly as broad as the body, much compressed; but, narrowing equally above and below from the vertex and the ventral spines, it forms a triangle ending obtusely in the short round rostrum, at the end of which the very small mouth is placed. The lips thickish; the jaws very short, equal, not extractile. The teeth close, a little bent and truncate, the two middle in each jaw the longest, and behind them are two tubercular teeth. The tongue cartilaginous, oblong, rounded, immoveable.

The eyes near the vertex, oval, in a deep socket, the iris golden and pearl colour; the nostrils double, a little before the eyes, small, oval, open, the posterior largest.

The linear branchial aperture is directly before the pectoral fin.

The *trunk*: the back rising in an arch from the vertex, is carinate, and crowned by the first dorsal fin; from the beginning of the second dorsal, it declines towards the tail. The belly is flattish, and armed with a strong bone, to which the ventral spines are connected. This is moveable with the spines, covered with the skin, and extends backward nearly to the anus. The lateral line is high, at first arched like the back, but afterwards straight, running along the middle of the tail.

The *fins*. The first dorsal is placed on the highest part of the back, consisting of one very strong spine, two inches and a half in length, straight, warty, serrated on both sides, and sharp-pointed; and of three (sometimes four) short spinous rays. The lower part of the front spine, and all the others with the connecting membrane, are black. The second dorsal is nearly one inch behind, on the declivity of the back, and terminates two inches from the tail; the pectoral in a line with the mouth, short, and rounded.

The two spines in the place of ventral fins are an inch shorter than that of the dorsal, but like it rough, and serrated; the anal rays gradually shortening, terminate on a line with the second dorsal; the caudal is deeply forked.

The *colour* of the back, when fresh from the water, is a dusky glittering yellow, but all below the line, that of burnished silver. The first dorsal fin is black and yellow, with a narrow white streak near the edge; the second dorsal and anal have a faint yellowish cast; the pectoral and caudal fins are yellow.

*Length* of the subject described.

	Inches.	Lines.
From the rostrum to the caudal fin - - - - -	9	5
the caudal fin - - - - -	2	2½
breadth from the dorsal to the ventral spines - -	3	5

REMARKS.

These fish are caught in vast numbers after the month of May, so as to injure the nets; and being thrown away by the fishermen as useless, are often left to putrify in numbers strewed on the beach.

It is the *Balistes Biaculeatus*, in Gmelin's edition of Linnæus; and described by Gronovius, Mus. Ichthyol: No. 115.

No. XXII.

*BALISTES pinna prima dorsali triradiata, radiis longis, spinosis, acutis, ultimo ab alteris remoto; radius primus pinnae ventralis, osseus, crassus, asper, reclusus; cauda lunata, varia.*

The *BALISTES* with the anterior dorsal fin of three long, spinous, sharp rays, of which the last is distant from the others; the first ray of the ventral fin, is a thick, rough bone, with a broken rugged point; the tail lunate and variegated.

Called by the natives LAMA YELLAKAH.

*D.* 3. 27. *P.* 14. *V.* 8. *A.* 25. *C.* 12.

The *body* oblong, broad, compressed, ventricose, narrowing towards the tail, which is small and round. The skin leathery, reticulate, rough.

The *head* nearly as broad as the body, compressed, obtuse; the vertex a little depressed, the front sub-carinate, declining to the mouth; the mouth on a line with the pectoral fin, small, the lips thick; the jaws not extractile, set regularly with teeth, those in the front long. The tongue thick, soft, obtuse, the point sheathed. The eyes very high, distant from the rostrum, large, orbicular. The nostrils double, on the edge of a groove a little before the eye; both small, but (what is unusual) the posterior nostril smallest.

The *trunk*. The back, from the beginning of the first to the second dorsal fin, straight, it then declines to the tail; the sides compressed; the abdomen prominent. The lateral line imperceptible, except a little on the tail, where it appears straight and carinate. The anus is nearer the tail than the head.

The *fins*. The three rays of the first dorsal fin are rough, long, and sharp, reclining when not erect, into a deep groove: the posterior ray is at a considerable distance from the other two; the second dorsal is situated on the declivity of the back, exactly opposite to the anal, both being of the same length; the short, roundish, pectoral fin, is situated immediately behind the branchial aperture; the ventral two inches further back, its first ray, a strong, rough, short bone; the anal rises very near it, and is continued to the tail; the caudal is lunate.

The *colour* of the head and trunk dusky, sprinkled below the pectoral fin with small, oval, light yellow

spots; the second dorsal and anal fins are striped with yellow, whitish, and dusky lines; the caudal fin is remarkably variegated with the same colours disposed in various shapes.

	Feet.	Inches.	Lines.
The <i>length</i> from the rostrum to the middle edge of the caudal fin - - -	1	3	0
greatest breadth - - - - -	0	5	6
distance of the eye from the rostrum - - - - -	0	2	4
dorsal spine - - - - -	0	1	5

## No. XXIII.

BALISTES, *pinna dorsali anteriore triradiata, radiis spinosis robustis, ex æquo distantibus; cauda lunata, non maculata nec fasciata.*

The BALISTES with the first dorsal fin, consisting of three spinous rays at equal distances, the tail lunated, without bands or spots.

Called by the Natives SOMDRUM YELLAKAH.

*D.*  $\frac{3}{3}$ . 28. *P.* 15. *V.*  $\frac{1}{8}$ . *A.* 25. *C.* 12.

THIS fish agreeing in its general form, the disposition and number of its fins, as well as in most other respects, with the one last described, it will be sufficient to mention the most material circumstances in which they differ.

The *head* towards the point is more ovate, and the mouth higher, the eyes oval, the posterior nostril much larger than the anterior; the last of the three rays of the first dorsal fin is not distant from the other; the pectoral fin is more central. The second dorsal fin only is streaked, as in the former, the anal and caudal being without streaks.

The *colour* here is not dusky but greyish; and the spots which in the former, were below the pectoral fin, are here above it, and of a fainter yellow. The narrow stripes, on the second dorsal, are yellow and white, like those on the anterior fin.

	Feet.	Inches.	Lines.
The <i>length</i> from the rostrum to the middle of the caudal fin - -	1	0	0
greatest breadth - - - - -	0	4	6
distance of the eyes from the rostrum - - - - -	0	2	4
length of the first dorsal fin - - - - -	0	2	6

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TETRAODON.

GENERIC CHARACTER.

*Maxillæ osseæ, porrectæ, apice bipartitæ.*  
*Apertura linearis. Corpus subtilis murica-*  
*tum. Pinnae ventrales nullæ.*

Bony, projecting maxillæ, divided at the apex. The branchial aperture linear; the under part of the body rough with prickles; no ventral fins.

No. XXIV.

TETRAODON, *corpore oblongo, compresso, ocellato; ore exerto; abdomine ventricoso muricato; cauda integra.*

The spotted TETRAODON, with an oblong, compressed body; the mouth pouting; a prominent, murexed belly; and an undivided tail.

Called by the Natives KAPPA.

*D. 10. P. 17. V. 0. A. 8. C. 11.*

THE *head* short, compressed, the front thick, prominent; the mouth small; the maxillæ projecting, are divided in the middle and, as in this genus, form the teeth, two above and two below. The eyes are close to the vertex, in a deep rough socket, large, oval. The nostrils double, roundish, in the middle between the eye and the rostrum. The solitary branchial aperture close to the pectoral fin, small, and a little curve.

The *trunk*: the back from the vertex, almost straight to near the dorsal fin, when it declines gently; it, as well as the sides, feels rough to the touch, but the belly is set with visible spiculi. There is no lateral line. The anus remote, or very distant from the head.

The *fins*: the dorsal and anal are opposite to each other, near the tail; the pectoral fins are on a line with the mouth, fan-form when extended; the caudal undivided, oblong-square. The ventral fin (as in this genus) wanting.

The *colour*: the back and sides are of a dark colour, spotted with pale bluish dots on the shoulder, but with oval spots behind the pectoral fin; the belly a bright yellow.

The *length*, from the rostrum to the end of the tail, four inches, three lines.





REMARKS.

There was no appearance of the right eye ever having existed; but from the faint trace of an orbit, the defect was most probably a *lusus naturæ*. I never met with a second subject.

No. XXVII.

TETRAODON *varius*, corpore oblongo, subtereti, maculis rotundis, toto muricato; pinnis orbiculatis. The variegated TETRAODON, with an oblong, roundish, spotted, murexed body; the fins orbicular.

Called by the natives BONDAROO KAPPA.

*D.* 10. *P.* 18. *V.* 0. *A.* 10. *C.* 10.

THE *body* oblong roundish, compressed a little on the sides, every where armed with small prickles.

The *head*, thick, short, roundish; and the rostrum obtuse. The mouth higher than the pectoral fin; the lips thick, but readily expose the bony maxillæ. The eyes low, or further from the vertex than usual in this genus, small, orbicular. No nostrils were found; but, about an inch from each orbit towards the rostrum, were two soft, oval, papillæ of unequal size, joined together, without any visible aperture.

The *trunk*. From the vertex to the dorsal fin the back is slightly convex: from that fin to the tail, it declines obliquely and rapidly; the sides are full, or convex; the breast and belly round and prominent, swelling, when inflated, to a monstrous size. There is no lateral line. The anus nearer the tail than the head.

The *fins*. The dorsal is distant from the head, but the anal is still more remote; the pectoral low, or near the abdomen; the caudal is the largest: all the fins are nearly orbicular.

The *colour*. The upper part of the trunk very dark, or blackish, variegated with numerous round, light brown spots. The colour of the head is nearly that of the spots, variegated with lighter streaks. The spots on the caudal fin are like those of the back, on the other four fins they have a purple cast.

The *length* of the subject, from the rostrum to the point of the caudal fin - 

Fect.	Inches.	Lines.
1	3	6

No. XXVIII.

TETRAODON *varius*, maculis ovalibus, corpore oblongo-rotundo; ventricoso, toto muricato; cauda oblonga, rotundata.

The variegated TETRAODON, with oval spots; the body oblong-rounded, universally murexed; the belly prominent; the tail oblong, rounded,

Called by the Natives CALAMARAH KAPPA.

*D.* 10. *P.* 18. *V.* 0. *A.* 11. *C.* 10.

THE *body* agrees nearly in form with the fish last described, but the belly being inflated, gives it still a more monstrous appearance; the skin is rather less hispid.

The *head* is longer, more compressed, but equally obtuse. The eyes are placed further back, near the vertex, large, and more prominent. There are no papillæ in front, and no visible nostrils.

The *trunk*. The back rises a little in a straight line to the dorsal fin, and then slopes, that fin being situated on the beginning of the declivity. The sides are convex; the abdomen, in the state it is drawn, enormous.

The *fins*. The situation of the fins the same as in the last fish. The pectoral are large and truncate, the other three oblong, rounded.

The *colour*: the head and trunk cineritious, spotted with oval, black, spots; the breast and abdomen white, with a faint yellowish tint. The fins (the pectoral excepted) spotted like the body: part of the tail is of a dusky red colour.

*Length* of the subject described, nineteen inches.

#### REMARKS.

The drawings of the two last fish have been reduced, but the proportions strictly preserved.

#### No. XXIX.

TETRAODON, *corpore oblongo, glabro, dorso et abdomine exceptis; linea laterali insigniter infracta; cauda sub-lunata.*

The TETRAODON with an oblong, smooth body, the back and belly excepted; the lateral line remarkably infracted; the last sublunate.

Called by the Natives KAPPA KOORAWAH.

*D.* 13. *P.* 15. *V.* 0. *A.* 10. *C.* 11.

The *body* oblong, and somewhat wedge-form, the back and breast a little rough, the rest smooth.

The *head* large, as broad as the body, depressed above, on the sides compressed, the front declining in an oblique line to the obtuse rostrum. The mouth terminal, but lower than the middle; the lips flaccid. The jaws extractile, the upper longer than the lower; teeth as usual in this genus. The tongue thick, obtuse, smooth, sheathed. The eyes large, roundish, high, covered by the skin of the head. The nostrils in the middle, between the orbit and rostrum, double, or, if single, divided by a valve.

The *trunk*: the back roundish, straight, somewhat rough before the dorsal fin; the tail small and round, the sides a little compressed and smooth; the belly prickly, prominent, and capable of great distention. The lateral line, singularly broken and irregular, is exactly represented in the figure. The anus behind the middle of the body.

The *fins*: the dorsal and anal are nearly opposite, the former a little broader, but both lanceolate; the pectoral larger, obliquely truncate; the caudal somewhat lunate.

The *colour* of the back and front dark; the sides a faint greenish-yellow, which brightens towards the breast and belly; the belly a stone white. The fins have a yellowish colour, the lower part of the anal and caudal excepted, which are whitish.

*Length* of the subject, 10 inches.

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## SYNGNATHUS.

## GENERIC CHARACTER.

*Caput oblongum, cathoplateum: maxillæ lateribus clausæ, et os in extremitate rostri tantummodo apertum. Corpus longum, et admodum gracile; ambitu plerumque angulato, interdum subrotundo: jam tetrapterygium, jam monopterygium. Pinnae ventrales nullæ.*

The head oblong, and compressed; the maxillæ are closed together at the sides, and the mouth has only a small opening at the extremity of the rostrum. The body is long, and very slender; for the most part angular, sometimes roundish; in some species there are four fins, in others one only. No ventral fins.

## No. XXX.

*SYNGNATHUS corpore medio hexagono; pinna ani carens; cauda pinnata.*

The SYNGNATHUS with the middle of the body hexagonal; no anal fin; the tail pinnated.

Called by the Natives GOORAHPOO SUBBOOKOO.

*Syngnathus Typhle* Linn. *S. N.* p. 416.

*D.* 30. *P.* 11. *V.* 0. *A.* 0. *G.* 8.

THE length of the subject nine inches; the laminæ of the trunk twenty in number, of the tail forty-one.

The appearance of the Syngnathus, with its slender and crusted body, is more that of an insect than a fish. The mouth is extremely small, and covered by the under jaw, which turning up at the point, and being longer than the upper, closes the mouth as with a lid. The dorsal fin consists of equal rays, the pectoral rounded; the tail undivided, the rays distinct and sharpish.

## PISCES APODES.

FISHES WHICH WANT VENTRAL FINS.

## MURÆNA.

GENERIC CHARACTER.

*Caput læve. Nares tubulosæ. Membrana branchiostega radiis x. Oculi cute communi tecti. Corpus teretiusculum, lubricum. Pinna caudæ coadunata dorsali anique. Spiracula pone caput vel pinnas pectorales.*

The head smooth; the nostrils tubular. The branchial membrane has x. rays. The eyes covered with the common skin. The body roundish, slippery. The dorsal, caudal, and anal fins united. Spiracles behind the head, or pectoral fins.

## No. XXXI.

*MURÆNA unicolor, maxilla inferiore longiore.*

The MURÆNA of one colour; with the lower maxillæ longer than the upper.

Called by the Natives CHOWLOO PAMOO OF MALGUMARU.

*Muræna Anguilla Linn. S. N. p. 426.*

THIS fish agreeing in all material points with the Eel in England, differs somewhat in colour. The head, back, and dorsal fin are nearly black; the throat and belly of a reddish or yellowish brown; the anal fin is of a lighter reddish brown than that of the belly.

The subject was from the Ankapilly Lake, and measured in length, twenty-one inches; but they are found of a much larger size.

## No. XXXII.

*MURÆNA pinnis pectoralibus carens; corpore purpureo obscuro, maculis parvis albidis.*

The MURÆNA without pectoral fins; of an obscure purple colour, spotted with small whitish spots.

Called by the Natives CALAMAIA PAUM.

THE body roundish, thick, long, tapering, and somewhat compressed; without scales, flabby and oily.

The head not broader than the neck, the front convex; the rostrum long, projecting like a bird's beak, triangular. The mouth very wide, straight; the upper jaw a little longer than the lower; both set with a regular

row of sharp, reflex teeth; a solitary tooth in the palate. No tongue visible. The eyes at the root of the rostrum, small, oval, flattish. One nostril near the orbit, the other close to the two tubuli at the extremity of the rostrum.

The branchial membrane hidden, consists of six setaceous rays; the aperture very small.

The *trunk*. The back rounded, straight; the breast and abdomen bellied; the sides and tail sub-compressed. No lateral line visible. The anus near the middle.

*Fins*. There are no pectoral nor ventral fins; the dorsal rises near the hind head, is continued along the ridge of the back, and unites with the blunt pointed caudal, with which the anal being also united, the three form one undivided, adipose, or fleshy, very narrow fin.

The *colour*, is a darkish purple variegated with small white spots; amongst which some are interspersed in pairs, joined by narrow stripes. The spots on the face are smaller than the others, and the throat and opercula are marked with long oblique lines of darker purple.

The *length*, two feet one inch and a half.

## REMARKS.

This fish, in the shape particularly of its head, approaches nearer to the figure of the Carolina *Muræna Maculata* given by Catesby, as also to the figure of the *Muræna Helena* given by Willoughby, than to the figure of the latter given by Bloch. In regard to mere colour and spots, Bloch has justly remarked, that in the *Muræna Helena* they admit of much variety; and he gives instances from Catesby, Plumier, and Cette.

Another fish, seemingly a variety of the same species, was brought under the same name. It differed only in the following circumstances: the eyes were rather orbicular than oval; there were two teeth in the palate, one behind the other, and the colour was a yellowish white marked with gray spots and dots. There was no drawing made of it.

The *length*, - - - - - Inches.  
23

Both this and the former fish, were, by the fishermen asserted to be of a poisonous nature, and on that account never eaten. Neither, indeed, had an inviting appearance, the latter especially had a remarkably rank smell, though fresh caught.

Two other sea *Murænae* caught in the large seine, were brought to me under the name Malagu Paum; of which, not having an opportunity of getting drawings made, I can only subjoin the descriptions.

## No. XXXIII.

*MURÆNA cirris duobus ad maxillam superiorem; punctulis tribus ad rostrum utrinque; cauda aptera.*

The *MURÆNA*, with two cirri at the upper jaw, one on each side; three small punctures on each side of the rostrum; no caudal fin.

Called by the Natives MALAGU PAUM.

*B.* *D.* 296. *P.* 13. *V.* 0. *A.* 200. *G.* 0.

The *body* eel-form, without scales, slippery.

The *head* large, oblong, conical, sharp. The mouth moderate size; lips loose; the jaws sub-triangular, the under jaw shortest; the teeth granular, in several rows; and the palate rough with similar teeth. The tongue ovate, smooth, immoveable. The eyes middle, small, covered with the skin of the head. Nostrils at the point

of the rostrum, tubular, solitary, and on each side of the rostrum are three small apertures at equal distances. On each side of the upper jaw are two small, short cirri.

The branchial membrane was hidden; there being only a small linear aperture near the pectoral fin.

The *trunk* round, oblong, tapering. The lateral line, declining from above the pectoral fin, run along the middle of the side to the tail. The anus central, between the head and the tail.

The *fins*. The dorsal rising from near the hind head, terminates near the point of the tail: the rays almost of equal length, but somewhat shorter towards the end; the pectoral, short, and roundish; the anal, like the dorsal, terminates near the tail. The tail is a little compressed, and sharp pointed.

The *colour* a dusky yellowish, brightening a little on the belly.

	Feet.	Inches.	Lines.
The <i>length</i> - - - - -	1	8	0
Circumference where thickest - - - - -	0	5	0

This fish is eaten by the natives.

No. XXXIV.

MURÆNA *dentibus granulosis; punctulis tribus, ad rostrum; cirris carens; cauda pinnata sub-rotunda.*

The MURÆNA with granular teeth; three small holes on each side of the rostrum; no cirri; a pinnated, roundish, tail.

Called by the Natives MALAGU PAUM.

The *body* round, thick at the shoulders, tapers more in proportion than the Eel; the skin smooth, but streaked in a manner so as at first sight to resemble scales.

The *head* conical, but shorter than the former, and less sharp. The jaws nearly of equal length; the teeth granular; the tongue ovate, large, smooth moveable. The fore part of the palate set with granular teeth, the hinder part smooth. The eyes almost marginal, small, round. The nostrils single, near the orbit, and two tubuli at the extremity of the rostrum, with three small foramina on each side. The branchial membrane concealed; the small aperture is a little lower than the pectoral fin.

The *trunk*, the shoulders and belly round, full; the tail towards the end compressed. The lateral line not visible above, but on the tail is conspicuous and straight. The anus in the middle, large, round.

The *fins*. The dorsal, anal, and caudal fins, are joined; the former rises near the middle of the back, the second a little behind the anus; the caudal is narrow, and rounded at the point. The pectoral fin, consisting of thirteen rays, is small, roundish, and pointed.

The upper part of the head and body, are of a dusky dark colour, the belly of a dull leaden white.

	Feet.	Inches.	Lines.
The <i>length</i> - - - - -	1	6	0
The circumference where thickest - - - - -	0	6	5

## No. XXXV.

MURÆNA *pinnis carens*.

The MURÆNA without fins.

Called by the Natives DONDOO PAUM.

THE *body* roundish, eel-form, covered with a coriaceous skin, and terminating in a very small sharp-pointed tail.

The *head* very little broader than the neck, oblong, depressed above, compressed, or rounded on the sides, smooth; the rostrum short, obtuse.

The *mouth* of a moderate size; the lips simple; the jaws of equal length, set with a regular row of small teeth, but in the fore part of the under jaw, there are several rows, and in the palate two diverging rows. The tongue narrow, ovate, smooth, free.

The eyes very small, lateral, round. A single nostril near each orbit, but the subject having been sometime dead, no tubulous nostrils were observed at the rostrum. The opercula oblong; the aperture small, gular, semi-lunate; the branchial membrane, consisting of six rays, cannot be seen without dissection.

The *trunk* eel-form to the tail, which is somewhat compressed, and tapers to a small point. No lateral line; the anus remote.

The *fins*. No vestige of fins whatever.

The *colour* universally black.

	Feet.	Inches.
The <i>length</i> from the rostrum to the anus -	1	6
of the tail - - - - -	0	5

## REMARK.

It was taken in the Ankapilly lake. This does not seem to be the *Muræna Cæca*, of Linnæus, S. N. p. 426.

## No. XXXVI.

MURÆNA *rostro longiore; pinna caudæ dorsali analique unita*.

The MURÆNA with a long rostrum; the caudal fin united with the dorsal and anal.

Called by the Natives TALOO PAUM.

THIS fish was taken in a net, in the month of June, near Waltier. I had no opportunity of having a drawing made, and described it on the beach.

The *trunk* was rounder and more taper, than that of the Eel; till near the tail, where it became depressed; no scales, smooth, and of a shining golden colour. The circumference eight inches.

The *fins*. The pectoral very small, the dorsal rose from the hind head, and was continued to the tail; the anal, one half shorter, joined the caudal, which being partly torn, its shape could not be determined.

The *head* somewhat conical, smooth, depressed on the front, and elongated into a very long rostrum. The

mouth straight, very large; the jaws long, the upper somewhat shorter than the lower; lips thickish. The teeth numerous, dissimilar: in the fore part of the under jaw, they were long, lanceolate, reflex, on the sides straight and depressed, in two rows, between which were numerous small granular teeth; in the upper jaw the teeth smaller, and covered by the lip. The palate also with long awl-form teeth, and two tuberculous rows. The tongue awl-form, smooth, tied.

The eyes at the base of the rostrum, large, oval, covered with the skin of the head. A gaping, oval nostril, near each orbit, and two tubulous at the extremity of the rostrum. The branchial membrane had ten ossicles.

### No. XXXVII.

*MURÆNA pinnis pectoralibus carens; cauda apterygia cuspidata.*

The *MURÆNA* without pectoral and caudal fins; the tail terminating in a sharp point.

Called by the Natives *MANTI BUKARO PAUMU*.

THE *body* perfectly round, tapering to a sharp point, smooth, without scales.

The *head* long, narrow, depressed, projecting into a sharp pointed rostrum. The mouth large, lips thin, the upper jaw longest, both set regularly with teeth. The eyes vertical, small; the nostrils on the edge of the rostrum tubulous. On the crown behind the eyes, about a dozen of white punctuli form an arch, with two parallel lines projecting towards the nose.

The *trunk* round; the tail flattened a little towards the end, terminates in a point, without any fin. The lateral line straight. The anus in the middle.

The *fins*. The dorsal and anal very narrow; the first rises near the head, the other close to the anus: both are continued to very near the point of the tail. No pectoral fin.

The *colour* of the back brownish, with several transverse streaks tending to the lateral line; between which line and the belly, is a long bluish-gray streak.

The *length*, one foot.

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## OPHIDIUM.

## GENERIC CHARACTER.

*Caput nudiusculum; dentes maxillis, palato, faucibus. Membrana branchiostega radiis vii. patula. Corpus ensiforme.*

The head without scales; teeth in the jaws, palate, and throat; vii. rays in the branchial membrane, mostly exposed. The body sword-form.

## No. XXXVIII.

OPHIDIUM *capite anguino; linea laterali loricata; pinna dorsalis analisque caudali connatae; cauda lanceolata.*

The OPHIDIUM with a snake-like head; the lateral line rough; the dorsal and anal fins united with the caudal; the tail lanceolate.

Called by the Natives TALA BON.

THE *body* sword-form, smooth, without scales.

The *head* oblong, compressed, pointed, resembling a snake's head. The mouth large, straight; lips thick; jaws elongated, the under shorter considerably than the upper; in both there are long crooked teeth in front, with a regular row of straight teeth in the upper jaw, which is rough on both sides like a file; the teeth in the under jaw are smaller, and almost concealed by the lip. The eyes lateral, more advanced than the corner of the mouth, large, oval; nostrils in a groove between the orbit and the nose. The rays of the branchial membrane numerous, partly covered, but discernible through the thin opercula.

The *trunk* roundish; the belly thinner than the back; the tail somewhat compressed, and terminates in a very narrow, small, pointed fin. The lateral line sloping gently from the shoulder, becomes straight a little behind the pectoral fin, and runs along the middle of the body and tail; rough, and very conspicuous. The anus is nearer the head than the caudal fin.

The *fins*. The dorsal rises near the head, and is blended with the caudal and anal fins.

The *colour*. The back is of a changeable, darkish golden colour, which brightens under the lateral line, and is strewed with very minute black dots. The belly is white.

The *length* of the subject, one foot nine inches.

## No. XXXIX.

OPHIDIUM *cirris duobus ad gulam; pinna dorsalis analisque caudali unita; pinna caudæ setis duabus brevibus terminata.*

The OPHIDIUM with two cirri at the throat; the dorsal, anal, and caudal fins united, the latter terminating in two short threads.

Called by the Natives TONKAH TALAWAREE.

*B. v. D. 223. P. 13. V. 0. A. 112. C. 10.*

THE *body* linear, lanceolate, sword-form, covered with a thin smooth skin.

The *head* small, short, obtuse, compressed. Mouth wide, no lips; jaws of equal length; a single row of small straight teeth in the fore part of both; behind which, in the under jaw, is a remarkably long, curved, tooth, on each side; there are two similar in form, but much shorter, in the upper jaw. The palate tuberculate. The tongue short, lanceolate, smooth, free. The eyes high, large, roundish. Nostrils double, distant.

Opercula rounded, hardly moveable; branchial membrane exposed. From the posterior, inferior part of the throat, hang two thread-form cirri, above one inch in length.

The *trunk*. The back straight, roundish; the throat carinate; the belly sharp, the tail a little compressed, pointed. No lateral line. The anus very near the head.

The *fins*. The pectoral small, short, lancet-form; the dorsal and anal very long, and both united with the caudal, but in such a manner as to be distinguishable; the pointed caudal fin terminates in two short setaceous cirri.

The *colour* was by some accident omitted in the description.

The *length* one foot two inches.

## No. XL.

GYMNETRUS, *capite cirris longioribus cristato; cirris duobus loco pinnarum ventralium; pinna anali carens.*

The GYMNETRUS, with a crest of long cirri on the head; two cirri in the place of ventral fins; no anal fin.

Called by the Natives

*B. v. D. 320. P. 11. V. 2. A. 0. C. 4.*

THE *body* lanceolate, sword-form, smooth, without scales.

The *head* very short, much compressed, not broader than the neck; the front declivous, carinate. The vertex crowned with four or five cirri, distinct at the base, and for two inches and a half upward, they then unite, and form a thin, taper, setaceous tail, in all nearly ten inches in length.

The mouth small, oblique, ascending, without lips; the cheeks membranous. The jaws extractile, without teeth, the upper a little longer than the under. The tongue small, sharp pointed, smooth, free. The palate smooth. Eyes large, round, not prominent, the pupil small. Nostrils double, the largest near the orbit, oval.

Branchial opercula consist of two flexible, streaked, oblong, plates; the membrane half exposed.

The *trunk*. The back carinate, straight; the sides compressed; the abdomen very short, sub-convex; the under part of the tail rendered somewhat rough, by a series of rough tubercles.

The branchiæ consist of four leaves with one interior row of tubercles. The lateral line descends from the crest, but from two inches behind the pectoral fin, it runs in a straight line to the tail, nearer the belly than the back. The anus near the head.

The *fins*. The first ray of the dorsal, is nearly three inches in length, and resembles the cirri of the crest; the others are setaceous, the longest in the middle of the fin not exceeding an inch; the pectoral very small, ovate; the ventral wanting, unless two cirri of equal length with those of the crest, be taken for fins; the anal are entirely wanting, the caudal (not united with the dorsal,) consists of four rays, connected at the base, by a thin, narrow, membrane, and afterwards joining together, terminate in a very small setaceous thread.

The *colour*, a pale silver; but the silvering comes off in thin pellicles upon handling. The dorsal fin on the edge is darkish.

The *length*, two feet eight inches.

#### REMARKS.

This fish, unknown to Linnæus, has been made a new genus by Bloch, characterised by the want of anal fins.

A figure has been given by Ascanius,\* under the name *Regalicus*.

In the Danish Transactions for 1786, it is described *Regalicus remipes*;† and in the Swedish Transactions, in 1798, under the name *Gymnetris Grillii*.‡ A species received from Goa, by Bloch, is distinguished, *pinna ventrali biradiata*.

These definitions differ, in some respects, from one another; and all of them from the present subject.

In 1796 a fish of this genus was cast on shore, in Cornwall; a drawing and description of which were sent to Sir Joseph Banks. It had two ventral cirri; and in the crest of the head resembled the present subject more than any of the others: the tail had been broken off.

The present fish was caught on the outside of the surf at Vizagapatam, in March 1788. The fishermen could give no name to it; declaring they never had seen any like it before.

\* *Icones Rerum Naturalium*, Copenhag. 1772.

† *Nov. Act. Societ. Hafn.*

‡ *Act. Acad. Stockholm*, Vol. XIX.

## TRICHIURUS.

## GENERIC CHARACTER.

*Caput porrectum; operculis lateralibus; dentes ensiformes, apice semisagittati: primores majores. Membrana branchiostega radiis vii. Corpus compresso-ensiforme. Cauda subulata, aptera.*

The head elongated; the opercula lateral; the teeth ensiform, half bearded at the point; the fore teeth largest. Seven rays in the branchial membrane. The body compressed, sword-form; the tail awl-form, without fin.

## No. XLI.

TRICHIURUS *capite oblongo, nucha carinata; linea laterali ab ventre ad caudam infima, sub-curva; aculei infra caudam loco pinnæ analis.*

The TRICHIURUS, with an oblong head, carinated behind; the lateral line from the anus to its end close to the belly, and a little curve; a row of small prickles along the under part of the tail, in the place of an anal fin.

*Trichiurus Lepturus, Linn. S. N. p. 429.*

Called by the Natives SAWALA.

*B. vii. D. 120. P. 11. V. 0. A. 0. C. 0.*

THE *body* long, much compressed, thin, without scales, and terminates in a very small, subulate tail.

The *head* oblong, compressed, projecting, sharp, the hind part carinate, the front declivous, depressed. The mouth large, straight, without lips; the under jaw sharp, and considerably longer than the upper. Teeth regularly, but not thick set, dissimilar, the larger curve, long, half bearded; the smaller straight, and sharp: all firmly fixed. The tongue lanceolate, smooth, free. The palate narrow, smooth.

The eyes lateral, high, round, large, much nearer the rostrum than the posterior edge of the opercula. Nostrils solitary, round, near the orbit. Branchial opercula striate, two-leaved, acuminate. Membrane covered; aperture large, lateral and gular.

The *trunk*. The back very narrow, sub-carinate, almost straight; the throat and abdomen hardly convex; the sides plane or compressed; the under part of the tail straight, carinate, set with very small prickles, to near its end, when it becomes extremely slender.

The lateral line, bending from the upper part of the operculum to near the anus, runs afterwards low, and parallel to the curve of the belly and under part of the tail. The anus small, two inches behind the branchial aperture.

The *fins*. The only fins are the dorsal and pectoral; the first rising from the hind head, is continued to within an inch of the point of the tail, it is narrow and nearly of equal breadth, till toward its end: the pectoral is situated low, small, falcate.

The *colour*. The whole fish shines as if silverized, though the colour is rather a bright lead, than that of pure silver.

The *length* of the subject described, one foot six inches; but they are brought of a much larger size.

## REMARKS.

This fish has been described by Artedi, under the name of *Lepturus*; and by Gronovius, under that of *Gymnogaster*. It is a very common fish at Vizagapatam, and in much request among the soldiery.

I always conceived it to be the *Anguilla indica* in Willoughby's appendix; and never saw the other species, (Linn. Ed Gmel. p. 1142) with jaws of equal length; of a brown colour, and spotted.

## STROMATEUS.

## GENERIC CHARACTER.

*Caput compressum; dentes in maxillis, palato.*  
*Membrana branchiostega, iv.—vi. Corpus*  
*ovatum, lubricum; cauda bifida.*

The head compressed; teeth in the jaws and palate. The rays of the branchial membrane, iv.—vi. The body ovate, slippery; the tail forked.

## No. XLII.

*STROMATEUS corpore rhombeo, squamoso; pinna dorsi anique falcata; pinnis pectoralibus, lanceolatis.*

The *STROMATEUS*, with a squamous rhomboidal body; the dorsal and anal fins falcate; the pectoral fins lanceolate.

*Stromateus Argenteus, partibus utrisque pinnæ caudæ æqualibus. Bloch, Pl. 421.*

Called by the Natives *TELLA SANDAWA*

The white Pomfret of the English.

*B. iv. D. 39. P. 21. V. 0. A. 38. C. 22.*

**T**HE *body* nearly rhomb-form, much compressed, smooth, covered with small orbicular scales, close, imbricate, tenacious.

The *head* small, much compressed, obtuse, without scales, the front declivous. The mouth under the blunt nose, small, a little oblique; the lips simple. The lower jaw somewhat extractile, the upper immovable: both short and set with numerous small teeth. Tongue roundish, short, smooth, tied. The palate smooth. The eyes middle, near the rostrum, orbicular, moderate size. Nostrils near the edge of the rostrum, double, the posterior (which is the biggest) oval, the anterior round.

The branchial opercula, smooth, ciliate at the edge, bridled so as hardly to be moveable, or to admit seeing the membrane.

The *trunk*. The back assurgent, carinate, and on the ridge, before the dorsal fin, five or six spiculi under the skin, may be felt by the finger; the throat and abdomen declivous, ridged, the sides and tail compressed, the former a little convex: five spiculi between the anus and the anal fin, rather more perceptible than those on the back, are found just piercing the skin.

The lateral line rising from the upper edge of the opercula, forms an arch over the pectoral fin to the end of the dorsal, and is then continued straight along the upper part of the tail: another line but less conspicuous rising with the first, runs straight to the middle of the caudal fin. The anus small, considerably nearer the head than the tail.

The *fins*. The dorsal rising from the highest point of the back, consists at first of eleven or twelve longer rays, disposed in somewhat of a crescent-form, and then becoming narrow and equal, is continued along the declivity, to where the tail grows narrowest. The anal of the same length, rises opposite to the dorsal; the pectoral nearer the belly than the back, long, sharp, lanceolate, or acuminate in the middle; the caudal fin deeply forked.

The *colour*. The back dark, with a bluish or purplish cast; the rest a silver gray; the dorsal and caudal fins a little lighter than the back. The anal has a very pale yellowish cast.

	Inches.	Lines.
The <i>length</i> , from the nose to the caudal fin - - - - -	9	5
Greatest breadth - - - - -	6	0
Length of the caudal fin - - - - -	2	5

### No. XLIII.

STROMATEUS *corpore ovalo, squamoso; pinnis pectoralibus falcatis.*

The STROMATEUS, with a squamous, ovate, body; and falcate pectoral fins.

*Stromateus niger maxillis æqualibus.* Bloch, *Pl.* 422.

Called by the Natives NALA SANDAWAH.

Black Pomfret of the English.

*B.* vi. *D.* 45. *P.* 19. *V.* 0. *A.* 39. *C.* 22.

THE *body* ovate, much compressed; scales oblong, roundish, close, smooth, tenacious.

The *head* much compressed, as in the former fish, but the nose less blunt, or round; the lower part of the face covered with scales. The mouth small, and capable of more extension; both jaws being in some degree extractile, and the rostrum not projecting as in the former. The teeth numerous, but larger; the eyes proportionally larger also and more distant from the rostrum; nostrils as in the former.

The opercula ciliated as in the former, but rounder: in some parts covered with scales, and not being tied down behind, leave the membrane visibly exposed.

The *trunk*. The back arched, carinate; the throat, belly, and tail, also carinate, but the latter, where the dorsal and anal fins terminate, becomes very small and round; the sides hardly convex. The two exterior branchiæ are pectinate and tuberculous, the interior tuberculous only. The lateral line gently curve, but from the end of the pectoral fin runs straight along the middle of the tail; and is there carinate: there is no appearance of a second line. The spines before the fins, in the former fish, are here wanting; and the anus is placed still nearer the head, on a line with the pectoral fin.

The *fins*. The dorsal and anal resemble those of the former fish, in their situation, but have less of the

crescent-form; the pectoral are long and falcate; there are no ventral fins; the caudal forked, though not so deeply as in the white Pomfret.

The *colour* universally dark, tending to black, except the throat and belly, which are some shades lighter. The skin, as also the membranes of the fins are remarkably thick.

The *length* from the nose to the caudal fin, seven inches; the greatest breadth, four.

## REMARKS.

The white and the black Pomfrets, are esteemed two of the most delicious fishes on the Coromandel coast; but they must be eat when fresh caught, as they are injured greatly by being kept only a few hours. The black, though a less firm fish, is by some preferred to the white.

In the latter fortnight of March, and during part of April, Pomfrets were in most plenty at Vizagapatam. It was remarkable that they were never caught in abundance for more than two or three days successively; after which they, in a manner, disappeared for a like number of days, and again returned.

The Pomfrets which I saw at Madras, agreed exactly with the descriptions given above; but there are other species on that part of the coast, of which notice shall be taken hereafter.

The figure of one species of this genus has been given by Sir Hans Sloane in his history of Jamaica,\* where it is known under the name Pampus, or Pampel, whence probably the name Pomfret among the English in the East Indies: sometimes pronounced Pomplet, or Pomflet.

## No. XLIV.

*STROMATEUS corpore sub-orbiculato, squamoso; maxillis obtusis sub-aequalibus.*

The *STROMATEUS*, with a body nearly orbicular, covered with small scales; the maxillæ obtuse, and nearly of equal length.

Called by the Natives ΑΤΟΟ ΚΟΙΑ.

*B. D. 44. P. 24. V. 0. A. 40. G. 22.*

The *body* nearly orbicular, much compressed, scaly; the scales small, round, close, less tenacious than in the other species.

The *head* round, compressed, short, the rostrum obtuse, like that of the white Pomfret, and the crown and part of the front squamous. The mouth small, capable of little extension; the jaws short, nearly of equal length, hardly extractile, the under one only moveable and obtuse; the teeth are unlike those in the other species: the upper jaw is rough to the finger like a file, the under is a bone distinctly pectinate. The tongue roundish, thick, smooth, bridled; the palate also smooth. The eyes small, round, not protuberant. Nostrils double, close to the nose, the posterior large, oval; the anterior smaller, round.

The opercula can scarcely be called two-leaved; they are not so pointed as in the white Pomfret, and more confined, while the branchial aperture is so small that the membrane is completely hidden.

The *trunk*. The back and belly arched, carinate; the sides compressed; the tail grows narrow where the dorsal and anal fins end, but again expands to receive its own fin. There are no spiculi on the back or belly.

The lateral line conspicuous, supreme, carinate, arched; but towards the end straight, and terminates not exactly at the middle of the caudal fin. There is no second line. The anus much nearer the head than the tail.

The *fins*. The dorsal and anal are placed more forward than in the white Pomfret; they are nearly alike in

\* Vol. II. Tab. 250, Fig. IV.

shape, and terminate opposite to each other, at the narrowest part of the tail; the first rays in both, are shorter, and rise more gradually to form the crescent; the caudal is less deeply divided, the lobes nearly of equal length: but all the three fins are more remarkably distinguished, by being squamous almost to the margin of the membrane. The pectoral broad, descending, the point a little curve. No ventral fins.

*Colour.* The whole fish is of a cineritious colour, the belly only being somewhat lighter, and here and there marked with very minute black dots.

	Inches.	Lines.
The <i>length</i> , from the nose to the middle of the anal fin, - - -	11	6
Breadth of the body - - - - -	7	0

## REMARKS.

This species is very rare. I first saw it in May 1788, and it was very seldom brought afterwards. In quality for the table it is very inferior to the white or black Pomfret. Though alike in colour, this fish is very different from the *Stromateus Cinereus* of Bloch; which is specifically characterized, by the length of the lower lobe of the caudal fin.

## No. XLV.

*STROMATEUS corpore rhombeo, alepidoto; aculeis bicuspidatis ante pinnam dorsalem analemque; cauda lunata lobo inferiore longissimo.*

The *STROMATEUS*, with a rhomb-form body, without scales; double headed spines before the dorsal and the anal fin; the inferior lobe of the lunated caudal fin very long.

Called by the Natives SUDI SANDAWAH.

*B.* iv. *D.*  $\frac{7}{7}$ .  $\frac{1}{39}$ . *P.* 22. *V.* 0. *A.*  $\frac{5}{5}$ .  $\frac{1}{40}$ . *C.* 24.

THE *body* rhomb-form, thin, compressed, without scales, the skin soft, marked with various lines or striæ.

The *head* small, compressed, short, obtuse. The mouth under the projecting blunt nose, small, narrow, the jaws have little motion, the under shortest: neither have teeth, nor are there teeth in the palate. The tongue round, blunt.

The eyes middle, large, not prominent. Nostrils between the orbit and nose, one before the other, the posterior largest, oval; the other round.

The hinder lamina of the operculum acuminate; the branchial membrane visible, though partly covered.

The *trunk*. The back assurgent and carinate; on the hind head are two latent spines; and on the ascent before the dorsal fin, are seven distinct, visible, spiculi, with double points. Another latent spine is felt on the breast, and five spiculi like those on the back, are visible before the anal fin. The sides and tail as in the other species. The lateral line is arched, exactly as in the white Pomfret; but a second line equally conspicuous, rising from the same place, runs straight to the tail. The anus near the head.

The *fins*. The dorsal and anal fins in situation and form resemble those of the white Pomfret, but each has a recumbent spine in front, pointing forward, and the anterior crescent portion of the anal terminates in a long setaceous tail. The caudal is lunate, and its inferior lobe, four inches one-fourth in length, terminates in the same manner as that of the anal; the pectoral, long, acuminate; no ventral fins.

The *colour* of the back, and dorsal fin, leaden, the belly silvery; the anal and caudal fins yellow.



	Inches.	Lines.
The <i>length</i> , from the nose to the caudal fin, - - -	4	0
Greatest breadth - - - - -	3	0

## REMARKS.

The two last fish seem hitherto to have been undescribed. The former, as before remarked, differs much from the *Stromateus Cinereus* of Bloch.\* The latter agreeing with the *Stromateus Argenteus* of China,† in the double-headed spines before the dorsal and anal fins, is distinguished by the want of scales, and by the shape of the anal and caudal fins.

The species therefore of this genus found on the coast of Coromandel, are the following.

1. *Stromateus striis carens* of Bloch, sent from Tranquebar by Dr. Koenig, and which appears to be distinct from the *Stromateus Paru* of Linnæus.‡
2. *Stromateus Cinereus*. §
3. *Stromateus Argenteus*, No. XLII.
4. *Stromateus Niger*, No. XLIII.
5. *Stromateus Atoo Koia*, No. XLIV.
6. *Stromateus Sudi Sandawah*, No. XLV.
7. *Stromateus Sadei Waval*, mentioned by the Danish missionary, the Rev. Mr. John, but not described ; and may possibly be the same with No. XLV.||

The two species of China, viz.

*Stromateus Argenteus*.

*Stromateus Chinensis*, ¶ are distinct from any of the above. As to the *Stromateus Cumarca*, \*\* it remains doubtful whether distinct or not, from the *Paru* of Linneus.

\* Bloch, Pl. 420.

† Act. Acad. Stockholm, Tom. IX. Tab. 9.

‡ Bloch, Pl. 160.

§ Pl. 420.

|| Ib. Tom. IV. p. 81.

¶ Act. Acad. Stockholm.

\*\* Linn. ed Gmel. p. 1148.

## PISCES JUGULARES.

FISHES WHOSE VENTRAL FINS ARE PLACED MORE FORWARD THAN THE PECTORAL FINS, OR UNDER THE THROAT.

## CALLIONYMUS.

## GENERIC CHARACTER.

*Caput labio superiore duplicato. Oculi approximati. Membrana branchiostega vi. Apertura nuclæ foraminibus respirante. Opercula clausa. Corpus nudum; pinne ventrales remotissime.*

The upper lip doubled; eyes near each other. The branchial membrane with vi. rays; the opercula closed, spiracula at the hind head. Body without scales; the ventral fins distant from the head.

## No. XLVI.

*CALLIONYMUS capite scabro, alepidoto; linea laterali carinata; cauda integra varia striata.*

The CALLIONYMUS with a rough scaleless head; a carinated lateral line; an undivided tail, streaked with different colours.

*Callionymus indicus, Linn. S. N. p. 434.*

*Platycephalus Spathula. Bloch, Pl. 423.*

Called by the Natives IRRWA.

*B. vii. D.  $\frac{9}{9}$ . 13. P. 19. V.  $\frac{1}{6}$ . A. 11. C. 16.*

THE *body* wedge-form, very small towards the tail; squamous, rough, scales very small, orbicular, ciliate.

The *head* broader than the body, long, wedge-form, depressed, without scales; but rough, and a line of small prickles behind each eye. The mouth terminal, large; the under jaw considerably longer than the upper: both set with numerous minute, linear, sharp teeth, in many close ranks. The tongue thin, hard, smooth, resembling in figure and colour, the flint of a small pistol. The palate tuberculous, and set with teeth. The eyes vertical, small, oval, near the nose, separated by a groove or furrow. The nostrils double, very small.

The opercula squamous, armed on each side with two hard, lanceolate, spines, and a softer spine near the point of the posterior lamina. The branchial membrane half exposed, has seven thick ossicles.

The *trunk* wedge-form, depressed; the back straight; the belly protuberant but flattish; the sides hardly convex; the tail very taper. The lateral line straight, supreme, carinate, rough. The anus nearly middle.

The *fins*. Two dorsal in a groove in the middle of the back; the first scapular consisting of soft spinous rays, of which the first and three last are very short; the second lumbar, declining; the pectoral are very low, orbicular; the ventral distant from each other, rather behind the pectoral; the anal declivous, exactly opposite to the second dorsal; the caudal distant, equal, or truncate.

The *colour* of the upper part darkish, with a faint mixture of yellow; below the line the colour brightens to white. The dorsal, pectoral, and ventral fins are variegated with black lines; the anal are light-coloured; the caudal remarkably striped, black, white, and yellow.

The *length* of the subject described nine inches; but they are sometimes found double that size.

## No. XLVII.

CALLIONYMUS *capite sulcato, spinis munito; linea laterali aculeata.*

The CALLIONYMUS, with a furrowed head, armed with spines; the lateral line prickly.

Called also by the Natives, IRRWA.

*B.* vii. *D.*  $\frac{9}{9}$ . 12. *P.* 18. *V.*  $\frac{1}{6}$ . *A.* 12. *C.* 16.

THIS fish agreeing in its form, as well as in most other material points, was found on a comparison of subjects of the same size, to differ in the following circumstances.

The crown of the head less depressed, more rough and prickly; the opercula not squamous; each was armed with three spines; and two rows of prickles passed from the nostrils to the hind head between the orbits. The eyes were larger.

The lateral line more highly carinate and prickly. The second dorsal fin fibrous; all the fins of a darker colour, and the caudal had not the coloured streaks remarkable in the former fish.

## REMARKS.

The position of the ventral fins should certainly exclude these two last described from the order of Jugular fishes; and Bloch has made a distinction: but in Gmelin's Linnæus, they still retain their place.

## No. XLVIII.

BLENNIUS? *dorso gibbo; aculeo curvo, vaginato, cristam referente, dorso anteriore; pinne ventrales pentadactylæ, molles; cauda bifurca.*

The BLENNIUS? with a hump; a curve, sheathed spine, on the anterior part of the back, resembling a crest; a ventral fin of five soft rays; the tail forked.

Called at Vizagapatam, SOMDRUM KARA MOODDEE, at Madras KAKASE.

*B.* vii. *D.*  $\frac{7}{7}$ .  $\frac{2}{17}$ . *P.* 18. *V.* 5. *A.*  $\frac{2}{34}$ . *C.* 22.

THE *body* somewhat ovate, but with a protuberance in the back; much compressed, without scales, smooth, pellucid.

The *head* small, compressed, without scales; front declivous, carinate; rostrum short, truncate. Mouth middle, a little oblique, wide; no lips, cheeks membranous. Jaws extractile; the under moves freely, and has

a small protuberance at the point, adapted to a cavity for its reception in the upper. Teeth setaceous, numerous. Tongue short, awl-form, white; eyes in deep orbits, small, orbicular. Nostrils double, in the middle between the orbit and rostrum.

Opercula consists of two laminae, sub-membranous, with four prickles on the edge of the second. The branchial membrane half exposed, the aperture arched.

The *trunk*. The back, gradually assurgent from the vertex, forms a hump in the middle; on the declivity of which, towards the tail, is situated the dorsal fin; the sides much compressed, the belly carinate, the breast prickly.

Branchiæ four-leaved, the exterior pectinate on the inside, with very long teeth. Lateral line very slightly curve, high, smooth, faint. The anus near the breast.

The *fins*. On the ridge of the back before the dorsal, there are seven small prickles, equidistant from each other, unconnected, three pointing forward, three backward, the seventh, and anterior, is the longest, appearing like a crest, in the shape of the elephant's trunk. It is covered with a black coloured skin, above which appears its curve point, but the direction of the crest is forward. On the concave side, it is connected by a very loose membrane. Lower towards the rostrum are two other prickles, erect and very minute.

The dorsal fin has one spinous ray, the next ramous, is an inch long, the last ray four lines; the pectoral middle, lanceolate, short; the ventral rays resemble fingers, they cover the anus, and are placed a little more forward than the pectoral fins. The long anal fin mounts towards the tail in an arch, but the rays are nearly equal; the caudal forked, the lobes sub-falcate.

The *colour* of this fish, when alive, is changeable, faint red, blue, and green, on a golden ground; that is, on the upper part of the head and back; the rest a glossy white. All the fins are whitish, but powdered with minute dark points, as are also the shoulders.

The subject described, was five inches in length, and I did not meet with any larger.

#### REMARKS.

This fish, though the position of its ventral fins is scarcely more forward than the pectoral, and their rays five in number, has been placed here; but under strong doubt of its belonging to the genus. The hump on the back, raised a suspicion of its being allied to the new genus Kurtus,\* of which only one species (sent from the Coromandel coast, by the late Dr. Koenig) is hitherto known. But there are strong objections to such a conjecture.

\* Bloch, Pl. 169.

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## PISCES THORACICI.

FISHES WHOSE VENTRAL FINS ARE PLACED IMMEDIATELY UNDER THE PECTORAL FINS, OR ON THE BREAST.

## ECHENEIS.

## GENERIC CHARACTER.

*Caput pingue nudum, depressum; supra planum, marginatum, transverse sulcato-serratum. Membrana branchiostega radiis x. Corpus nudum.*

The head oily, without scales, depressed; flat above, marginated, and furrowed transversely with serrated ridges; ten rays in the branchial membrane; the body without scales.

## No. XLIX.

*ECHENEIS striis capitis viginti quinque, linea elevata in duas partes secundum longitudinem divisis; cauda integra.*

The ECHENEIS, with twenty-five transverse striæ on the head divided, down the middle by a longitudinal raised line; the tail undivided.

*Echeneis Neucrates, Linn. S. N. p. 446.*

Called by the Natives, АЛА МОТТАН.

*B. x. D. 37. P. 21. V. 6. A. 37. C. 16.*

THE *body* long, roundish, taper, without scales; the skin coriaceous, and somewhat rough, when stroaked upwards.

The *head* oblong-ovate, broader than the body, flat above, and furnished with a long oval shield, extending beyond the hind head, with twenty-five oblique, transverse, curve, rough ridges, divided equally in the middle, by a longitudinal ridge. It is by means of this apparatus, that the fish adheres firmly to living as well as to inanimate subjects.

The *mouth* small, transverse; the under jaw pointed, and considerably longer than the upper; both feel like a file, being set thick with minute, sharp, teeth. Tongue small, round, smooth, free. Palate rough. The eyes high, orbicular. Nostrils double, small. Opercula gular, oblong, imperfectly divided; most part of the branchial membrane exposed.

The *trunk*. The back and sides convex; the belly flattish; the tail small, round. The lateral line conspicuous; at first a little curve, afterwards middle, and straight. The anus middle and gaping.

The *fins*. The dorsal and anal opposite, alike in form, and of the same length; they are broadest at the

beginning, but from the fifth ray, gradually decline; the pectoral broad, acuminate above; the ventral long, sword-form, near each other; the caudal long, entire, the middle rays a little longer than the rest, forming a blunt, or rounded point.

The *colour* of both body and fins, nearly black; the belly of a darkish lead colour. An oblong white spot on each corner of the caudal fin.

The *length*, of the subject described, including the caudal fin, one foot four inches.

## REMARKS.

I have met with this fish at sea, of a lighter colour, and much larger size. They were found fixed on the bodies of sharks, which had been caught by hooks, and were with difficulty separated. I do not recollect seeing more than one on the same shark.

## GOBIUS.

## GENERIC CHARACTER.

*Caput foris duobus inter oculos approximatos: altero anteriore. Membrana branchiostega radiis iv.; pinnæ ventrales unitæ in ovalam.*

The eyes near each other; and two pores between them, one before the other. The branchial membrane consists of four ossicles; the ventral fins united in an oval form.

## No. L.

*GOBIUS corpore maculis magnis, nigrescentibus; pinnis pectoralibus lanceolatis; cauda lato-ovata, acuminata.*

The GOBIUS, with large blackish spots; lanceolate pectoral fins; the tail broad ovate, with a narrow point.

*Gobius Lagocephalus. Pall. Spic. Zool. 8. p. 14. Tab. 2. Fig. 6. 7. Linn. ed. Gmel. p. 1202.*

Called by the Natives KORAH MOTTA.

*B. v. D. 6. 11. P. 18. V. 10. A. 10. C. 18.*

THE *body* oblong, roundish, compressed, squamous; the scales large, rounded, base truncate, imbricate, loose.

The *head* large, elongated, depressed above, compressed on the sides, without scales. The mouth large, terminal; the lips thick. The lower jaw longer than the upper; teeth numerous, dissimilar, the larger reflex, the smaller straight. The tongue large, obverse, heart-form, sub-bifid at the base, smooth, pellucid, free. The palate smooth. The eyes high, nearly vertical, orbicular, prominent. The nostrils near the rostrum, very small, double. Two pores between the eyes.

Branchial opercula without scales, the anterior lamina covered with a fleshy muscle, the posterior shaped like a quadrant. The branchial membrane half discovered, the two inferior rays much curved; the aperture rather small.

The *trunk*. The back straight, round, the side convex; the throat flat, the belly prominent; the tail round, compressed. No lateral line to be distinguished. The anus middle, between the head and the tail.

The *fins*. Two dorsal, the first scapular, of six rays with the soft points rising above the membrane; the second lumbar, of eleven declining ramentaceous rays; the pectoral broad and pointed. The ventral united in the manner peculiar to this genus. The anal has ten assurgent rays, shorter than those of the second dorsal. The caudal fin is ovate, with a small point.

The *colour* a dull yellow, variegated on the sides, with large dark spots; the belly white. The rays of the dorsal and pectoral fins dotted with black; the other fins of a darker yellow than the body, but without dots.

In a smaller subject some dots were found on the pectoral and caudal fins.

Length from the nose to the caudal fin, one foot.

Length of the longest ray of the caudal fin, two inches and a half.

#### No. LI.

*GOBIUS maculis ovalibus; pinna anali radiis octo; cauda sub-rotunda, fasciata.*

The GOBIUS with oval spots; an anal fin of eight rays; the tail roundish, and streaked transversely.

Called by the Natives KOKU.

*B. v. D. 6. 10. P. 17. V. 10. A. 8. C. 16.*

THIS species was never found to exceed eight inches in length. The head and back were of a very dark green, sprinkled with black dots. The belly whitish. The dorsal fins spotted with brown; the ventral and anal were of a light colour, the former with a faint yellowish cast, the latter a reddish; the caudal marked with transverse lines of dusky brown.—On the lateral line, on each side, were five oblong-oval, black spots.

#### No. LII.

*GOBIUS maculis rhombeis; pinnis pectoralibus caudaque cuspidatis.*

The GOBIUS with lozenge-shape spots; the pectoral and caudal fins cusped.

Called by the Natives NUNA MOTTA.

*B. iv. D. 6. 11. P. 17. V. 10. A. 11. C. 16.*

THIS species, including the tail, generally measured five inches. Its colour pale brown, with a few azure dots scattered on the sides; the belly whitish. Five black marks were observed on the lateral line, as in the last species, but of a lozenge-shape; the form of the caudal fin was very different, and the fins were not spotted.

## No. LIII.

*GOBIUS macula nigra in pinna dorsi anteriore; cauda oblonga, rotundata, fasciata.*

The GOBIUS with a black spot on the first dorsal fin; an oblong, rounded tail, streaked transversely.

Called by the Natives BULLEE KOKAH, (OR MOTTAH.)

*B. iv. D. 6. 11. P. 18. V. 10. A. 9. C. 16.*

THIS species agreeing in general with the former, in its generical characters, differs somewhat in the form of the body; the back is more convex and the tail near the end becomes almost quite round. The tongue, of the usual shape, resembles a piece of firm, clear jelly.

The *colour* of the whole, except the belly, dark brown, the sides marked with three or four dusky longitudinal lines, and a few spots of a colour still darker. The rays of the dorsal and anal fins are also spotted; and on the first dorsal is a remarkable round, black mark; the caudal is streaked transversely, as in No. LI. but the fin differs in shape.

## No. LIV.

*GOBIUS corpore punctulis cæruleis; pinna prima dorsi radiis quinque longioribus, in setam junctis; cauda obliqua, obtusa.*

The GOBIUS with small cerulean dots over the whole body; the first dorsal fin of five long rays uniting into a setaceous thread; the tail oblique, obtuse.

Called by the Natives NETTEE KUNLA MOTTAH.

*B. v. D. 5. 25. P. 17. V. 10. A. 24. C. 16.*

THIS beautiful species has the ventral fins united, and other characters of the genus.

The *body* of an olive colour, has seven dark oblique streaks on each side, and is every where powdered with azure dots; the dorsal and caudal fins are dotted in like manner. The rays of the first dorsal setaceous, and remarkably long; the membrane of a dark green, being decorated with a large purplish mark besides the azure dots, makes, when fully spread, a very showy appearance.

The caudal fin is of an uncommon form. The inside of the mouth of a deep purple colour. The length five inches.

It was found among some rocks which had been covered by the surf.



## No. LV.

GOBIUS varius; iride aurea; radio tertio quartoque pinnæ dorsi longiore, setaceo; cauda integra, parum acuminata.

The variegated GOBIUS. The iris of the eye golden; the third and the fourth ray of the dorsal fin long and setaceous; the tail entire, somewhat pointed.

Called by the Natives PEEL MOTTAH.

B. iv. D. 6. 11. P. 17. V. 10. A. 12. C.

THIS species, different from any of the former, was found also among some rocks; but neither drawn, nor fully described. It was three inches long; the back of a faint green with dark spots; about the throat and opercula the colours changeable. Iris golden. The tongue remarkably distinguished by six studs, placed transversely in pairs, which looked as if gilded; and emitted a light in the dark, resembling that of the glow worm, visible after death, but most splendid when the fish was alive. The third and fourth rays of the first dorsal fin, long and setaceous. The tail a little pointed.

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## SCORPÆNA.

## GENERIC CHARACTER.

*Caput magnum aculeatum; oculi vicini.*  
*Dentes maxillis, palato, faucibusque.*  
*Membrana branchiostega. radiis vii.*

The head large, prickly; eyes near to each other; teeth in the jaws, palate, and throat. The branchial membrane has vii. rays.

## No. LVI.

SCORPÆNA *capite cavernoso, alepidoto, spinis munito; cirrulis pluribus ad maxillam inferiorem; oculis magnis; cirrus inter nares utrinque; cauda oblonga, rotundata.*

The SCORPÆNA with a rough, pitted, head, without scales, but armed with spines; several cirri at the lower jaw, and one between the nostrils.

Called by the Natives MOOROO BANTOO.

*B. vii. D.  $\frac{12}{22}$ . P. 18. V.  $\frac{1}{6}$ . A.  $\frac{3}{8}$ . C. 16.*

THE *body* oblong-ovate, compressed, squamous. Scales imbricate, small, roundish, with pectinated margins, and feeling rough to the finger.

The *head* roundish, obtuse, rough, with many straight spines pointing backwards; the front concave declivous. The mouth very wide, a little oblique, terminal. The jaws extractile, nearly equal in length, the upper emarginate; six or seven cirri at the under jaw. Teeth small, setaceous, in many rows. Tongue short, awl-form, smooth, free. The palate rough with teeth. The eyes large, high, near each other, orbicular; the upper edge of the orbit armed with curve spines. Nostrils small, near the orbit, with a small cirrus or pinnula, between them.

Branchial opercula two-leaved, partly squamous, moveable, armed with straight spines pointing backward; the membrane exposed; aperture lateral and gular, arched.

The *trunk*. The back somewhat arched, roundish; the sides convex, compressed, the throat and abdomen convex; the tail attenuated, compressed, roundish. Lateral line carinate, descending obliquely from the point of the first opercula, it proceeds straight and nearly middle to the tail. The anus small, and distant from the head.

The *fins*. The solitary dorsal fin occupies the whole of the back, the twelve spinal rays forming an arch, the others ascending; the pectoral broad, and pointed; the ventral and anal short; the caudal oblong, rounded.

The *colour* of the head and body dark, with a mixture of dull red; the throat and belly are of a pink colour. The fins irregularly streaked black and red; the ventral at its root is pink, like the belly.

The *length* including the caudal fin nearly seven inches.

## ZEUS.

## GENERIC CHARACTER.

*Caput compressum, declive: labium superius membrana transversa fornicatum. Lingua subulata.*

*Membrana branchiostega radiis vii. perpendicularibus; infimo transverso. Corpus compressum, tenue, splendens.*

The head compressed, declivous: the upper lip arched (furnished with a membranous velum attached before, and loose behind). The tongue awl-shape.

Seven perpendicular rays in the branchial membrane, the lowest transverse. The body compressed, thin, splendent.

## No. LVII.

*ZEUS corpore sub-rhomboido; radiis quibusdam pinnæ dorsalis, ventralis, anique, longioribus, in setas longissimas coadunatis; cauda profunde bifida,*

The ZEUS with a body somewhat rhomboid; several rays in the dorsal, ventral, and anal fins, uniting respectively, form very long setaceous tails; the caudal fin deeply divided.

*Zeus Gallus, Linn. S. N. p. 454.*

Called by the Natives GURRAH PARAH.

*B. vii. D.  $\frac{5}{25}$ . P. 17. V. 6. A.  $\frac{1}{18}$ . C. 22.*

THE body nearly rhomb-form, compressed, very thin, without scales, smooth, shining.

The head large, declivous, much compressed, front very steep, and carinate; the nose large, emarginate. The mouth low, terminal, oblique, wide. The jaws nearly of equal length, extractile, feel to the finger like a file; the lips thin.

Teeth hardly visible, minute, set in many rows. Tongue short, linear, free, smooth. Palate tuberculate.

The eyes middle, at the root of the nose, close together, round, large, flat. Nostrils small, oval, between the orbit and the nose.

The opercula oblong, rounded, smooth, moveable; branchial membrane small, covered; the aperture large, lunated.

The trunk. The back arched, carinate; the sides much compressed; the throat and belly straight; the posterior part of the tail almost round, and very small. The lateral line forms an arch above the pectoral fin, and then runs straight to the tail, being carinate towards its termination. The anus near the throat.

The fins. The dorsal assurgent and declining; five short spines compose the first five rays; the next five are very long, and joining together form a setaceous tail, between six and seven inches in length; the next four rays are also long and setaceous, but shorter; the rest of the fin is low, equal, with eleven fibrous rays. The pectoral, middle, moderate length, and falcate; the ventral near the anus, the second and third rays the

longest, and joining with the other four, form a setaceous tail, like that of the dorsal. The anal, opposite to the dorsal, but shorter, forms, by the junction of the anterior rays, a setaceous tail also; but neither are equal in length to that of the dorsal; the caudal profoundly bifid; the lobes equal, sharp.

*Colour.* The ground colour of the upper parts, when the fish is fresh caught, is golden, reflecting a variety of changeable tints; the belly and parts under the lateral line, silvery, intermingled with mother of pearl; but these beautiful colours quickly vanish, and give place to five or six dusky transverse bands, not visible in the recent fish.

	Inches.	Lines.
Length from the rostrum to the caudal fin - - - -	4	6
of the caudal fin - - - - -	1	5
Greatest breadth - - - - -	3	5
Length of the long dorsal rays - - - - -	6	6
of the ventral - - - - -	4	5

### No. LVIII.

*ZEUS corpore sub-orbiculare, maxilla inferiore longiore; radiis quibusdam pinnæ dorsalis, ventralis, anique, filiformis, longissimis; aculeis ante pinnam dorsi et ani.*

The *ZEUS* with a somewhat orbicular body; the under jaw longer than the upper; some rays of the dorsal, ventral, and anal fins, very long and filiform; spiculi before the dorsal and anal fins.

*Zeus Vomer. Linn. S. N. p. 454.*

Called by the Natives CHEWOOLA PARAH.

*B. vii. D.  $\frac{7}{27}$ . P. 18. V.  $\frac{1}{6}$ . A.  $\frac{1}{17}$ . C. 20.*

THIS fish agreeing with the one last described, in the form of the head, the teeth, tongue, branchial ossiculi, and nearly in the situation and shape of the fins, differs specifically in various circumstances. The body is more orbicular, the belly being more rounded; the lateral line forms a higher arch and is not carinate; the pectoral fin is shorter, acuminate above, but not falcate; the caudal lobes are setaceous at the points; on the ridge before the spinous rays of the dorsal fin, are three small prickles which hardly appear above the skin; two others more visible, are found between the ventral fins and the anus.

The *colour* above the line is leaden, the rest silvery; but the sides are streaked conspicuously with three or four oblique fillets of a dark colour. The long rays of the fins are very slender, and being of a green colour, look at first sight, like the fibres of some marine plant entangling them.

	Inches.	Lines.
The <i>length</i> , from the nose to the caudal fin, - - - - -	2	6
Greatest breadth of the body - - - - -	2	0

No. LIX.

*ZEUS cauda lunulata; corpore sub-rhombeo; pinna ventrali unica, exiguissima.*

The **ZEUS** with a tail slightly lunated; a body somewhat of a rhombic form; the ventral fin single, and extremely small.

Called by the Natives **KAUKI SANDAWA.**

*B.* iv. *D.*  $\frac{8}{38}$ . *P.* 16. *V.*  $\frac{1}{5}$ . *A.*  $\frac{3}{32}$ . *C.* 22.

THE *body* somewhat rhomb-form, but the lower part towards the anal fin, more expanded than the back; compressed, squamous, and rough.

The *head* compressed, with scales on the vertex only; the rostrum projecting a little. The mouth, in respect to the tail, is middle, but much more distant from the anal than the dorsal fin, it appears very small, when shut. The jaws extractile, the upper longest, and rough as a file. The eyes near the rostrum, large, round. Nostrils small, round, double. The opercula smooth, the membrane concealed.

The *trunk*. The back assurgent, carinate; the breast and belly declivous to the anal fin; the sides very compressed. The lateral line arched. The anus distant from the tail.

The *fins*. The dorsal and anal are alike in shape, the spines and two first soft rays assurgent, then declining, and the last ten rays equal; the pectoral low, short, acuminate above; the ventral fin single, remarkably small, consisting of one short spine, and three or four setaceous rays; the caudal slightly concave or lunate. All the fins are squamous.

The *colour* silvery, with three dusky, oblique streaks on the shoulder; the dorsal fin yellow, with a black margin; the anal white, with a black margin; the caudal is yellow, slightly tipped with black.

The <i>length</i> , including the tail,	- - - - -	Inches.
		5
The greatest breadth	- - - - -	4

REMARKS.

I am in doubt whether this subject ought not to have been placed with the *Chaetodons*. In the ventral fin it differs from any I have yet met with of that genus.

No. LX.

*ZEUS corpore alepidoto, ventricoso; pinna ventrali unica, radiis duobus longioribus; pinnulis triginta loco pinnæ analis.*

The **ZEUS** with a naked body, and a very prominent belly; the ventral fin single, with two rays longer than the rest; thirty short pinnulæ in place of an anal fin.

Called by the Natives **AMBATA KUTTEE.**

*B.* v. *D.* 45. *P.* 16. *V.* 6. *A.* 34. *C.* 24.

THE *body* of a singular form, much compressed, the lower and hinder parts enormously expanded; altogether without scales.

The *head* large, high, compressed; rostrum short, obtuse. The mouth, when shut, small; lips thin. The jaws extractile in an extraordinary degree, forming a kind of tube when extended, and rough to the touch; the

tongue and palate smooth. Eyes middle, in respect to the mouth; moderate size, orbicular. Nostrils double, distant from the orbit. Opercula polished, silvery; the branchial membrane exposed.

The *trunk*. The back gently arched; the breast and belly declivous to the ventral fin, whence the hinder part ascended circularly to the tail; both were thin and carinated; the sides much compressed. The lateral line rising from the acuminate edge of the operculum, was hardly bent, and terminated unusually at the upper edge of the tail. The anus nearly middle.

The *fins* were all simple, and in other respects differ remarkably from others of this genus. The first twenty rays of the dorsal, slender, and declined gradually, the last twenty five nearly equal in length, capillaceous, and hardly connected by any membrane. The pectoral fins situated close to the branchial apertures, of moderate length, and the rays declined from the upper part; the single ventrical fin, close to the anus, had two setaceous rays united, nearly two inches in length, with four very short capillary rays; the anal consisted of thirty-four short pinnulæ, fringing, as it were, the posterior lower edge of the fish; the caudal fin deeply bifid.

The *colour* of the back leaden, with several rows of dark spots of various sizes; below which, the sides and belly roughly silverized, resembling the back of a mirror, but the colour, on handling adheres to the finger. The head and opercula are also silvery, but burnished.

The *length* four inches, the breadth three.

#### REMARKS.

Not being acquainted, when in India, with the Zeus insidiator, which appears to have been described and transmitted from India by Dr. Koenig; and of which a figure has been given by Bloch;\* I was at a loss to what genus to refer the present subject, and the seven fishes following, all which agree in the singular construction of the jaws, with the Insidiator, though differing widely in other respects.

The Zeus ore angusto of Bloch, (Insidiator Gmel. Linn. p. 1221) has seven branchial ossicles, and the fins have some spinous rays: it is, besides, a fresh-water fish. The present subject has only five branchial ossicles, no spinous rays in the fins, and, as well as the rest following, are caught in the sea.

The affinity of all, however, in the protrusion of the jaws, and (the present and another excepted) in the similitude in shape to others of this genus, has procured them a place here: at least for the present.

#### No. LXI.

*ZEUS corpore rhombeo, squamoso; cauda bifida; spinis dorsalibus octo; membrana pinnæ dorsalis antice macula insignita.*

The ZEUS with a rhombic, squamous body; a forked tail; eight spines in the dorsal fin, and the fore part of the membrane marked with a large spot.

Called by the Natives GOOMORAH KARAH.

*B.* iv. *D.*  $\frac{8}{24}$ . *P.* 15. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{17}$ . *C.* 18.

The *body* broad-ovate, or somewhat rhomb-form, much compressed, thin, resplendent; scales extremely small, close, tenacious.

The *head* declivous, broad thin, without scales, polished; front a little depressed; crown carinate, rostrum obtuse.

The mouth small, but the maxillæ so constructed, as to render it extractile and retractile, in an uncommon degree. There were no lips. The cheeks composed of fine, glassy, membranes, and the thin cartilages

\* Pl. 192.

extending them being perfectly white, gave to the whole, when protruded far beyond the rostrum, a tubular appearance, pellucid, glistening.

Teeth minute, perceptible only to the finger. Tongue short, round, smooth, free. Palate smooth. Eyes supreme very large, orbicular, not prominent; iris pearl. Nostrils double, close on the rostrum, the posterior largest. Branchial opercula smooth, oblong-rounded, the posterior a little acuminate; the membrane covered, four-rayed; aperture small.

The *trunk*. The back arched, carinate, the sides much compressed; the breast sub-carinate, the belly arched, the tail small, thin. The exterior branchiæ pectinate, on the inside. Lateral line, from the upper edge of the opercula, gently arched, and ending at the middle ray of the caudal fin. The anus nearer the head than the tail.

The *fins*. The dorsal rising from the highest part of the back, was continued to near the caudal fin; it consisted of eight declining, spinous, rays, (the first excepted, which was very short,) and sixteen ramous rays nearly equal in length, resembling united pinnulæ. The pectoral fin middle, short, acuminate above. The ventral shorter, with one spinous, and five ramous rays. The anal of the same form as the dorsal, but shorter, with one short, and two longer spines. The caudal bifid, the lobes sub-lanceolate.

The *colour*. The upper part of the head of a greenish yellow; all the rest, as well as the trunk, a shining white, changing in different lights like mother of pearl. The fins a pale yellow; and there was an irregular black spot on the middle of the dorsal fin.

The *length* of the subject five inches and a half; and it is seldom they are met with of greater length.

## No. LXII.

*ZEUS corpore rhombeo, squamoso; cauda biloba; spinis dorsalibus mollibus septem.*

The *ZEUS* with a rhombic, squamous body; a tail divided into two unequal lobes; and seven soft dorsal spines.

Called by the Natives ТОТТАН КАРАН.

*B.* v. *D.*  $\frac{8}{24}$ . *P.* 17. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{17}$ . *C.* 24.

THIS pisciculus agrees in most circumstances so exactly with the one immediately preceding, that it may suffice to mention the few in which they differ.

The eyes are smaller, and not so high; the lateral line forms a higher arch, and terminates near the upper edge (not at the middle) of the caudal fin; the spines of the dorsal fin are slender; the pectoral fins situated lower; and the caudal is divided into two unequal lobes, the under being broadest.

The *colour* a bright silver, with a few pale yellow bands on the sides. The dorsal, ventral, and anal fins, orange at the roots; above, glassy; the pectoral and caudal glassy, with a faint cast of yellow at the edges.

The *length*, of the subject nine inches; which was an uncommon large size, as they seldom exceed seven.

## REMARKS.

This fish when dressed tastes like the whiting. Two inches is their common size. They are caught, like the former, in vast numbers, and cured for the use of the inland countries.

## No. LXIII.

*ZEUS corpore rhombeo; cauda bifida; spinis dorsalibus octo, analibus majoribus duabus.*

The ZEUS with a rhombic body; a forked tail; eight dorsal, and two larger anal spines.

Called by the Natives КОМАН КАРАИ.

*B.* iv. *D.*  $\frac{8}{24}$ . *P.* 18. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{17}$ . *C.* 22.

THIS in its shape approaches somewhat nearer the rhomboid, but in all other material circumstances, agrees with the species already described. The eyes are a little more prominent, and the upper edge of the orbit prickly. The teeth larger than in the former, and somewhat curve. The lateral line terminated at the middle ray of the caudal fin; the pectoral fin inclined more to a falcate form; the caudal equally divided.

The *colour* silvery, as in the last species, but with bands of dusky yellow, between the back and lateral line. The spinous part of the dorsal fin, yellow at the bottom, and black above. The pectoral and ventral glassy; the anal, caudal, and hinder part of the dorsal pale yellow.

The *length* five inches.

## REMARKS.

There was another species (not drawn) distinguished by the name of Sudoon Karah, differing from the above in colour; in the body being a little more oblong; and in the gums being rough like a file, without visible teeth.

The *colour* universally silver, but the throat remarkably burnished; the belly white, not bright, the back reflecting various tints, from a silvery ground.

*Length* five inches.

## No. LXIV.

*ZEUS corpore rhombeo; cauda bifida; spinis dorsalibus novem; pinnis ventralibus parvis, muticis.*

The ZEUS with a rhombic body, and a forked tail; nine dorsal spines; the ventral fins small, and without spines.

Called by the Natives БИНДОО КАРАИ.

*B.* iv. *D.*  $\frac{9}{24}$ . *P.* 15. *V.* 5. *A.*  $\frac{3}{18}$ . *C.* 22.

THIS small fish comes nearest to the last in its shape, but in other characters agrees to the description of the first species, with the few following variations. The back before the dorsal fin was not only carinate, but to the finger felt serrated; distinct from the fin there was a small recumbent spine pointing forward; the scales rather less perceptible; the pectoral fin less falcate than in the last; the ventral had no spinous ray, and was much shorter than in any of the former species.



The *colour*, like the rest, was silvery, yet less bright above the lateral line : all the fins were of a pale yellow, except the anterior part of the dorsal, and whole of the tail, which were orange.

*Length* four inches. I never found them exceed six.

## REMARKS.

These also are prepared in the same manner for the supply of the inland countries.

## No. LXV.

*ZEUS corpore ovale; cauda bifida, sub-falcata; spinis dorsalibus, mollibus, declinatis, septem; macula obscura in pinna dorsi.*

The **ZEUS** with an oval body; a bifid, somewhat falcate tail; seven declining soft spines in the dorsal fin, and a darkish spot on the membrane.

Called by the Natives DACER KARAH.

*B.* . *D.*  $\frac{8}{24}$ . *P.* 16. *V.* 5. *A.*  $\frac{3}{21}$ . *C.* 20.

IN shape, this is more exactly ovate than any of the former, but in other respects differs from the last, chiefly in colour; in the back not being serrate; and in wanting the recumbent dorsal spine.

The *colour* a bluish white, somewhat darker on the back, and lighter on the belly; a broad yellow fillet from the opercula to the tail. The fins pale yellow, and a large dark spot on the fore part of the dorsal fin.

The *length* of the subject four inches, and seldom exceeds eight.

It is cured in the same manner as the former.

## No. LXVI.

*ZEUS corpore ovale, alepidoto, maculis oblongis vario; cauda bifida; radio dorsali analique secundo longiore.*

The **ZEUS** with an oval, naked, body; variegated with oblong marks; a bifid tail; and the second ray of the dorsal and of the anal fin very long.

Called by the Natives KARAH.

*B.* . *D.*  $\frac{8}{24}$ . *P.* 16. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{17}$ . *C.* 22.

THE paper containing the description of this pisciculus having been lost, I can say nothing more from recollection than that it possessed the general characters of those already described, and was of a silvery white, variegated, in the manner expressed in the drawing, though the exact colours are not remembered.

The *length* of the second dorsal and anal fins is a conspicuous character.

## No. LXVII.

*ZEUS corpore oblongo-ovato, squamoso; cauda bifida; radio dorsali secundo perlongo.*

The *ZEUS* with an oblong-ovate, squamous body; a forked tail; and the second dorsal ray very long.

Called by the Natives WODAWAHAH.

*B.* vi. *D.*  $\frac{9}{20}$ . *P.* 15. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{11}$ . *C.* 18.

The *body* oblong-ovate, much compressed, thin, scales large, ciliate, imbricate, tenacious.

The *head* declivous, thin, compressed; without scales, the front depressed, a little grooved; the rostrum short, obtuse. The structure of the mouth, the maxillæ, teeth, tongue, palate, eyes, nostrils, and opercula, as in the preceding species, but the branchial membrane had six rays.

The *trunk*. The back more arched than the abdomen, carinate; the sides and tail compressed; the latter rather broad near the fin; the abdomen rather flat. The branchiæ tuberculate. The lateral line conspicuous, supreme, very gently curve to the end of the dorsal fin, then straight. The anus nearer the tail than the head.

The *fins*. The dorsal long, consisting of nine spinous and ten ramous rays; the first spine very short, the second very strong, and ends in a setaceous tail, nearly equal in length to the body; the other spinous rays soft, and a little longer than the ramous. The pectoral fins long, narrow, falcate; the ventral long, broad; the anal had three spines and eight small, declining, ramous, rays; the caudal bifid.

The *colour*. The upper part of the head and back, of a darkish green, all the rest, especially the breast and abdomen, a bright silver. The fins glassy, with a faint yellow cast.

The fish described six inches in length, and they seldom exceed eight.

## REMARKS.

This fish is caught in the same season with the others, and cured in like manner. It agrees in the structure of the mouth, as well as in most other characters, but differed in some not immaterial: the shape is different, the scales larger; the pectoral fins longer, and the anal much shorter, than in any of the six preceding species; to which it may be added, that the branchial membrane has six rays

## No. LXVIII.

*ZEUS corpore ovato, squamoso; cauda bifida; radio dorsali secundo longiore, capillaceo; spina anali unica.*

The ZEUS with an ovate squamous body; a forked tail; the second ray of the dorsal fin long and capillary; a single anal spine.

Called by the Natives WOODAN.

*B. v. D.*  $\frac{8}{21}$ . *P.* 15. *V.*  $\frac{1}{6}$ . *A.*  $\frac{1}{10}$ . *C.* 18.

THE principal differences of this pisciculus from the preceding, are a little variation in shape, the posterior portion of the dorsal fin by rising more in an arch, having more of an interrupted appearance; and the solitary spine in the anal fin.

There is very little difference in colour, but a row of blackish dots runs along the bottom of the dorsal fin, not found in the other.

The *length* seldom exceeds four inches.

## REMARKS.

I have before expressed my doubts of the propriety of placing some of the preceding subjects under the genus Zeus, more especially No. LIX. which bears so strong an affinity to the genus Chaetodon. Similar doubts subsist also in respect to No. LXVI. LXVII. and LXVIII. I was in hopes of receiving, in time before the publication of these papers, specimens of the above dubious fishes, from India, but have been disappointed.

Should No. LIX. prove a Chaetodon, the smallness of the ventral fins presents a good specific character.

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## PLEURONECTES.

## GENERIC CHARACTER.

*Caput parvum; oculi spherici, ambo in eodem latere capitis. Os arcuatum, maxillæ dentatæ, inæquales. Operculum tribus laminis (in plurimis) constans. Membrana branchiostega radiis iv.—vii. Anus capiti propior.*

*Corpus compressum, carinatum, altero latere sub-convexo, dorsum; altero plano, pallidior, abdomen.*

The head small; the eyes spherical and both on the same side of the head; the mouth arched; jaws unequal; set with teeth. The operculum usually of three laminae. The branchial membrane from iv. to vii. rays. The anus nearer the head than the tail.

The body compressed, carinate; one side somewhat convex, answering to the back; the other flat, and of a paler colour, to the belly.

## No. LXIX.

PLEURONECTES *oculis dextris; ore magno, ascendente; dentibus sparsis, acutis; corpore ovali, glabro; cauda in medio parum productior.*

The PLEURONECTES with eyes on the right side; a wide ascending mouth; sharp teeth, scattered; a smooth, oval body; the caudal fin projecting a little at the middle.

Called by the Natives ADALAH.

*B. vii. D. 52. P. 14. V. 6. A. 39. C. 18.*

THE *body* oval, much compressed; scales small, orbicular, imbricate, tenacious.

The *head* small, compressed, sharp; the rostrum without scales. The mouth large, ascending obliquely; the jaws long, straight, extractile; the teeth of unequal size, not in a close row, long, sharp, a little curve. The tongue short, roundish, emarginate, smooth at the point, rough towards the root. The palate set with small teeth. The eyes on the right side, large, globular, prominent, both on a line, one close to the vertex, the other near the posterior edge of the mouth. The nostrils small, round, one before the other, on a line with the superior edge of the orbit. The branchial opercula consist of two laminae, the posterior pointed; the branchial membrane of seven rays.

The *trunk*. The back and belly carinate, the sides compressed, very little convex; the upper or right side (which is common to this genus) dusky, the opposite side white. The tail flat. The lateral line rising from the top of the posterior operculum, after inclining by a gentle bend, runs straight along the middle of the tail. The anus is situated near the ventral fins in the carina of the belly.

The *fins*. The dorsal rising an inch and a half from the rostrum, is continued to within the same distance of the caudal fin; the anal nearly of the same length, terminates exactly opposite: the rays of both incline

to the tail. The pectoral fins situated low, and consist of short declining rays; the ventral a little more forward than the pectoral. The caudal undivided, oblong, juts out a little obtusely at the middle.

The colour of the upper side a dark gray, the lower, or blind side, a dull white.

	Feet.	Inches.	Lines.
Length from the rostrum to the middle of the caudal fin - - - - -	1	0	3
Breadth - - - - -	0	4	3

No. LXX.

PLEURONECTES *oculis dextris; corpore oblonga ovata, pinnis dorsi anique caudali junctis, sed non coadunatis; cauda brevi, rotundata.*

The PLEURONECTES with eyes on the right side; an oblong-ovate body; the dorsal and anal fins join the caudal, without coalescing; the tail short and rounded.

Called by the Natives JERREE POTOO. A.

B. v. D. 68. P. 6. V. 4. A. 59. C. 18.

THE *body* oblong-ovate, much compressed; covered with very small orbicular scales, ciliate, imbricate, and rough to the touch; dark on one side and whitish on the other.

The *head* very small, short, compressed, the front and rostrum carinated.

The mouth terminal, small, curve; the lips thickish, the lower (on the right side) being curled and hairy. A few very small, sharp, teeth only visible on the left side, at the corner of the curled mouth. The tongue small, smooth, immoveable. The eyes near the rostrum, and close on the corner of the mouth, small, orbicular. The nostrils double, the anterior with a small valve.

The branchial operculum consists of one lamina; the membrane concealed.

The *trunk*. The back and abdomen carinate; the sides much compressed; the tail thin. The lateral line, after making an arch over the eyes, runs straight along the middle of the tail. The anus thoracic, between the ventral fins.

The *fins*. The dorsal rising from near the mouth, is continued to the tail; the anal fin on the opposite edge, joins also with the tail, but neither in such a manner as not to be distinguished from the caudal rays: both are narrow, only widening a very little in the middle; the pectoral are situated near the branchial aperture, short, distinct, rounded; the ventral extremely small, and being partly adipose, the rays with difficulty can be counted; they cover the anus; the caudal small and round.

The *colour*, as already remarked, dark on one side, and whitish on the other. The dorsal and anal fins are of a darkish brown, with a narrow white edging.

	Inches.
The length, - - - - -	9
breadth, - - - - -	3

REMARKS.

This species appears seldom, and is never brought to the European tables.

Another species still more different from the common sole, and which is found in abundance, will be mentioned hereafter.

## No. LXXI.

PLEURONECTES *oculis dextris; corpore ovato, fasciato; spinulis ad radices pinnarum dorsi anique; cauda lata, mucronata.*

The PLEURONECTES with eyes on the right side; an ovate body, striped transversely; spinuli at the roots of the dorsal and anal fins; a broad, pointed, tail.

Called by the Natives JERREE POTOO. B.

*B. v. D. 64. P. 7 vel 8. V. 6. A. 58. C. 20.*

THE *head* and body much compressed, the back, breast and abdomen carinate.

The two sides, (as usual in this genus,) of different colours. Mouth small. There are no teeth in the jaws; the tongue short, sharp-pointed, and loose, the eyes of a beautiful emerald colour. The branchial membrane visible; the lateral line rising a little above the pectoral fin, runs bending very gently to the tail, but nearer the back than the belly.

*Fins.* The dorsal rises from the vertex, on a line with the eyes; the anal immediately below the anus; both are continued to the anal fin, without coalescing with it, and a row of minute spiculi runs along the roots of both, on the coloured, or right side. The pectoral fin rather high, small, pointed; the ventral also small, longitudinal, solitary; the caudal fin is pointed and marked with five oval spots.

The *colour* of the right side a dusky brown, striped transversely with thirteen or fourteen narrow bands of a lighter brown shade, which are continued on the dorsal and anal fins. The spots on the caudal fin are white, with a little mixture of black and yellow.

*Length*, five inches and a half.

## REMARKS.

This seems to be the rarest of the genus, and, like the former, was never brought of larger size.

## No. LXXII.

PLEURONECTES *oculis dextris; corpore oblongo, fasciato; pinnis pectoralibus nullis; radio primo pinnæ dorsi longiore.*

The PLEURONECTES with eyes on the right side; an oblong body striped transversely; no pectoral fins; the first dorsal ray longer than the others.

Called by the Natives JERREE POTOO. C.

*B. iv. D. 73. P. 0. V. 5. A. 63. C. 18.*

THIS small fish agreeing in its general form with the preceding, differs in the following circumstances. The eyes are placed less obliquely, round, and much smaller; the first ray of the dorsal fin thick, and longer than the others; the pectoral fins are wanting; the ventral much smaller, and just above the anus, which is in the carina of the abdomen.

The mouth, tongue, nostrils, junction of the dorsal and anal fins with the tail, are all as in the fish last described, but the lateral line rising nearer the mouth, forms a small arch before it becomes straight.

The *colour* of the right side dark gray, with cross fillets of light brown from the front to the tail; the caudal fin spotted with brown spots with black edges; the left side light coloured.

*Length* five inches.

### No. LXXIII.

PLEURONECTES *oculis sinistris; corpore lanceolato; lineis lateralibus duabus utriusque; pinnis pectoralibus carens; pinnæ dorsi, caudæ, anique unitæ; cauda attenuata, acuta.*

The PLEURONECTES with eyes on the left side; the body lanceolate; a double lateral line; no pectoral fins; the dorsal, caudal, and anal fins united; the tail terminates in a sharp point.

*B. iv. D. 148. P. 0. V. 4. A. 111. G. 10.*

Called by the Natives JERREE POTOO. D.

THE *body* lanceolate, much compressed; scales rather small, orbicular, imbricate, adherent, feel rough when stroked upwards. Of a dark colour on the left side, and white on the other.

The *head* narrower than the body, ovate, compressed; the rostrum long, compressed. The mouth not terminal, as in the English sole, but at some distance from the extremity of the rostrum, on the verge of the abdomen; not corrugated on the dark or left side, but rough with some small tubercles and pili on the white side. The tongue and teeth as in No. LXX.

The eyes placed obliquely (though sometimes on an even line) between the lateral line and corner of the mouth, small, orbicular. The nostrils single, divided by a membrane: and situated between the eyes, or rather a little nearer the nose.

The *trunk*. The back and abdomen carinate; the tail terminates in a sharp point. The principal lateral line commences at the middle point of the rostrum, and bending gently over the eyes, proceeds in a straight line to the tail. The second line is much higher, and runs parallel with the back. The anus is not in the carina of the abdomen, but a little on one side, giving place for a membrane which connects the ventral fin with the anal.

The *fins*. The long dorsal rises at the centre of the rostrum; the anal near the branchial aperture: they are of equal breadth, and both are united with the caudal fin, in such a way as hardly to be distinguished, and, with the few caudal rays, composing the pyramidal sharp pointed tail. There are no pectoral fins; and the solitary ventral is connected with the anal.

The *colour* of the left side blackish; of the right white; the dorsal, anal, and caudal fins, have a purplish cast.

*Length* of the subject described, one foot five inches; greatest breadth, three inches two lines.

### REMARKS.

This is the sole most common in India, and reckoned in delicacy even superior to that of England. The specimen drawn was of the largest size found at Vizagapatam; but, at Caringa, I have seen them considerably larger.

## No. LXXIV.

*PLEURONECTES oculis sinistris; corpore lanceolato, scabriusculo; ore cirroso in latere sinistro; lineis lateralibus duabus; pinnis pectoralibus nullis; pinna dorsi anique, caudali connate.*

THE PLEURONECTES with eyes on the left side; the body lanceolate, somewhat rough; the mouth cirrous on the left side; two lateral lines on each side; no pectoral fins; the dorsal, anal, and caudal fins united.

*Pleuronectes biliniatus Bloch. Pl. 188.*

Called by the Natives JERREE POTOO. E.

*B. iv. D. 97. P. 0. V. 4. A. 75. C. 8.*

THIS in general agrees with the preceding fish. It has no pectoral fins; the single ventral fin is joined to the anal by a membrane, the anus being on one side of the carina; and the junction of the dorsal and anal fins with the pointed caudal, is alike in both. There are also two lateral lines on each side; but besides these, there is here a third undulating, carinated line, from the corner of the mouth to the edge of the operculum. Other circumstances in which they differ are the following: the aperture of the mouth is not smooth on the coloured side, as in the former, but wrinkled and cirrous both above and below; the scales are smaller, as well as rougher, and the inferior edges tipped of a dusky white, gives a mixed colour, different from the uniform dark colour of the other sole, while the white of the right side is less pure: lastly, there is a marked difference in the number of dorsal and anal rays.

The *length*, ten inches; greatest breadth two inches four lines.

## REMARKS.

In this fish, Bloch met with the first instance of two lateral lines on the same side.

## No. LXXV.

*PLEURONECTES oculis sinistris; corpore rotundo-ovato, maculato; cauda pentagona, distincta.*

PLEURONECTES with eyes on the left side; a body of a round-ovate form, spotted; a pentagonal, distinct, caudal fin.

Called by the Natives NOOREE NALAKA. A.

*B. vii. D. 73. P. 11. V. 6. A. 58. C. 16.*

THE *body* round-ovate, much compressed, and the edges carinate; the left side dusky with a greenish cast, spotted with large, round, brown, spots; the other side of a bluish white.

The *head* small, compressed; the face without scales. The mouth terminal, large; the jaws extractile, the upper a little curve, the lower convex: both with a regular row of recurve, sharp teeth. The tongue awl-shape, blunt, smooth.



The eyes on the left side, near the vertex, the one exactly under the other, oval, large. The nostrils, on a line also, nearer the edge of the rostrum. The second branchial opercula pointed.

The lateral line forms a high arch above the pectoral fin, then sloping gently, it becomes straight: on each side of the straight part, is a faint, somewhat curve line. The anus between the ventral fins.

The *fins*. The dorsal rises above the eyes, and, like the opposite anal, widening a little as it descends, both terminate near the tail; two ventral fins larger than usual; the pectoral high, the rays declining; the caudal fin distinct, broad, pentagonal.

*Length*, from the rostrum to the caudal fin, eight inches; the greatest breadth, four.

## REMARKS.

The dorsal and anal fins are sometimes spotted.

## No. LXXVI.

PLEURONECTES *oculis sinistris; pinnis ocellatis; corpore ovale, maculis ternis prope caudam insignito.*

The PLEURONECTES with eyes on the left side; ocellated fins; an oval body, and three remarkable spots near the tail.

Called by the Natives NOOREE NALAKA. B.

*B.* vii. *D.* 68. *P.* 12. *V.* 6. *A.* 47. 16.

THIS fish agrees with its genus in the compressed form of its body, and the different colour of the opposite sides; it resembles the fish last described, in the form of the jaws, and the lateral line, as also in its oval shape. There are no teeth in the jaws; the cheeks membranous; the lower eye nearer the edge of the mouth, the rays of the dorsal and anal fins are proportionally longer, and, as well as the tail, are always spotted; the oblong pointed tail, is very different from the former: the situation of the pectoral and ventral fins is the same.

The *colour* of the left side is very dark, sometimes obscurely spotted with brown; the spots on the fins are black: but the spots placed triagonally on the back (which seem to be constant) afford a good specific character: The two anterior are exactly round, jet black, with a white dot in the centre, and a rim of dusky white: the posterior of the same colour, is exactly triangular, and placed on the lateral line.

The *length*, from the rostrum to the point of the tail, five inches, six lines.

## No. LXXVII.

*PLEURONECTES oculis sinistris; corpore ovale, fasciis fuscis; linea laterali sub-undulata, aspera; cauda oblonga, in medio parum productiore.*

The *PLEURONECTES* with the eyes on the left side; an oval body with brown cross bands; the lateral line rough, and somewhat waving; the oblong caudal fin elongated a little at the middle.

Called by the Natives NOOREE NALAKA. C.

*B.* vii. *D.* 54. *P.* 16. *V.* 6. *A.* 39. *C.* 16.

IN the form of the body, the head, the tail; the mouth, teeth, tongue, and position of the fins; this fish agrees with the *Adalah*, No. LXIX.; but the scales here are smaller; the lateral line carinate; the body, though of the same colour, is distinguished by cross bands of a darkish brown; and the eyes are on the left side.

The *length* six inches.

## REMARKS.

Of the above nine species of this genus, No. LXXIV. is the only one I have found described by authors. Bloch mentions the having received a specimen of that fish from Tranquebar.

The addition in Gmelin's edition of Linnæus consisting of eight or nine new species, made the whole amount to twenty-six, and to these, three or four have been added since.

The nets in India are not well suited for soles, which are known to feed at great depths, and require nets of a particular make. A French gentleman at Bimblipatam, undertook to direct a net of a proper construction, but the fishermen could not manage it to advantage, and we had no success.

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## CHÆTODON.

## GENERIC CHARACTER.

*Caput parvum; os exiguum, labiis retractilibus; dentes (plurimis) setacei, flexiles, mobiles, æquales, confertissimi, numerosissimi. Membrana branchialis iii.—vi. Corpus latum, tenue, compressum, squamis duris vestitum, pictum. Pinna dorsi antequæ rigida, carnosa, squamosa, ut plurimum aculeis aucta.*

The head small, mouth narrow, with retractile lips; the teeth (in many) setaceous, flexible, moveable, equal, very numerous and close. The branchial membrane iii.—vi. rays.

The body broad, thin, compressed, covered with hard scales, and coloured. The dorsal and anal fins rigid, fleshy, squamous, and generally with the addition of spines.

## No. LXXVIII.

CHÆTODON *cauda parum productiore in medio; spinis dorsalibus undecem; corpore et pinnis maculatis.*

The CHÆTODON with a tail projecting a little at the middle; the body and fins speckled.

*Chætodon Argus, Linn. S. N. p. 464.*

Called by the Natives POOL CHITSILLOO.

*B. iv. D.  $\frac{11}{27}$ . P. 16. V.  $\frac{1}{6}$ . A.  $\frac{4}{18}$ . G. 16.*

THE *body* of an irregular roundish form, much compressed, squamous, rough; scales small, orbicular, subciliate, tenacious, and (as frequent in this genus) they cover part of the fins.

The *head* small, much compressed, declivous, the crown and front only covered with scales. Mouth very small, terminal, horizontal; lips thin. The jaws of equal length, extractile. Teeth setaceous, numerous, close, equal. Tongue short, roundish, smooth, hardly moveable. Palate smooth. The eyes rather small, distant from the rostrum, high, separated from each other by a bony knob, the iris golden. Nostrils double, between the orbit and rostrum, one before the other, the anterior round, the posterior oval.

The opercula smooth, without scales, acuminate. The branchial membrane partly concealed; the aperture lateral, large.

The *trunk*. The back assurgent, carinate, the breast and abdomen slightly rounded; the sides and tail much compressed. The lateral line rising from the upper edge of the opercula, forms an arch ending at the narrow part of the tail, whence it is continued straight along the middle of the tail to the fin. The anus equidistant from the head and caudal fin.

The *fins*. The dorsal long, compound, interrupted; the first part possesses the straight ridge of the back, consisting of eleven spinous rays, lodged in a groove, into which they occasionally recline: the second part

possesses that part of the back which descends abruptly to the tail, and consists of sixteen soft, declining rays. The dorsal as well as all the other fins, except the pectoral, are covered with scales from the roots for some way upwards. The pectoral low, short, broad, declining; the ventral behind the pectoral, the second and third rays fibrous; the anal spines four, very strong, the other part of the fin resembles the soft rays of the dorsal; the caudal fin almost equal, the three middle rays only a little longer than the rest.

The *colour* of the fish a darkish grey which brightens towards the belly; the breast yellowish-white; the sides variegated by numerous round, black spots, as are also part of the dorsal, anal, and caudal fins. The rays of the fins in general darkish; and it may be remarked that the soft rays of the dorsal and anal fins, as well as the tail, remain expanded after death.

The *length* from the rostrum to the caudal fin nine inches; the broadest part of the trunk, six inches, three lines.

#### REMARKS.

This fish seldom, or never, appears at the European tables at Vizagapatam. Bloch mentions it as a remarkable circumstance that petrifications of this species are found in the mountains of Bilka in Italy. Part VI. p. 96.

#### No. LXXIX.

CHÆTODON *cauda integra parum productiore in medio; spinis dorsalibus novem; corpore sub-orbiculato; ocellis viride-aureis ad latus utrinque.*

The CHÆTODON with an undivided tail projecting a little at the middle; nine dorsal spines; a sub-orbicular body; green and gold small spots on both sides.

Called by the Natives LATTE.

*B.* vi. *D.*  $\frac{9}{30}$ . *P.* 16. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{22}$ . *C.* 18.

THE *body* somewhat orbicular, much compressed, nearly as broad as long. The scales oval, imbricate, and cover part of all the fins, except the pectoral.

The *head* large, much compressed; from the knob between the eyes to the rostrum very steep, without scales, except the front. The mouth low, very small, terminal, horizontal; lips thickish. Jaws extractile, the upper a little longer than the under; the teeth setaceous, numerous, close, equal; the tongue oblong, smooth, retracted, tied. The palate smooth.

The eyes supreme, distant from the point of the rostrum, large, orbicular, not prominent. The opercula smooth, without scales, the posterior leaf ciliate, acuminate. The branchial membrane exposed; the aperture large, lateral.

The *trunk*. The back assurgent and carinate to the dorsal spines, where it rises into a sort of hump and then descends gradually, but convex, to the tail; in the opposite direction, the line from the lower jaw to the anal fin, inclines gently, and then ascends circularly. The sides much compressed; the tail thin. The lateral line springing from the upper edge of the operculum, forms rather a lower arch, than in the former fish, but in like manner becomes straight near the end of the tail. The anus equidistant, oval.

The *fins*. The three first dorsal spines very short and small, and none of them nearly so robust as in the last fish, the soft rays form an arch. The pectoral fin very long, falcate. The first and second ventral rays,

terminate in a setaceous thread. The first and last anal spines short, the soft rays somewhat arched. The caudal fin intire, but the blunt projection in the middle rather more conspicuous.

The fins remain expanded after death, as in the former fish.

The *colour* of the upper parts a light gray, on a silvery ground, reflecting various tints in different lights, which growing lighter and lighter towards the belly, terminate in a rich mother of pearl. The knob between the eyes, the face, the opercula, and the breast look as if silverized; but what adds greatly to the beauty of the fish are small round spots of dark green and gold, disposed in regular transverse rows on the sides.

	Inches.	Lines.
<i>Length</i> from the nose to the caudal fin - - - - -	9	6
Caudal fin - - - - -	1	5
Pectoral fin - - - - -	4	5
Breadth between the dorsal and anal spines - - - - -	7	0

This fish is not common, and is not esteemed for the table.

No. LXXX.

CHÆTODON *cauda integra, medio parum productione; spinis dorsalibus octo; pinna dorsi, ani, caudæque fascia lata flavescente.*

The CHÆTODON with an undivided tail projecting a little at the middle, eight spines in the dorsal fin; a broad, yellowish band, on the dorsal, anal, and caudal fins.

Called by the Natives TERLA. A.

*B.* vi. *D.*  $\frac{8}{30}$ . *P.* 16. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{21}$ . *C.* 18.

THE *body* of this species in its form comes near the Latte. It is equally compressed and thin.

The *head* in its form, as well as the face, agree with the Latte; the position of the eyes, the nostrils, and the mouth, the lips, the tongue, and the palate are alike in both; but there is a variation in the teeth: the regular row is here wanting, the jaws only feel like a file, and in the upper are a few small curve teeth. There are a few scales on the lower part of the face, but the opercula are naked. The branchial membrane very visible.

The *trunk*. The back assurgent as in the Latte; the hump less, and the declivity from the dorsal spines less curve. The belly part of the fish as in the Latte; the hinder part to the tail more in a straight line; the lateral line and the anus in form and situation the same in both.

The *fins* in situation and shape agree very nearly also with those of the Latte. The three last dorsal spines are longer, and the posterior part of the fin more completely arched; the three anal spines are distinct, seemingly not connected with the anal soft rays.

The *colour* of the back gray, the face and belly silvery. The anterior part of the back, the membranes of the dorsal and anal fins, red; all the other fins are of a dull yellow; the opercula of a pale red.

	Feet.	Inches.	Lines.
The <i>length</i> of the subject described - - - - -	1	3	0
Greatest breadth - - - - -	0	0	9

## No. LXXXI.

CHÆTODON *cauda integra*; *spinis dorsalibus octo*; *fascia lata, rubra, in pinna dorsi, ani, caudæque.*

The CHÆTODON with an undivided tail; eight dorsal spines; the dorsal, anal, and caudal fins distinguished by a broad, red, band.

Called also TERLA. B.

*B.* vi. *D.*  $\frac{8}{30}$ . *P.* 16. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{25}$ . *C.* 18.

THIS species agreeing in most circumstances, excepting colour, with the one last described, may perhaps be reckoned only a variety: the variation however was found to be constant. The form of the body more rhombic; the teeth, as in the Latte, regular, setaceous, without the curve teeth in the upper jaw, as in the last species: the fins less squamous, but in like manner remain expanded after death.

The general colour silvery without spots; the lips and iris red; the membrane of the dorsal spines, and the pectoral fin slightly tinged with the same colour, but the dorsal, anal, and caudal fins distinguished by a broad band of deep red, on both sides.

*Length* ten inches.

## REMARKS.

The last two fish, though of inferior quality to the Pomfrets, are superior in quality to No. LXXVIII. and LXXIX. The latter, indeed, is sometimes brought under the name Terla, and the names of the three species are often confounded by the fishermen.

## No. LXXXII.

CHÆTODON *cauda lunata*; *spinis dorsalibus novem*; *aculeo mobile in sulco, ad caudam utrinque.*

The CHÆTODON with a lunate tail; nine spines in the dorsal fin; and a moveable spine in a groove, on each side of the tail.

*Chætodon Nigrofuscus, Forskal p. 64?*

Called by the Natives MATA.

*B.* iv. *D.*  $\frac{9}{34}$ . *P.* 17. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{26}$ . *C.* 18.

THE *body* perfectly ovate, much compressed, rough to the finger, but smooth to the eye; covered with very minute, oblong, tenacious scales, which are not, as in the preceding species, continued on the fins.

The *head* large, much compressed, the front declivous, but not so abrupt as in the former species, naked, yet to the touch roughish. The mouth nearer the belly than the back, small, terminal, horizontal; lips thin. Jaws of equal length, extractile. Teeth in a regular row, strong, though short, a little curve, fixed, yellow. Tongue short, small, white, tied. Palate smooth. The eyes high, large, round, nearer the opercula than the front. Nostrils near the orbit, close to each other, very small, round, the anterior largest. The opercula without scales, but roughish like the face. The branchial membrane concealed; the aperture semicircular.

The *trunk*. The back and belly arched and carinate. The sides and tail compressed. The lateral line high, not so much arched as the back, but descending obliquely to the narrow part of the tail, is continued waving to the root of the fin.

The anus nearly middle.

On each side of the tail where narrowest, there is an oval groove, tinged yellow on the inside, in which is lodged a moveable spine, the anterior point a little curve, the other point straight; it is furnished with a black sheath, moves as on a pivot, and, when raised, the curve point is turned forward.

The *fins*. The dorsal and anal long, and both, especially the last, regularly assurgent; the pectoral low, broad, pointed above, declivous; the ventral contiguous, pointed in the middle. The caudal lunate.

The *colour* generally a shining black, streaked on the head and several parts of the body with longitudinal lines of very dark blue.

The dorsal and anal membranes are leathery, resembling a bat's wing; the points of the spines white.

	Inches.	Lines.
The <i>length</i> from the rostrum to the caudal fin - - -	9	0
of the longest rays of ditto - - - - -	2	8
Greatest breadth of the body - - - - -	4	8

## REMARKS.

They are sometimes brought double the size of the subject described, but seldom appear at the European tables, though a very white, firm, and palatable fish. The crescent shape of the tail distinguishes it from the *Chætodon Nigricans* of Linnæus,

## No. LXXXIII.

*CHÆTODON cauda sub-arcuata; spinis pinnæ dorsi tredecem; fascia nigrante ad faciem; corpore lineis obliquis fuscis striato.*

The *CHÆTODON* with a tail slightly arched; thirteen dorsal spines; a blackish band cross the face; and the body variegated with oblique yellowish lines.

*Chætodon vagabundus?* Linn. *S. N.* p. 165.

Called by the Natives PAINAH.

*B. v. D.*  $\frac{13}{37}$ . *P.* 16. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{19}$ . *C.* 16.

*THE body*. This species in its form resembles many others of the genus, but the scales are uncommonly large, and the head and opercula are squamous, as well as the trunk and fins.

The *head* small, much compressed, with a short, blunt, rostrum: the scales smaller than on the trunk. The mouth projects more than any of the preceding, but the wide lips, jaws, setaceous teeth, tongue, and palate are as usual in the genus. The opercula squamous, and cover, without hiding, the branchial membrane.

The *trunk*. The back assurgent from the vertex, then arched; the breast and belly are carinate like the back, but less arched; the sides and tail much compressed. The lateral line forms a high arch and terminates, as in the last fish, at the upper edge of the tail. The anus middle.

The *fins*. The spinous part of the dorsal possesses the ridge of the back, the soft part, the declivity: both

are arched, the middle rays in each being longest. The same remark may be made on the anal, which is hardly half so long. The pectoral fins, very low, about the length of the head, acuminate above. The ventral close together, shorter than the pectoral; the caudal slightly arched.

The *colour*. The ground colour a yellowish-white; a dark brown band from the ridge of the back crosses the face to the throat; seven or eight yellow lines run obliquely, parallel to each other, from the back towards the head and opercula, and from the last of these a dozen of similar lines run obliquely towards the tail and anal fin. The spines of the dorsal and anal fins are of a reddish brown, the whole of the soft fins in both are of a dark chesnut, but the anal has a cross fillet of bright yellow, and the fibrous edge is of the same colour; the pectoral and ventral are whitish; the caudal yellow, with a transverse band of dark purple in the middle, and a border of reddish brown at the extremity.

The *length*, five inches three lines; the breadth three inches, six lines.

#### REMARKS.

If this be the *Chætodon vagabundus* of Linnæus, reference is made in Gmelin's edition to three figures in Valentine, and to an equal number in Renard's coloured figures. The former affords an instance of the liberty taken in the variation of the shape of the mouth, as the latter does of the colour of the whole fish.

#### NO. LXXXIV.

CHÆTODON *cauda truncata; spinis dorsalibus undecem; corpore ovato; fascia nigra ad faciem; quatuor ad latus.*

The CHÆTODON with a truncate tail; eleven dorsal spines; a black band across the face; and four on the side.

Called by the Natives МООТА.

*B.* iv. *D.*  $\frac{11}{31}$ . *P.* 15. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{22}$ . *C.* 18.

THE *body* in its compressed form, its small, roughish scales, carinated back and belly, the arched lateral line, and position of the fins, agrees with the general characters, only that the fins are not squamous.

The *head* large, the front very declivous from the eye to the rostrum, which projects a little. The mouth, lips and jaws as usual: but the teeth are strong, semi-conical, not setaceous; the tongue free, obtuse, and smooth; the palate also smooth.

The *fins*. The first spine of the dorsal very short, the others, as well as the soft rays, assurgent till near the end, where the rays shorten, giving a roundness to the hinder part of the fin; the anal assumes the same form; the pectoral short, acuminate in the middle; the ventral fins of the same length, with a setaceous point; the caudal exactly equal, or truncate.

The *colour* of the upper part of the head, and the back, very dark, but on the sides it changes to a dark blue, variegated by four black streaks running from the ridge of the back to near the belly. A streak somewhat lighter crosses the face, from the crown to the throat; while another like those on the sides, sometimes crosses the tail: but in the subject drawn there were only two black dots. The fins were of a very dark blue, or, in some lights, a black colour.

The *length*, including the caudal fin, three inches and a half.



## No. LXXXV.

CHÆTODON *cauda bifida; spinis tredecem pinnæ dorsæ; corpore fasciis nigrescentibus; macula nigra ad caudam.*

The CHÆTODON with a forked tail; thirteen dorsal spines; the body variegated with blackish bands; and a black spot on the tail.

Called by the Natives CALAMOIA POTA.

*B. v. D.*  $\frac{13}{28}$ . *P.* 17. *V.*  $\frac{1}{6}$ . *A.*  $\frac{2}{17}$ . *C.* 19.

THE *body* sub-orbicular, compressed, the scales large, roundish, tenaceous, and extended on the fins.

The *head* small, compressed, squamous, except the rostrum which is naked, smooth. The mouth, teeth, and tongue, as usual, but the lips are thickish, and the palate tuberculate. The eyes, high, oval. The nostrils single, lower than the orbit, and nearer the rostrum. The opercula squamous, and moves freely; the branchial membrane is readily discovered.

The *trunk*. The back arched, carinate, the breast convex; the belly straight and thin; the tail unusually broad. The lateral line conspicuous, slightly archèd, and terminates at a round black spot on the upper edge of the tail. The anus a little nearer the tail than the head.

The *fins*. The dorsal spines only a little archèd, being nearly of equal length; the hinder part of the fin broader, and acuminate in the middle; the pectoral and ventral of moderate length, acuminate at top; the anal has only two spines, and the other rays are of the same form with the dorsal; the caudal divided, but not deeply.

The *colour* of the back above the line, a pale yellow, with six darkish bands, which are extended on the dorsal fin; the rest of the body cinerious, growing lighter on the belly. The fins are of a dark colour.

The *length*, including the tail, six inches six lines.

## REMARKS.

This fish bears some resemblance to the Chætodon Saxatilis, Linn. S. N. p. 466.

## No. LXXXVI.

CHÆTODON *cauda bifurca; spinis pinnæ dorsalis tredecem; corpore fasciis cæruleis et maculis flavis, alternatim.*

The CHÆTODON with a forked tail; thirteen dorsal spines; and the body variegated with sky-blue bands and yellow spots, alternately.

Called by the Natives RAHTI POTA.

*B. v. D.*  $\frac{13}{26}$ . *P.* 18. *V.*  $\frac{1}{6}$ . *A.*  $\frac{2}{14}$ . *C.* 16.

THE *body* is rather more oval, than the fish last described, but in the form of the scales, the disposition and shape of the fins, opercula, lateral line, and anus, they approach very near.

The *head* is not so low, the mouth consequently more central from the back and the belly; the jaws and

teeth as described before; the lips thin, the tongue retracted, the palate smooth. The eyes lower, round, large. Nostrils double. The branchial membrane exposed; the aperture large.

The pectoral fin low, and in proportion long; the caudal a little more divided, than in the last, and the lobes sharper.

The *colour* a grayish pearl, with sky-blue bands on the sides, and a pale yellow, large, spot, between each band. The belly a dull white. The dorsal and anal fins have a bluish cast; the others a yellowish white.

The *length*, including the tail, six inches.

### NO. LXXXVII.

CHÆTODON *cauda integra, medio parum productiore; spinis dorsalibus quatuor; pinna dorsi analisque sicut alæ extensis; pinnis ventralibus longissimis, falcatis.*

The CHÆTODON with an undivided tail, projecting somewhat in the middle; four dorsal spines; the dorsal and anal fins extended like wings; and the ventral extremely long and falcate.

*Chaetodon Teira, Forskal. Descr. Anim. No. 82.*

Called by the Natives KAHI SANDAWA.

*B. iv. D.  $\frac{4}{35}$ . P. 17. V.  $\frac{1}{6}$ . A.  $\frac{3}{24}$ . G. 18.*

THE *body*. This species in its form differs from the others, it is transverse-oval, and the dorsal and anal fins have the appearance of wings extended. It is much compressed, covered with very minute scales, and is rough to the touch.

The *head* low, small, compressed, and, the crown and cheeks excepted, without scales. The rostrum short, blunt. The mouth small; lips thin; jaws nearly of equal length; teeth setaceous; the tongue and palate smooth. The eyes high, nearer the opercula than the rostrum, small, round, iris yellow. The nostrils stand obliquely, half way between the orbit and rostrum, the posterior oval, the other smaller, round. The posterior opercula acuminate, and lower part squamous. The branchial membrane partly exposed.

The *trunk*. The back thin, rapidly assurgent to the dorsal spines, then arched; the arch on the opposite side (the belly being hardly convex) less complete. The lateral line forms a low arch, and after waving a little terminates at the middle of the caudal fin. The anus is nearer to the gills than to the tail.

The *fins*. The dorsal and anal remaining expanded after death, forms something of a crescent, with the expanded tail projecting from the middle, but the upper limb is the longest; the dorsal ray longest measuring about five inches, and the anal four; the pectoral low, short, acuminate; the ventral falcate, ending in a setaceous tail, nearly four inches in length; the caudal fin intire, yet not truncate, the exterior rays, and two or three in the middle, being a little longer than the rest.

The *colour*, of the head, breast, and trunk, a dark gray; but a band of a still darker colour, crosses the face, and eyes, from the back to the gills, and another twice as broad crosses the body and pectoral fin: the hinder part of the fish is nearly the same colour as the band, with a tint of dark purple. The fins almost black.

	Inches.	Lines.
The <i>length</i> , from the rostrum to the caudal fin, - - - -	4	5
of the caudal fin - - - - -	1	2
Greatest breadth - - - - -	4	5

The *colour* in another subject, almost twice as big as the one now described, was more uniformly of a purplish black; and the bands were hardly discernible.

## REMARKS.

This is a rich and excellent fish; having the peculiar flavour of such as feed among the rocks.

It has been accurately described by Forskal who found it in the Red sea. The figure in Renard referred to by Gmelin, exhibits an extravagant variation in colour.

## No. LXXXVIII.

CHÆTODON *cauda alba, truncata; spinis dorsalibus tredecem, radiis aliquot pinne dorsi unitis in setam longiorem; corpore villis obliquis, curvis, cæruleis; aculeo curvo, vaginato, ad operculum.*

The CHÆTODON with a white, truncate tail; thirteen spines in the dorsal fin, and some of the rays united into a long filiform tail; the body adorned with oblique, curve cærulean lines; a curve, sheathed spine on the operculum.

Called by the Natives SAHNI TCHAPA.

*B.* iii. *D.*  $\frac{13}{35}$ . *P.* 19. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{24}$ . *C.* 17.

*THE body.* The form of this fish is singularly clumsy. It is much compressed, very broad towards the tail; that is, between the soft portion of the dorsal and anal fins, diminishes slowly towards the obtuse head, and terminates in a short, blunt rostrum. The scales small, imbricate, tenacious, margins ciliate, rough.

The *head* not large, declivous, much compressed, without scales, roughish. The mouth small; lips very thick; jaws extractile, the upper a little longer than the lower; teeth setaceous; tongue ovate, smooth, free. Palate tuberculate. The eyes high, forward, large, round. Nostrils double, one before the other, declining obliquely from the orbit to the rostrum, the anterior oval, and by much the largest. The opercula without scales; striate, rough; the rounded edge of the anterior lamina, armed with a robust, curve, channeled spine, one inch and three lines long, furnished with a sheath, and pointing backwards and upwards. The branchial membrane visible; the aperture large, lateral and gular.

The *trunk.* The back very gradually arched to the last of the dorsal spines, when it rounds off, descending almost perpendicularly to the tail. The breast and belly are less arched, but the posterior part rounded and bulging out, ascends in like manner as the back descends. The lateral line beginning at a remarkable mark, high on the shoulders, bends in a low arch to the middle of the tail. The anus central.

The *fins.* The dorsal occupies the back intirely, from the shoulder to the tail. It consists of thirteen assurgent, strong, not long, spines, and twenty-two soft rays, the four first of which uniting, form a setaceous tail, eight inches in length: the rest of the fin is hardly an inch in breadth, declining very little to the end; the pectoral rather short, acuminate above; the ventral long, falcate, ending in a setaceous tail of three inches; the anal commencing a little behind the anus, and following the shape of the body, ascends arch-form opposite to the dorsal; the caudal fin entire, and like the dorsal and anal, remains expanded after death. The fins, as usual, are squamous.

The *colour* of the head a reddish orange; of the body, a dull golden, with several curve, azure fillets, which are continued on the dorsal fin: two of them, from the front, cross the face and opercula; on each shoulder, there is a remarkable square spot, orange in the middle, the sides azure; the dorsal and anal fins are darker

than the head, with fillets of darker azure than those on the body; the pectoral yellow; the ventral fins striped sky blue, yellow and brown. There are three transverse fillets of light blue on the tail, but the fin is perfectly white with only an elegant narrow edging at the end.

In a smaller subject the head was cinerious; the yellow colour of the body darker, and the azure fillets brighter; but their shape, nor that of the mark on the shoulder did not vary.

	Feet.	Inches.	Lines.
<i>Length</i> , from the rostrum to the caudal fin - - - - -	1	0	0
of the caudal fin - - - - -	0	1	8
Greatest breadth of the body - - - - -	0	8	0
Breadth of caudal fin at the base - - - - -	0	1	8
at the end - - - - -	0	3	0

## REMARKS.

The present subject bears a strong resemblance to the *Chætodon Annularis*,\* but differs principally in two circumstances: the one, the setaceous elongation of the dorsal fin, resembling that of the *Chætodon Setifer*;† the other, (less material) in the remarkable ring on the shoulder being rather square than of a circular figure.

The genus *Chætodon* may be reckoned of all others the most numerous. It is supposed to comprehend above eighty species; though all of these have not been exactly described, and drawings of many are still wanting. To twenty-three species known to Linnæus, forty have been added in Gmelin's edition of the *Systema Naturæ*; and among other new ones since collected by Bloch, are three or four beautiful species received from Tranquebar.‡ The greater part now known to naturalists have been furnished by the East Indies; but the American seas, besides possessing in common many of those, has a peculiar claim to others.

\* Linn. Ed. Gmel. p. 1263.

† Bloch, Pl. 426.

‡ *Chæt. Setifer*, Pl. 426.———*Falcula*, ib.———*Maculatus*, Pl. 428.

## SPARUS.

## GENERIC CHARACTER.

*Dentes incisores vel laniarii robusti; molares obtusiusculi, conferti. Labia duplicata. Membrana branchialis radiis quinque. Corpus compressum. Linea lateralis postice curvata. Pinne pectorales rotundatæ.*

The canine, or cutting teeth, strong, the grinders bluntish, and thick set. The lips double. The branchial membrane has five rays. The opercula squamous. The body compressed; the lateral line curved behind. The pectoral fins rounded.\*

## No. LXXXIX.

*SPARUS cauda bilobata; spinis dorsalibus decem; corpore cinereo.*

The SPARUS with a tail unequally bifid; ten dorsal spines; the body of a whitish gray colour.

Called by the Natives KARWA.

*B. vi. D.  $\frac{10}{20}$ . P. 13. V.  $\frac{1}{6}$ . A.  $\frac{3}{12}$ . G. 20.*

THE *body* oblong-ovate, compressed, smooth; scales large, roundish, ciliate, imbricate, tenacious.

The *head* very large, compressed, declivous, face smooth without scales; the front convex, steep; the mouth low, terminal, transverse, wide; lips thickish. Jaws extractile, upper somewhat longer than the under. Teeth dissimilar, canine and grinders, and behind the latter, both above and below are several close rows of very small teeth. The tongue short, round, obtuse, smooth, bridled. The palate wide, smooth. Eyes middle, large, flat. Nostrils double, equidistant from the orbit and point of the rostrum; the posterior oval, the anterior round; both small. The opercula consist of two laminæ and an appearance of a third; the anterior angular, the posterior rounded and squamous. The branchial membrane exposed; the aperture large, arched.

The *trunk*. The back arched, carinate, the breast and abdomen flat; the sides and tail compressed. Branchiæ tuberculate. Lateral line supreme, bending at first very gently, runs afterwards straight to the middle of the caudal fin. The anus remote, or nearer the tail than the head.

The *fins*. The dorsal consists of ten spinous rays, arched, reclining in a groove, and of ten ramous, assurgent rays; the pectoral low, acuminate above, long; the ventral also in a groove, long, setaceous; the anal assurgent; the caudal bilobate, the upper lobe longest.

*Colour* a bluish gray, growing lighter towards the belly; the breast and belly white: some faint bluish streaks on the head. The dorsal, pectoral, and caudal fins have a yellowish cast; the ventral and anal a darkish blue: the inside of the mouth is of a yellowish red.

*Length* of the subject described one foot, including the tail.

## REMARKS.

In younger and smaller subjects, the edge of the dorsal and anal fins is of a deep orange; while the caudal and other fins are of a darkish red.

\* The generic character of the pectoral fins, in the Sparus, according to GOUAN, is *acuminatæ*, which agrees better to all the species following, than the *rotundatæ* of LINNÆUS.

## No. XC.

*SPARUS cauda ferè integra; corpore et pinnis rubris.*

The SPARUS with a tail nearly entire; the body and fins red.

*Sparus Erythrinus* Linn. *S. N.* p. 469?

Called by the Natives JAHNGARAH.

*B.* vii. *D.*  $\frac{11}{25}$ . *P.* 17. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{12}$ . *C.* 18.

The *body* oblong-ovate, compressed, red; scales large, roundish, a little ciliate at the edge, the base striate, imbricate, firm, extended on the fins.

The *head* large, compressed, declivous, front and face smooth, without scales, fleshy. Mouth low, nearly horizontal, large; lips thick, soft. Jaws of equal length, extractile. Teeth numerous, partly small, straight, partly large, recurve. Tongue large, sub-ovate, smooth, moveable. The palate rough. Eyes high, remote from the rostrum, large, orbicular, prominent. Nostrils double, near the rostrum, one oval, large, the anterior one oblong, divided.

The opercula squamous, the posterior lamina acuminate. The branchial membrane exposed; the aperture large, lateral and gular.

The *trunk*. The back carinate, and rising in an arch from the vertex to the middle of the dorsal fin, slopes gradually to the tail; the sides compressed, convex; the breast and belly rounded, not prominent; the tail broad and compressed. The lateral line high, arched, at first runs parallel to the back, then straight along the middle of the tail to the fin. The anus nearer the tail than the head.

The *fins*. The spinous rays of the dorsal arched, the others assurgent to the ninth, and then gradually shorten; the pectoral very long, acuminate in the middle, setaceous; the ventral, in like manner, acuminate, and setaceous; the anal ascendent, but rounded at the end, and all the rays, as in the dorsal, exceeding the membrane. The anal broad, and sub-lunate.

The *colour* of the whole fish, the fins included, a beautiful red, but the head and back, deepest; and beneath the lateral line, part of the white scales appearing gives it more of a pink colour.

*Length*, one foot eight inches.

## REMARKS.

About the beginning of March, this fish is caught in abundance with hook and line, from katamarans on the outside of the surf. They are strung as caught, and dragged astern of the katamaran to the beach, where they are sold at 2 dubs a piece.\* It is an excellent fish for the table. They are caught also in nets.

\* A halfpenny.

## No. XCI.

*SPARUS cauda bilobata; spinis pinnae dorsalis undecem; corpore lato, sub ovale, lineis longitudinalibus, parallelis, aureis argenteisque, alternatim.*

The SPARUS with a divided tail of two unequal lobes, eleven spines in the dorsal fin, a broad sub-oval body, with longitudinal, parallel lines alternately gold and silver.

Called by the Natives CHITCHILLEE.

$B. vi. D. \frac{11}{24}. P. 15. V. \frac{1}{6}. A. \frac{3}{14}. C. 18.$

THE breast and belly being here more convex than usual in this genus, gives the fish more of an oval form. The head is short, almost truncate; but the mouth, teeth, tongue, palate, eyes, nostrils, and scaly, acuminate opercula, are nearly as in the fish last described. The branchial membrane consists of six rays, half concealed.

The dorsal spines form an arch; the soft rays of the dorsal and anal fins nearly of equal length, and the ends fibrous; the pectoral and ventral sharp pointed; the caudal divided; the upper lobe a little longer than the lower.

The colour, varies in subjects of different size; in the one now described, the front was of a dark, shining green, the rest of the head silvery. The back and sides were striped longitudinally with narrow fillets gold and silver alternately, curve above the lateral line but straight below it. The dorsal fin ash colour with a black border, the ossicles silvery: the other fins pale yellow with orange margins.

In smaller subjects the fillets instead of gold were red above the line, and of a dusky yellow below it, in which case, there was a mixture of red on the fin.

The length, thirteen inches, and seldom exceeds sixteen.

The fish is not in much esteem for the table.

## No. XCII.

*SPARUS cauda sub-bifida; corpore vario, cinereo et nigro; spina ventralis, et secunda pinnae analis robustissima.*

The SPARUS with a somewhat bifid tail; the body variegated black and gray, the ventral spine, and the second anal spine, remarkably large and strong.

Called by the Natives CALAMARA.

$B. v. D. \frac{11}{23}. P. 15. V. \frac{1}{6}. A. \frac{3}{13}. C. 18.$

THIS species agrees in the essential generic characters. The head is sharper, the mouth higher, and the hinder part of the body fuller and rounder, than in the last species.

The spinous rays of the fins, particularly the ventral, and second anal, remarkably large. The pectoral fin long, broad and pointed. The ventral situated between two long, sharp, scale-like laminæ, are likewise large.

The *colour* of the head a dusky purple; of all the rest, including the fins, gray, but the scales on the trunk, having black margins, give the variegated appearance black and gray; the belly has a faint reddish cast.

The subject described measured only eleven inches: they are sometimes brought of a size considerably larger.

## REMARKS.

This species is in esteem, and often appears at the European tables; it is reckoned one of the rock fish, having the peculiar flavour belonging to that tribe.

## No. XCIII.

*SPARUS cauda fere integra; corpore rufo-albescente, operculo sub-serrato.*

The *SPARUS* with a tail very slightly lunate; the body a reddish white; the operculum slightly serrated.

Called by the Natives *CHIRTAH*.

*B.* vii. *D.*  $\frac{11}{25}$ . *P.* 16. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{12}$ . *C.* 16.

The *body* ovate; the scales remarkably small.

The *head* large, compressed; the front smooth, opercula squamous. The mouth, lips, jaws, teeth, tongue, eyes and nostrils, as usual. The palate rough. The anterior lamina of the opercula, a little serrated, the posterior acuminate.

The back, and the lateral line arched, the belly rather prominent; the tail broad; the anus remote.

The *fins*. The dorsal interrupted, the spinous rays slender, compared with the last fish, and the posterior part blunt-pointed; the pectoral and ventral fins, long, narrow, acuminate: the point of the latter setaceous. The anal assurgent, rounded; the caudal fin slightly lunate.

The *colour* of the head a reddish shining copper, that of the back is nearly the same intermixed with a dull white. The throat and belly whitish, with a yellowish red cast. The dorsal, anal, and caudal fins of a dull red: the pectoral and ventral pale red: the latter tipped with black.

*Length* of the subject thirteen inches.

## No. XCIV.

*SPARUS cauda integra; spinis dorsalibus decem; operculo sub-serrato; dorso et pinnis, purpurascens.*

The *SPARUS* with an undivided tail; ten dorsal spines; the operculum slightly serrated; the back and the fins of a purplish colour.

Called by the Natives *RANGOO*.

*B.* vii. *D.*  $\frac{10}{23}$ . *P.* 16. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{11}$ . *C.* 17.

The *body* of this species more oblong than the last; the scales larger and extended further on the fins.

The *head* declivous, and the mouth low, as usual in the genus, nor is there any variation as to the jaws, lips, teeth, eyes, and nostrils; but the tongue here is rough, and there are a few teeth in the palate. The opercula and membrane, as in the last described, the belly is more straight and flat, and the tail broader: the lateral line less arched.



The *fins*. The form and disposition of the fins are the same as in the last, but the soft rays are more ramous, and the dorsal spines here recline in a groove; the pectoral is very slightly falcate; and the ventral does not terminate in a setaceous point.

The *colour* of the face a very dark purple, the opercula lighter purple, the throat reddish. The back, above the line, of the same colour as the face, but beneath it, the purple brightens a little; the breast and belly reddish intermixed with white. The pectoral fin is orange, all the others are purple, of a shade lighter than the back; the edge of the caudal a reddish brown.

The *length* of the subject described thirteen inches, but they are brought double that size.

In quality it is not much esteemed by the Europeans.

### No. XCV.

*SPARUS cauda truncata; spinis dorsalibus decem; operculo anteriore serrato; pinnis flavescenscentibus.*

The SPARUS with a truncate tail; ten dorsal spines; the anterior operculum serrated; the fins yellow.

Called by the Natives YAPILLI.

*B.* vii. *D.*  $\frac{10}{25}$ . *P.* 16. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{12}$ . *C.* 18.

THIS species has a more serrated operculum, and the fins are more squamous than usual.

The *colour* of the face purplish; the back a dark gray, which grows gradually lighter on the sides below the lateral line; the sides streaked longitudinally with darkish fillets; the belly a yellowish white. All the fins are yellowish, but the edges of the dorsal, anal, and caudal, approach to an orange colour.

The *length* from the nose to the end of the caudal fin, thirteen inches.

### No. XCVI.

*SPARUS cauda integra; spinæ anales dorsalibus robustiores; corpore ovale, punctis lineisque cæruleis vario; macula rotunda ad lineam lateralem.*

The SPARUS with an undivided tail; the anal spines stronger than the dorsal; the oval body variegated with light blue dots and short lines; a round spot on the lateral line.

Called by the Natives KALLEE MAEE.

*B.* vii. *D.*  $\frac{10}{26}$ . *P.* 16. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{12}$ . *C.* 18.

THIS species agreeing in most respects, with the others already described, is sufficiently distinguished by its form and colour.

The *body* approaches nearer to oval than the others, and the crown is flatter; the anterior lamina of the opercula serrated, the second has a small dent in the edge, for the reception of a little blunt process on the edge of the posterior lamina. The tongue is smooth, bridled; the fore part of the palate rough.

The *fins*. The spines of the anal fin thicker than those of the dorsal; the pectoral fins acuminate above; the caudal entire.

The *colour*. The front adorned with several rows of small azure dots, and the cheeks and opercula with curve and straight lines of the same colour, some dots being interspersed: all on a changeable gold ground. The scales are of a dark ash-colour, with azure edges, giving an elegant appearance to the whole trunk; and on the lateral line is an orbicular mark, blue, brown, and white. The dorsal fin and upper half of the caudal a yellowish brown; the pectoral gray, the other fins blue.

The *length* of the subject described, six inches; but I have seen others nearly two feet long; and in such the colours were less vivid.

### No. XCVII.

*SPARUS cauda sub-bilobata; spinis dorsalibus decem; operculo anteriore serrato; corpore vittis obscuris; macula rotunda nigrescente supra lineam lateralem.*

The *SPARUS* with a tail slightly bilobed; the anterior operculum pectinate; obscure longitudinal bands on the body, and a blackish, round spot above the lateral line.

Called by the Natives DOONDIAWAH.

*B.* vi. *D.*  $\frac{10}{25}$ . *P.* 15. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{12}$ . *C.* 20.

The *body* ovate, the head rather more pointed than usual in this genus; the anterior lamina of the opercula serrated.

The *colour* of the head purplish, and faint red, but the opercula towards the branchiæ golden. The back has a dull greenish cast, with several curve dark fillets, running from the opercula to the tail; but below the line, the colour grows gradually lighter on the sides, changing on the belly to a pale yellow; the breast white with a yellow cast. The sides are also striped with dusky, straight fillets, and between the dorsal fin and lateral line there is an orbicular, blackish, spot. The fins are of a reddish yellow, the edge of the dorsal and caudal membranes orange.

*Length* of the subject, ten inches,

### No. XCVIII.

*SPARUS cauda sub-lunata; spinis dorsalibus decem; corpore oblongo ovale, lineis longitudinalibus et obliquis, fulvis et flavis; macula nigra ad lineam lateralem.*

The *SPARUS* with a tail somewhat lunate; ten dorsal spines; an oblong-oval body, with longitudinal and oblique lines of dusky and bright yellow; and on the lateral line, a black spot.

Called by the Natives ANTIKA DOONDIAWAH.

*B.* vii. *D.*  $\frac{10}{24}$ . *P.* 16. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{9}$ . *C.* 20.

The *form* of the head and position of the eyes nearly the same as in the last, the operculum also serrate; but the body is more of an oblong shape and the lateral line less arched.

The *colour*. The head red, shining as if varnished; the back of a darker red, which below the line brightens

nearly to pink; the belly a yellowish white; the breast white. Above the line, three or four darkish yellow lines run from the ridge of the back to the hind head; and below the line, two fillets of the same colour run straight to the caudal fin, while the other two of lighter yellow, and a little curve, run from the face to the anal fin: besides these, there is a remarkable oblong, black spot touching the lateral line. The dorsal and caudal fins are of a dull purple, the latter edged red; the other fins are yellow. These colours vary in subjects of different ages, but the spot on the lateral line is constant.

The *length*, eleven inches.

### No. XCIX.

*SPARUS cauda bifida; spinis dorsalibus decem; corpore fasciis duabus latissimis, sanguineis, insigniter picto.*

The SPARUS with a bifid tail, and ten dorsal spines; two remarkable broad, blood-colour bands on the body.

Called by the Natives BOTLAWOO CHAMPAH.

*B.* vi. *D.*  $\frac{11}{28}$ . *P.* 16. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{14}$ . *C.* 17.

THIS species, which is richly coloured, differs in the form of its body from those last described. The back is more arched; the breast and belly straighter; the scales smaller than usual in this genus, and the hinder part of the dorsal, as well as the anal fin, remarkably acuminate. The tail slightly bifid.

The eyes oval; nostrils small, distant from each other; the tongue long, lanceolate, smooth, free. Teeth regular, not close; some teeth in the palate. The first lamina of the opercula slightly serrated. The lateral line conspicuous but not carinate.

The front and rostrum are of a deep blood colour, the rest of the face and lips pink; two very broad bands of a still deeper red than the front, cross the trunk; one from the points of the three first dorsal spines to the ventral fin, the other from the margin of the hinder dorsal, curves to the under margin of the caudal, on which it is continued: the interstices between them a light gray, variegated with transverse lines of white dots. The throat white; the belly pale pink. The pectoral fin is pink; the dorsal, ventral, and anal, with the points of the caudal lobes, look as if dipped in blood.

*Length*, eleven inches; *breadth* three and a half.

## No. C.

*SPARUS cauda biloba; spinis dorsalibus decem; corpore oblongo-ovato, vario; linea lateralis descendens.*

The SPARUS with a tail unequally divided; ten spines in the dorsal fin; an oblong body variously coloured; the lateral line descending.

Called by the Natives SILA00.

*B.* vii. *D.*  $\frac{10}{24}$ . *P.* 16. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{12}$ . *C.* 18.

THE *body* oblong-ovate; the back not much arched, the sides compressed, the belly convex.

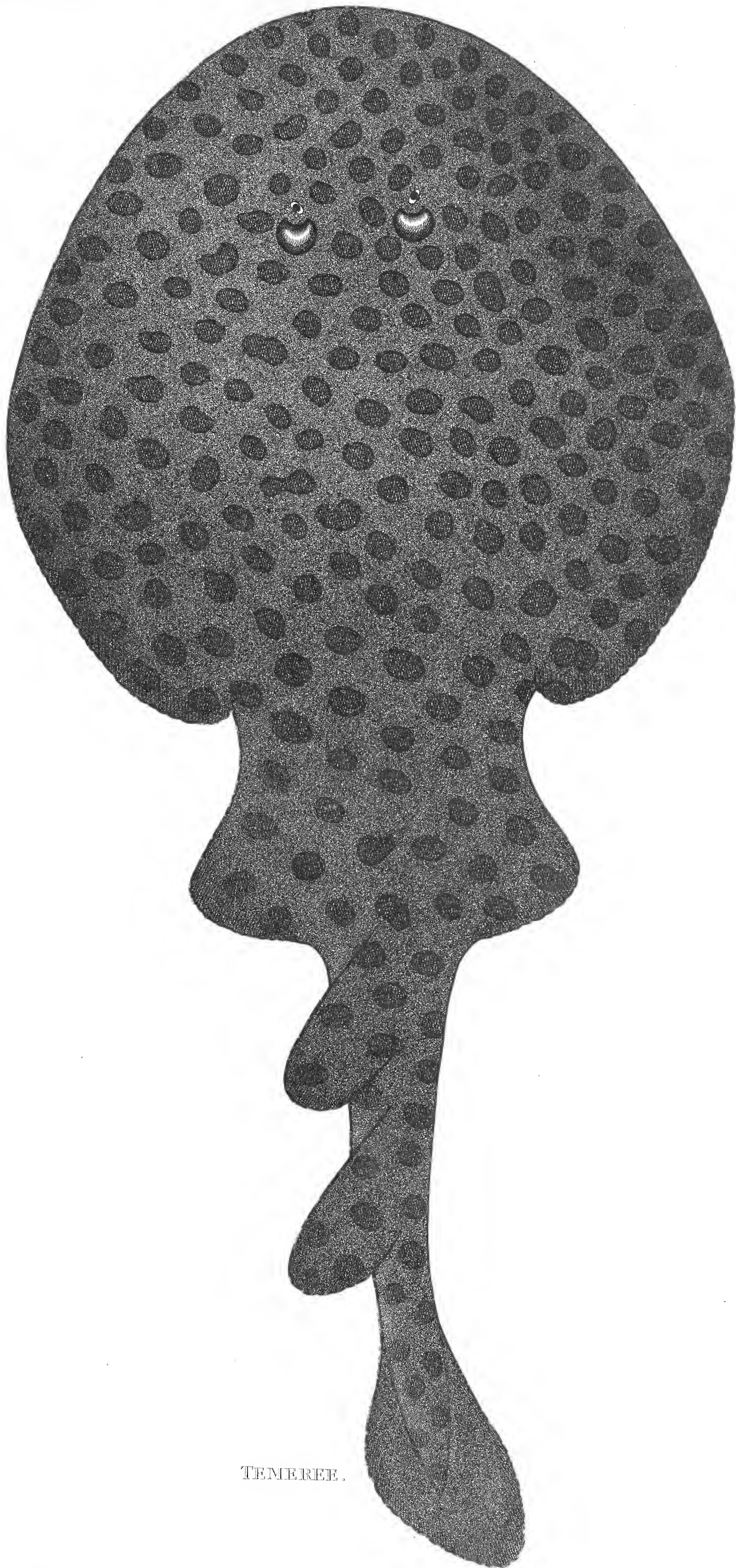
The *head* smooth, but less declivous than in most of the other species. Mouth large; fore teeth in the upper jaw long; tongue large, ovate, free, and like the palate, rough in the middle. The anterior lamina of the opercula slightly serrated. The lateral line very gently arched above the pectoral fin.

The *fins*. The dorsal and anal fins not broad, the posterior edge of both rounded; the pectoral short, acuminate; the ventral also acuminate; the caudal unequally divided, the lower lobe shortest.

The *colour*. The cheeks spotted yellow, on a light ground; the back cinerious, the sides, belly and breast reddish; the dorsal and caudal fin purplish; the pectoral has a yellowish cast; the ventral and anal a yellowish red. Sometimes the caudal fin is of a darker red and each lobe tipped yellow.

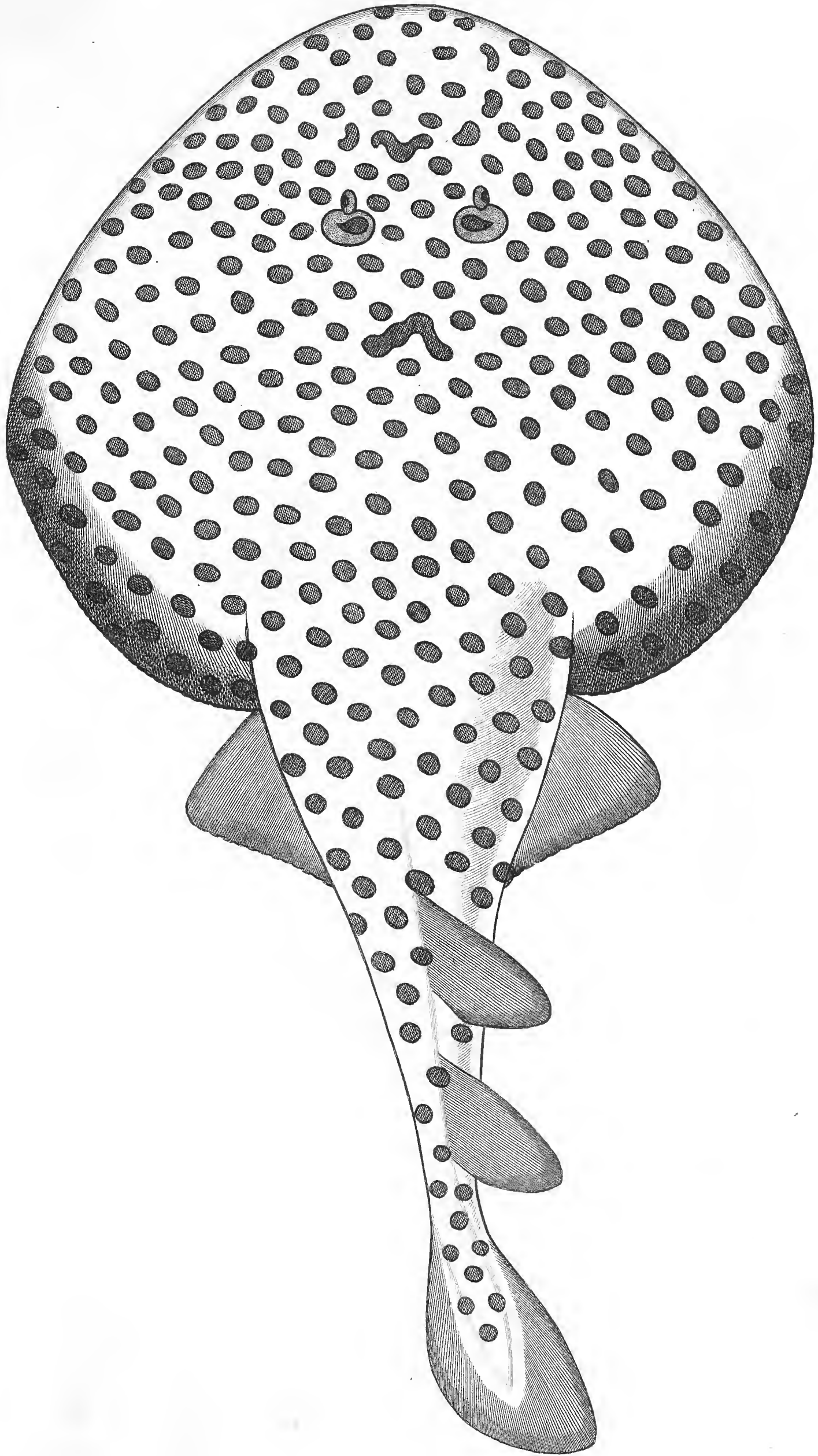
*Length* of the subject fifteen inches.

END OF VOLUME I.



TENEKRE.

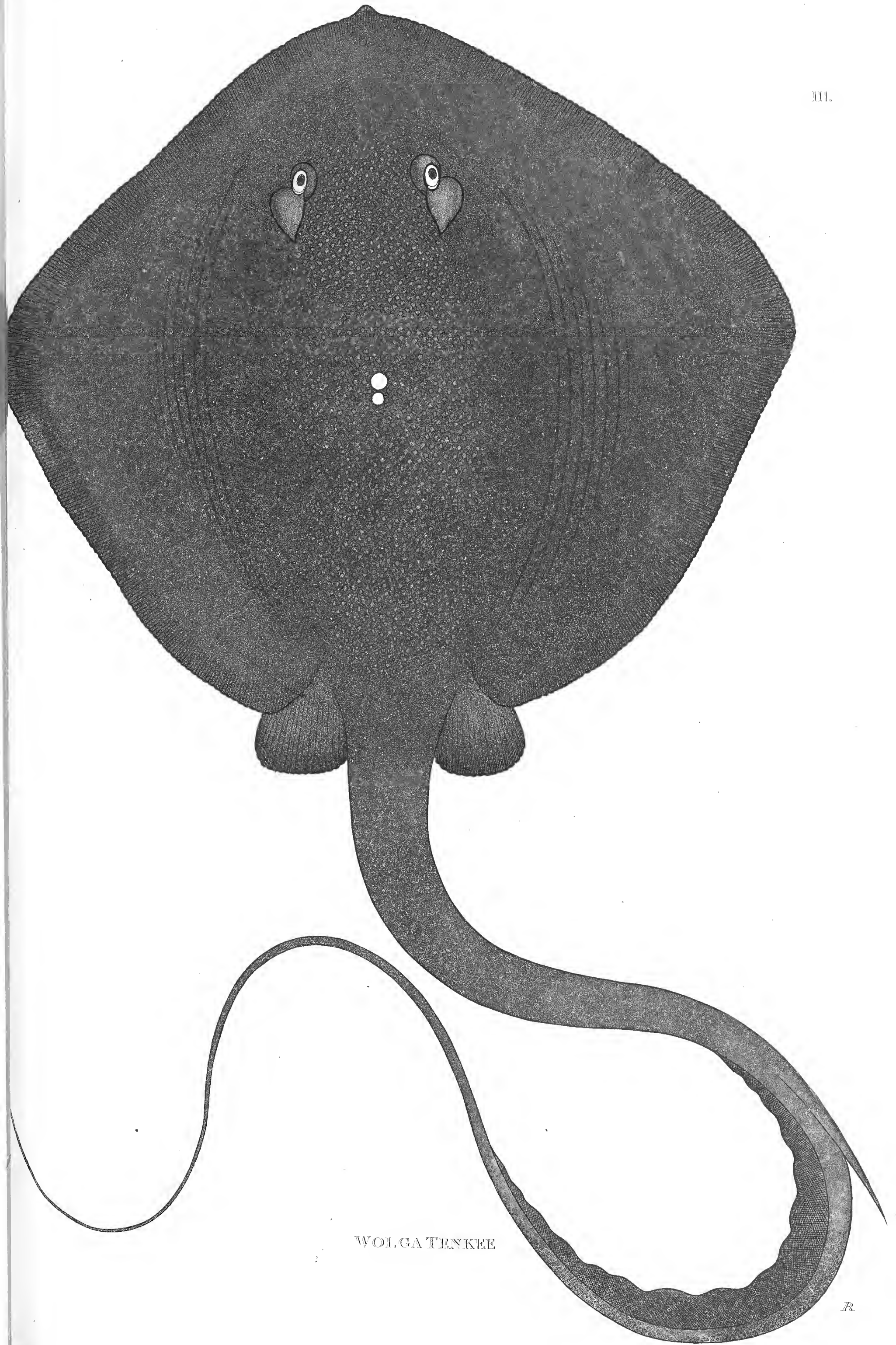




NALLA TEMERE.

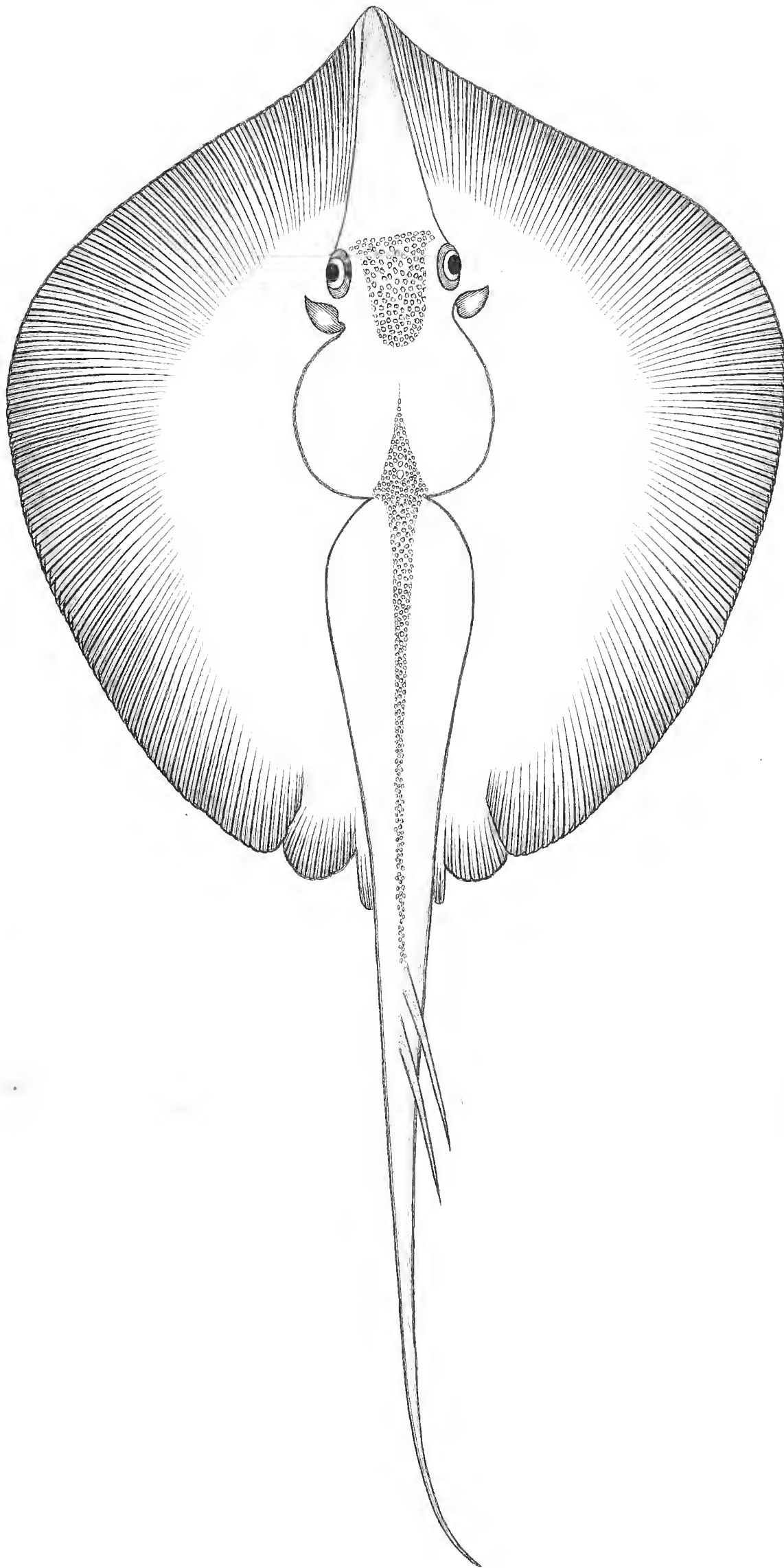






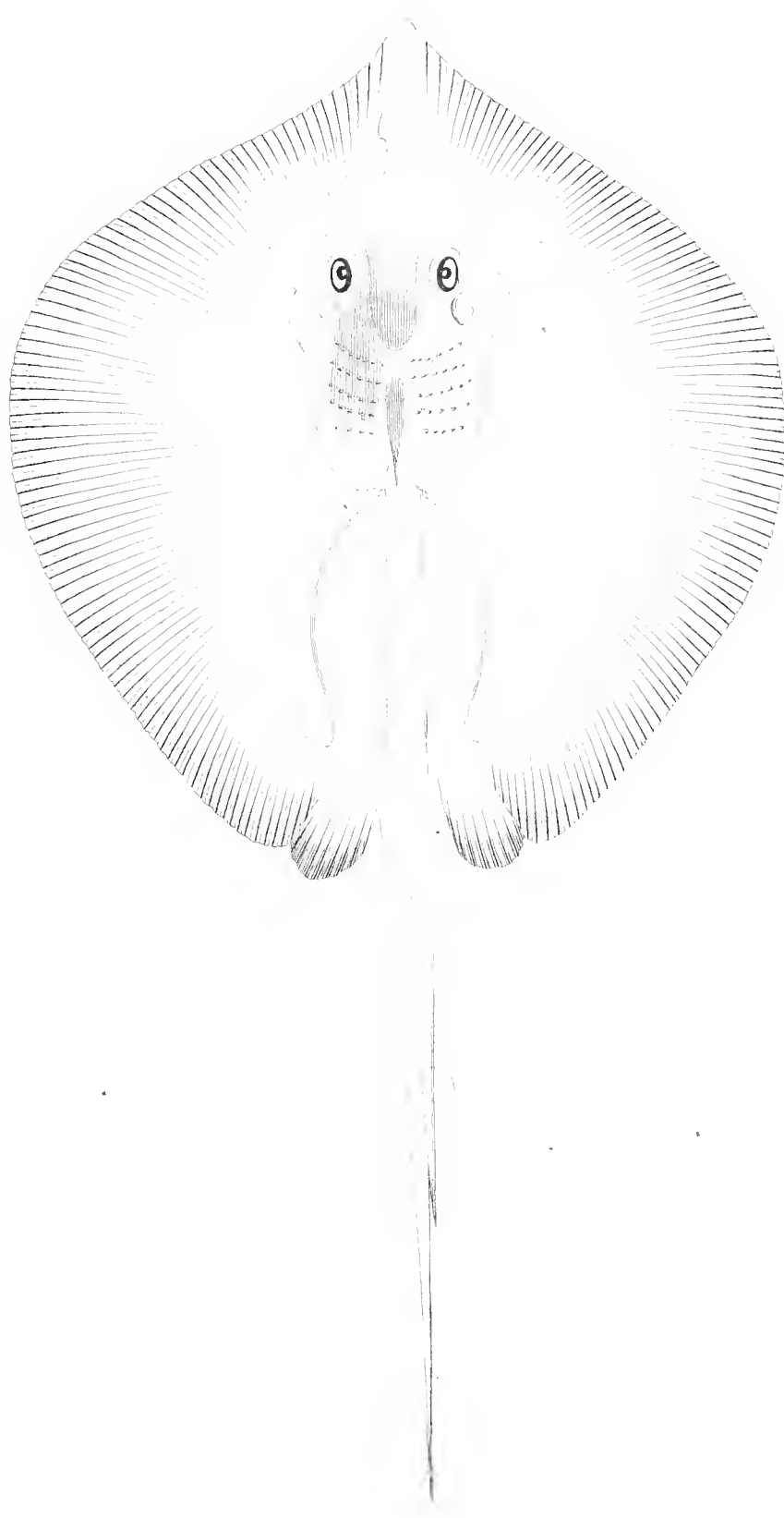
WOI, GA TENKEE





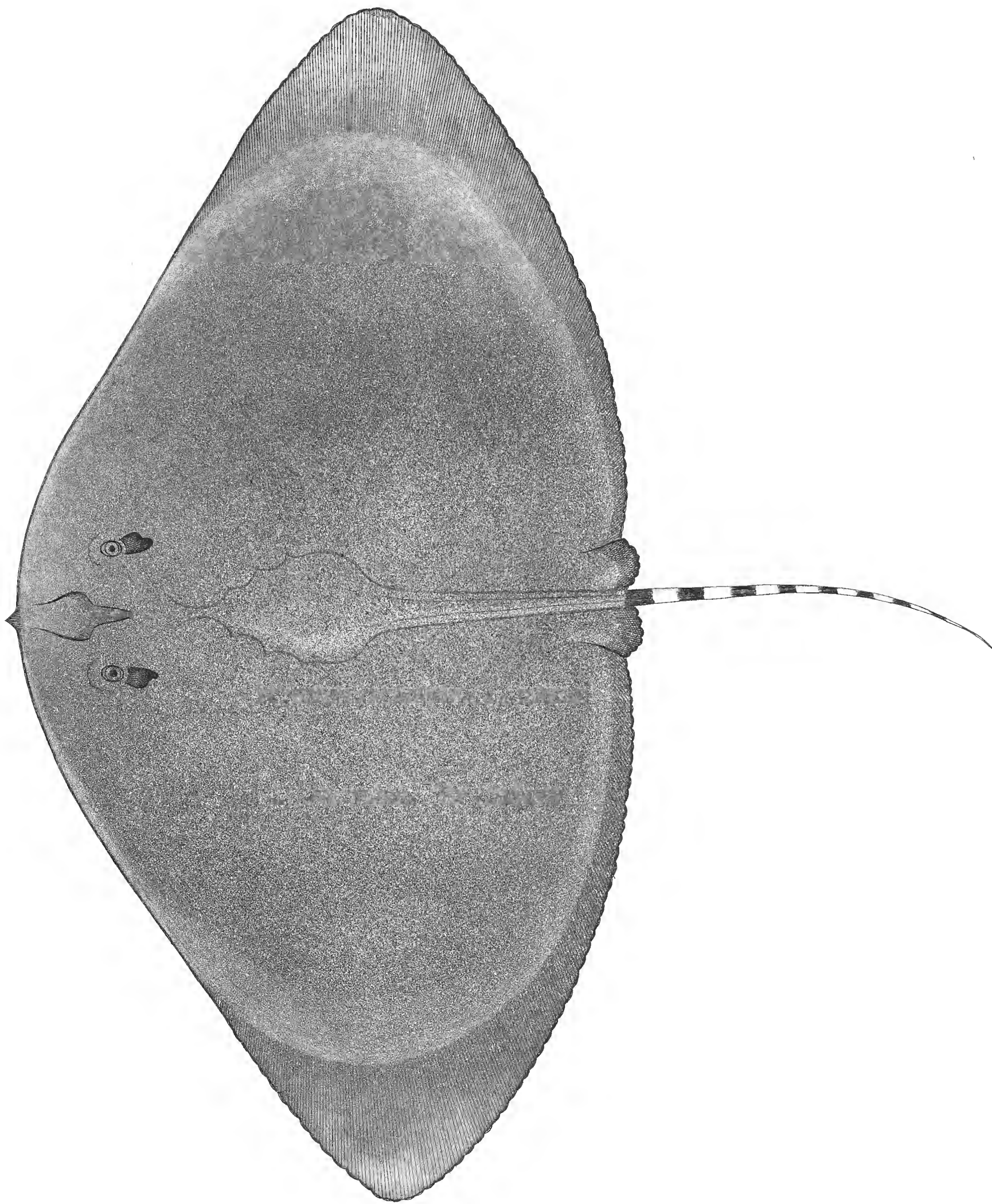
ISACURRAH TENKEE.





TENKEE SJUNDRAKL.





TENKEE KUN SUL.

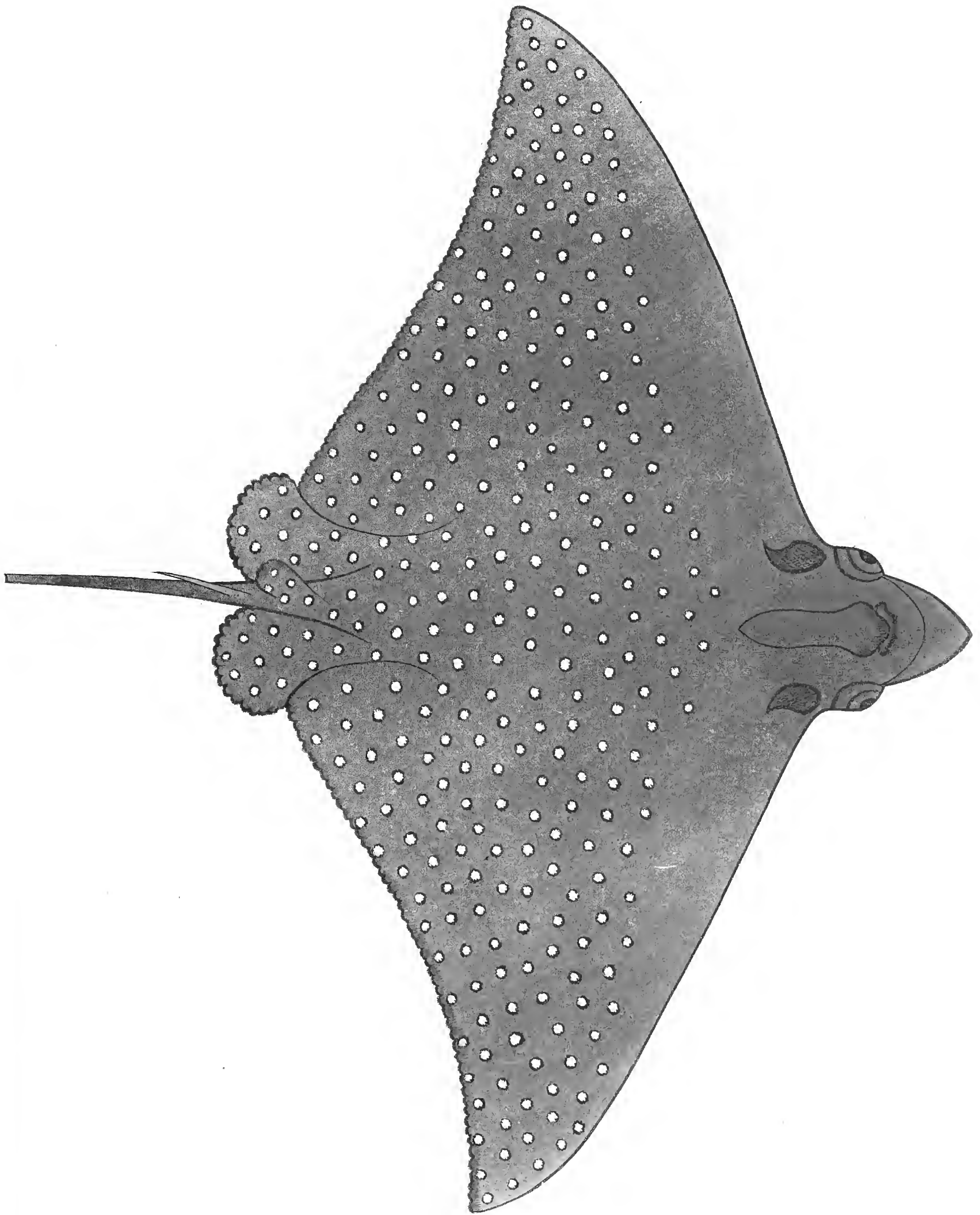






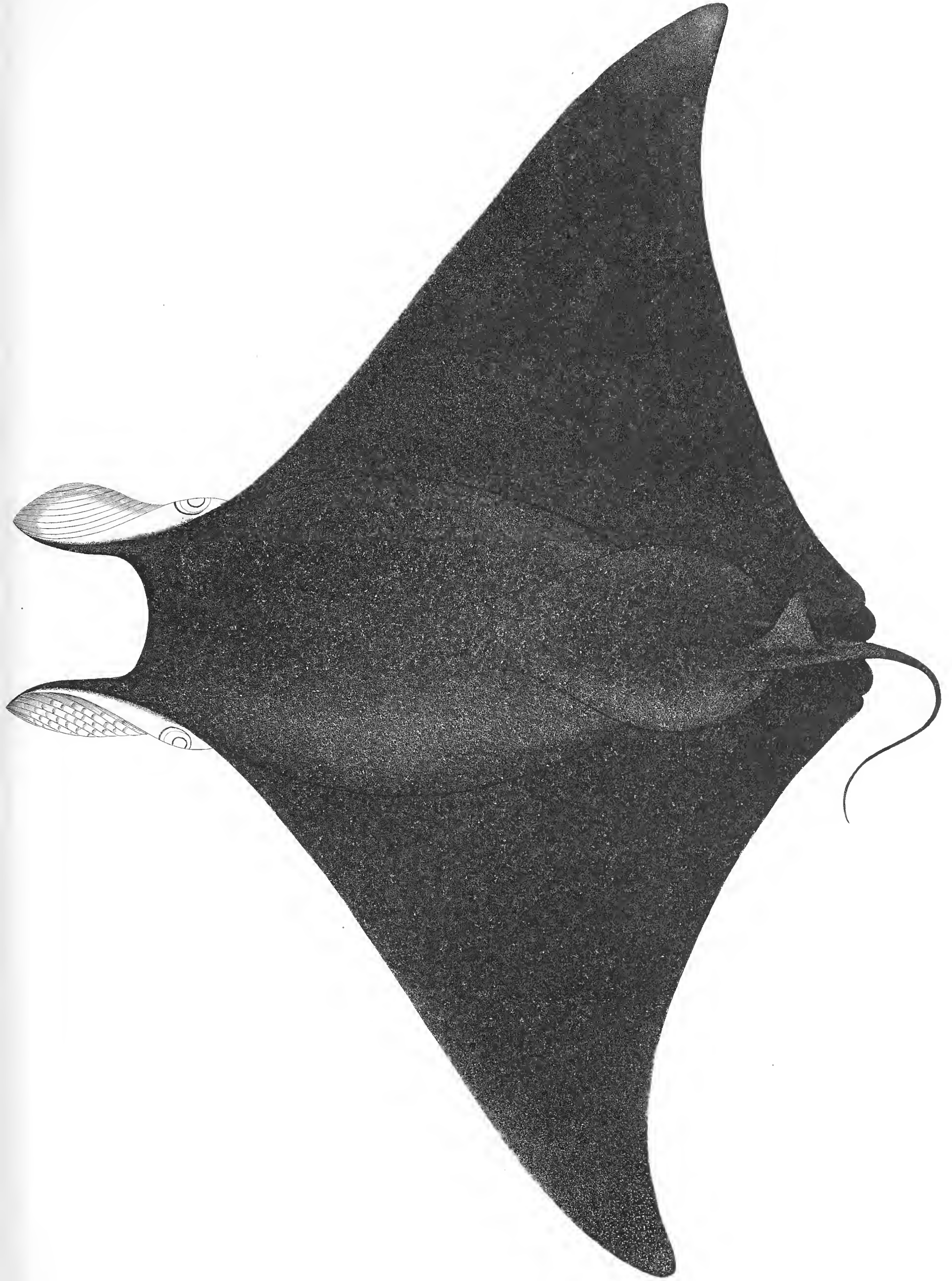
MOOKARAH TENKEE.





EEL TENKEE.





ERE GOODOO TENKEE.

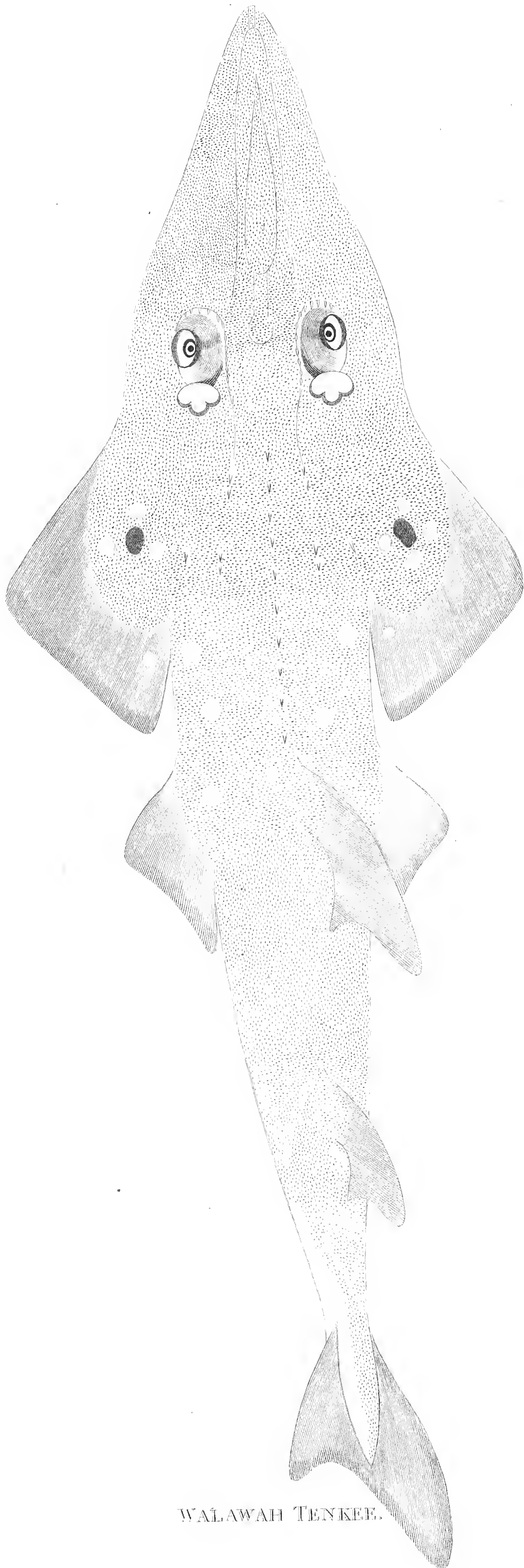




EREGOODOO TENKEE.

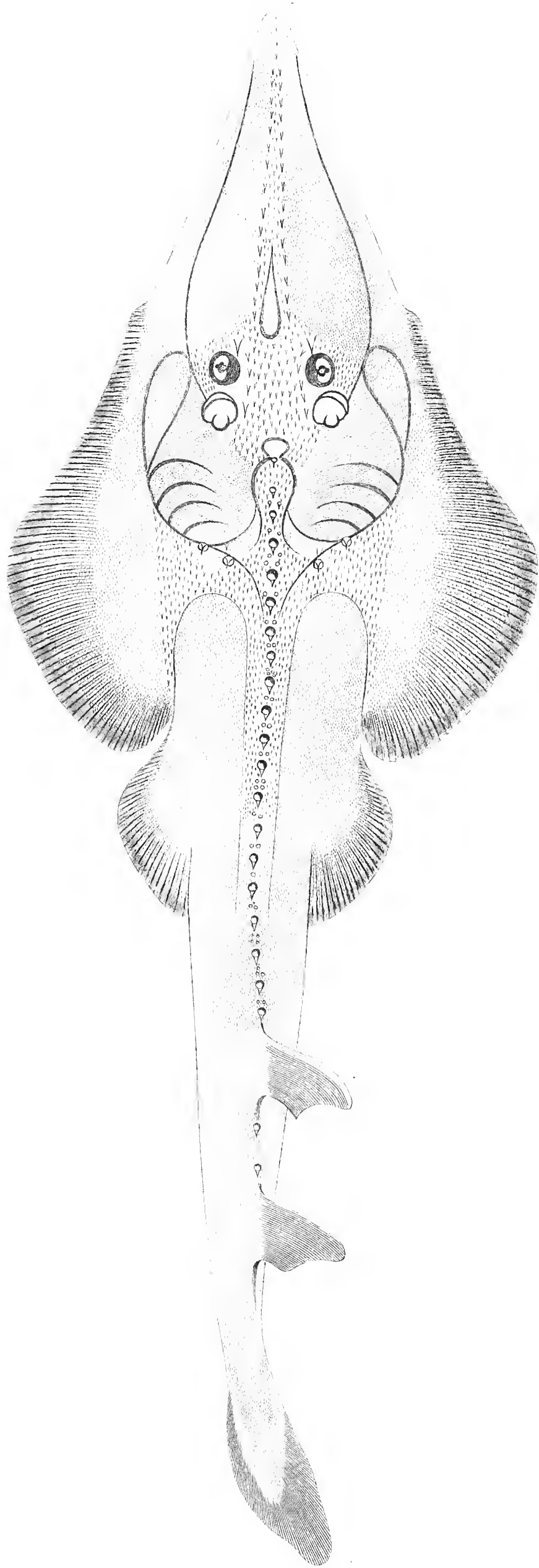






WALAWAH TENKEE.



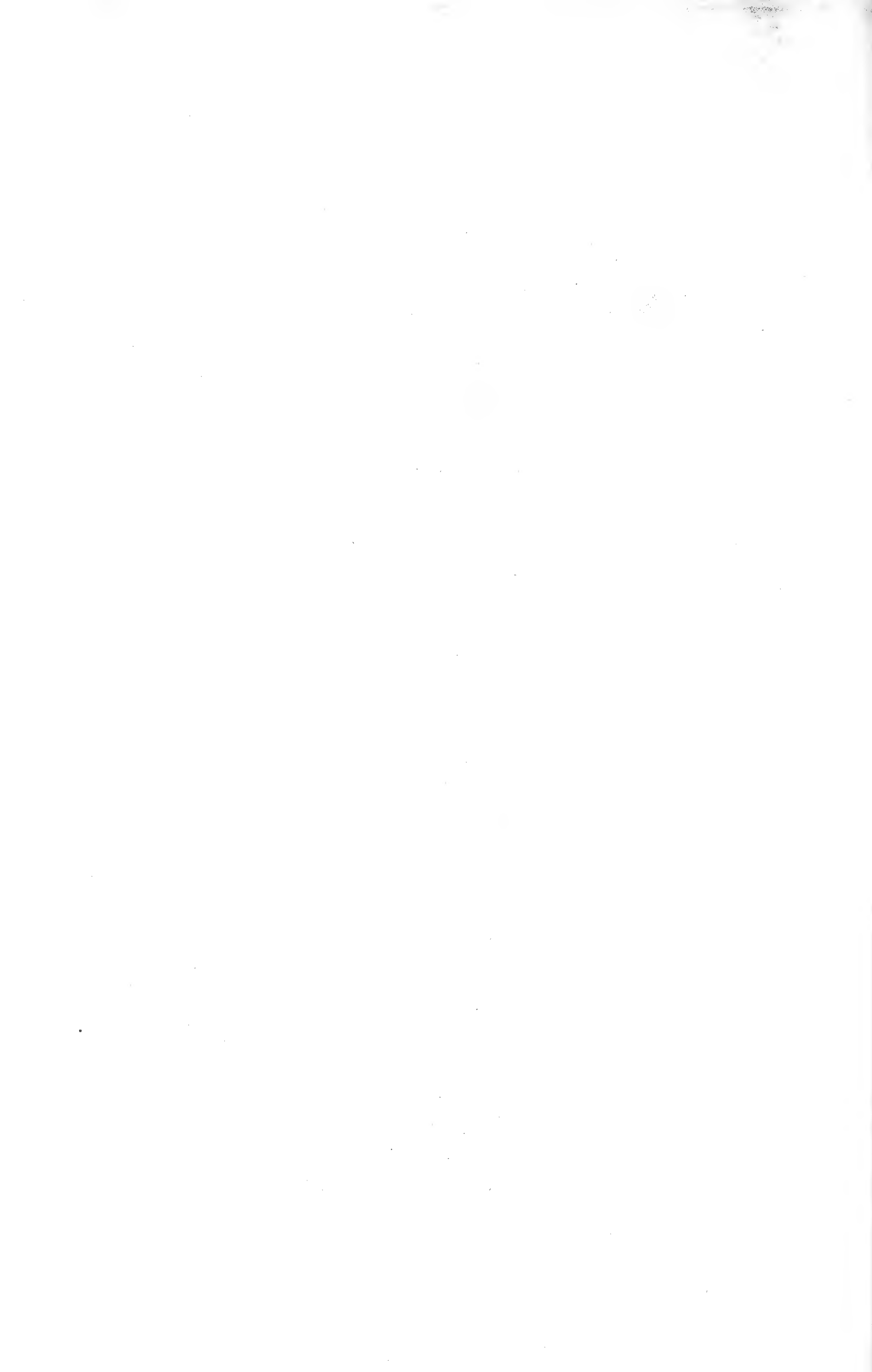


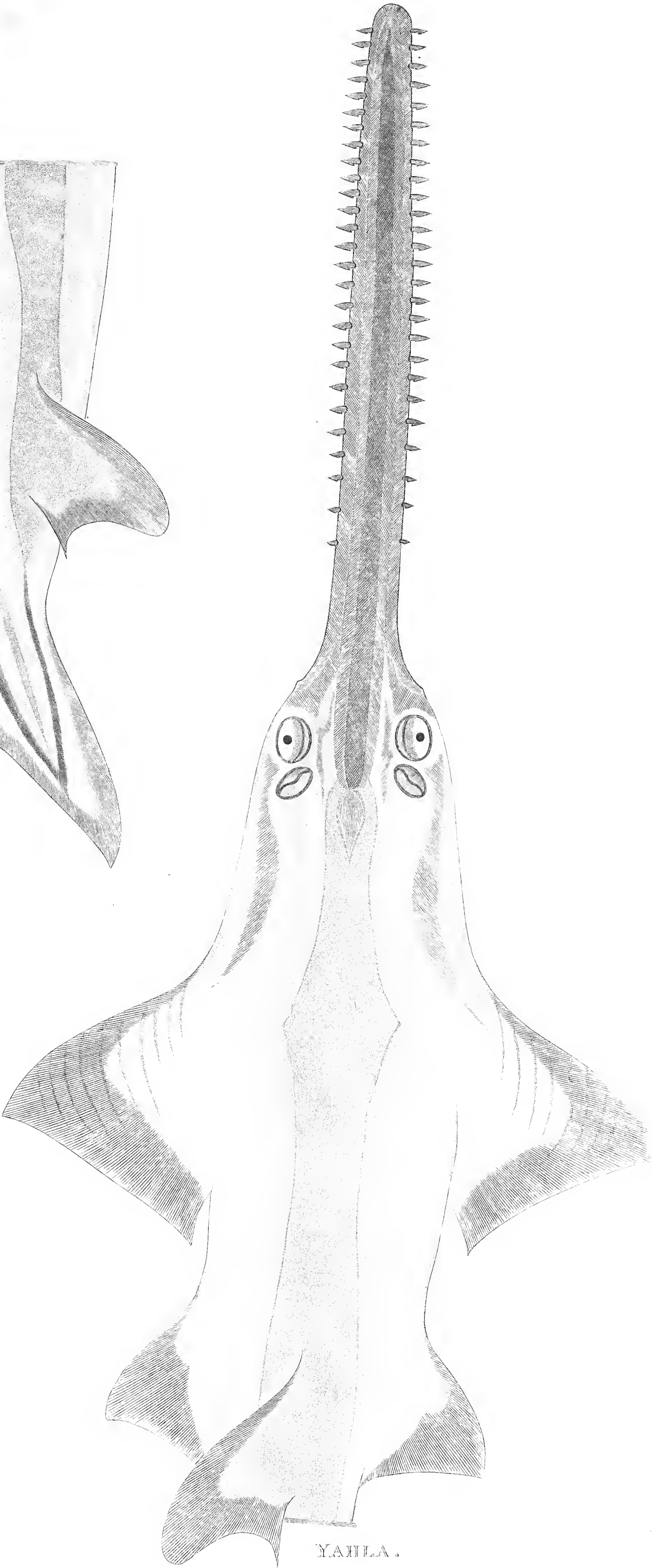
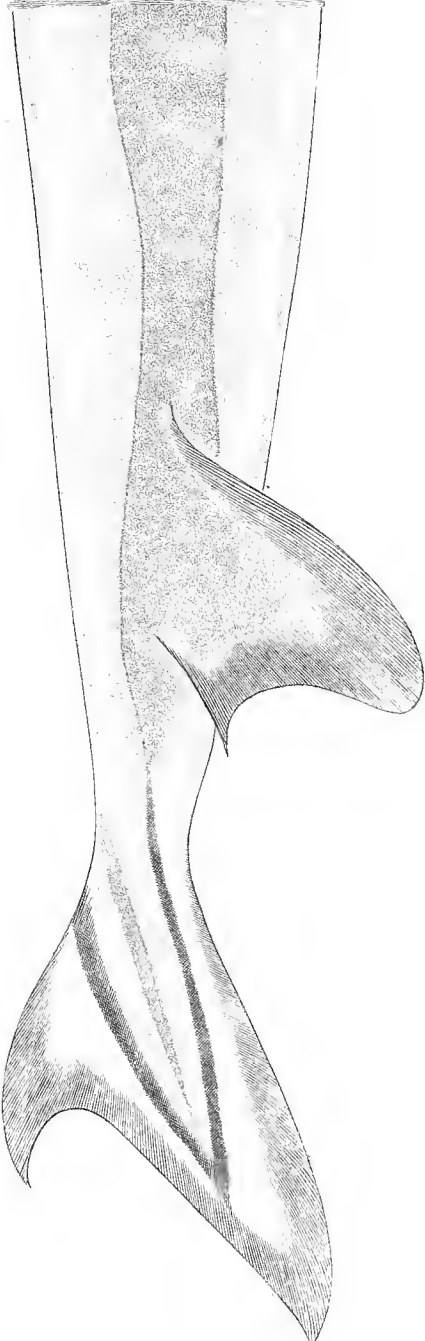
SUTTIWARAU.





KOMA SORRA.

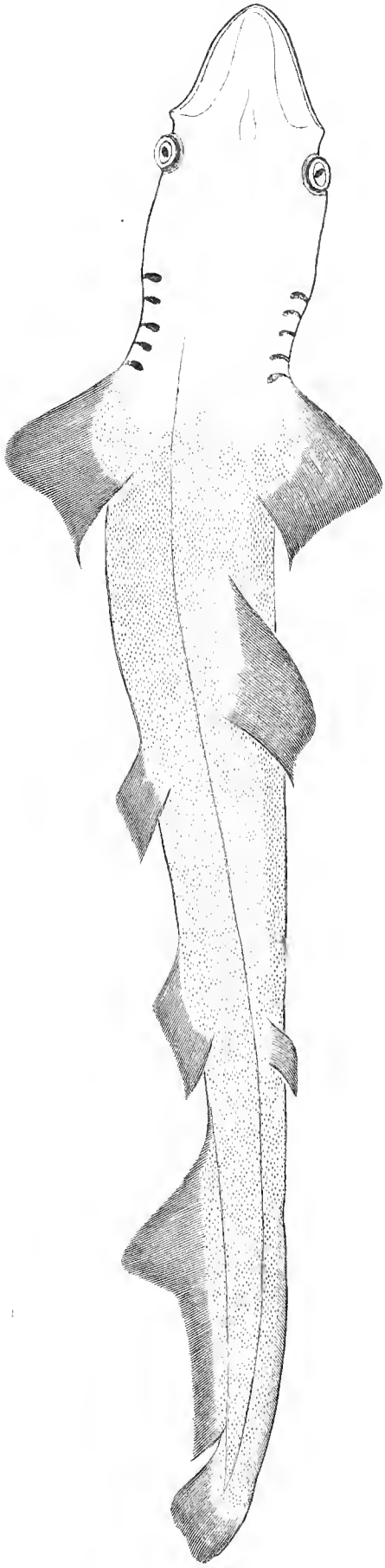




YAHILA.





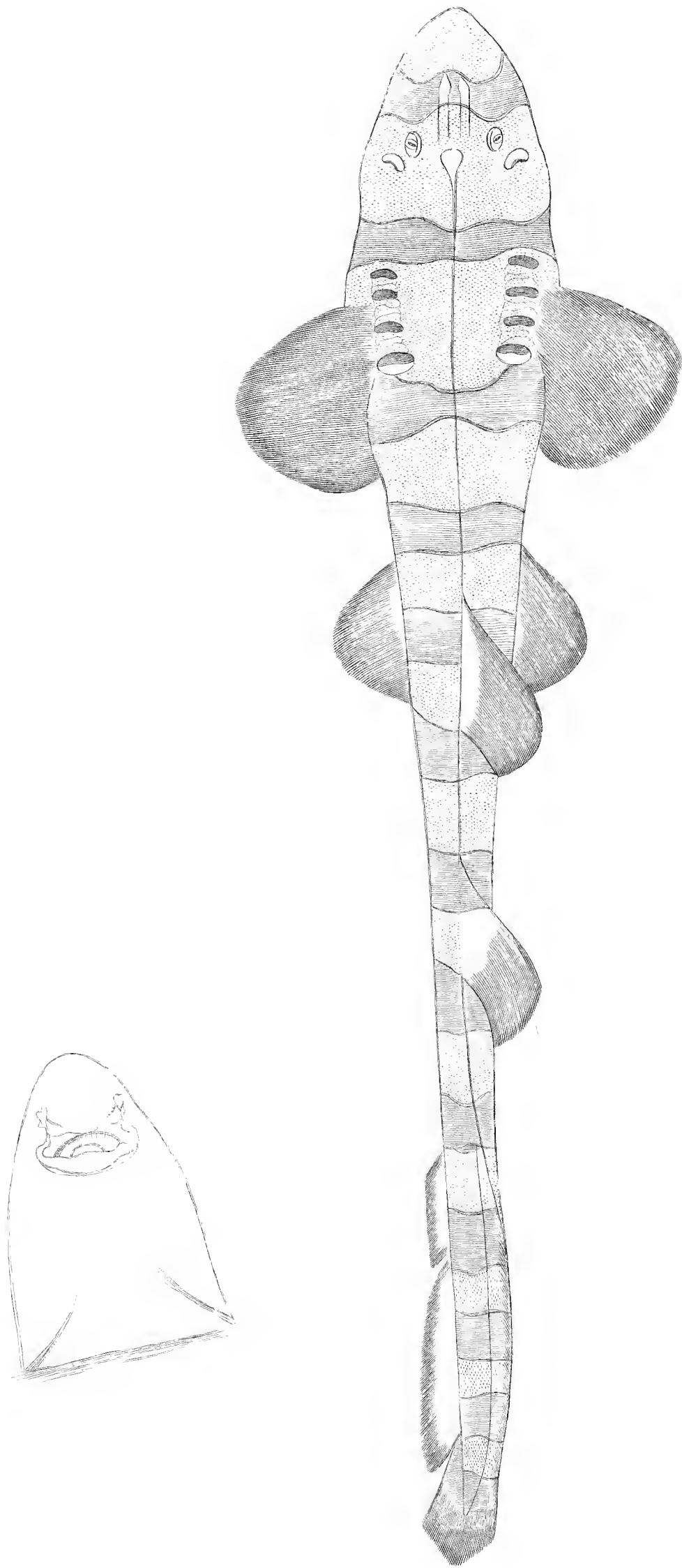


PALA SORRA.



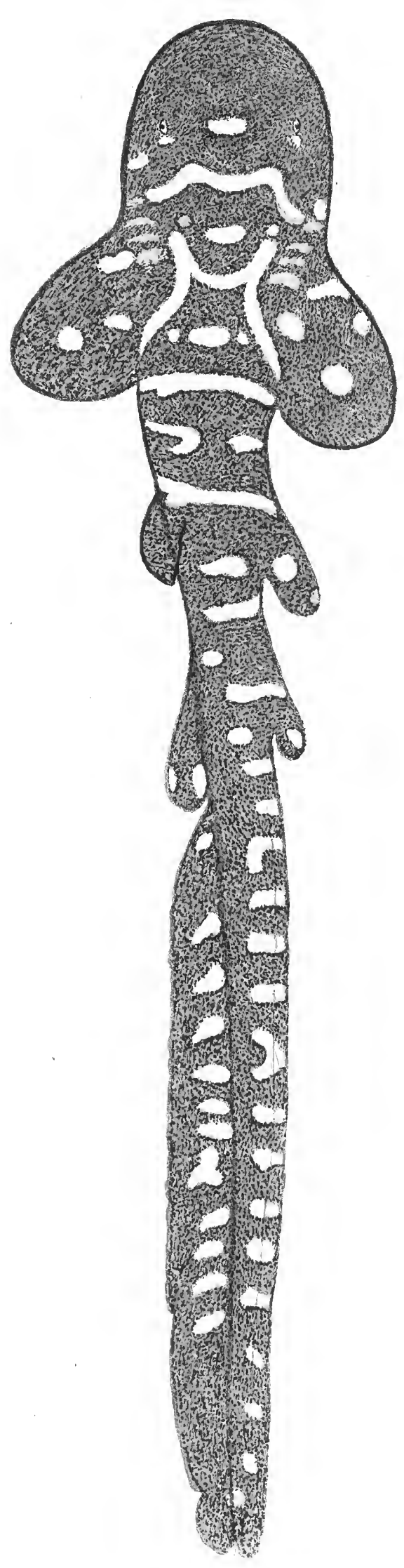
SORRA KOWAH.





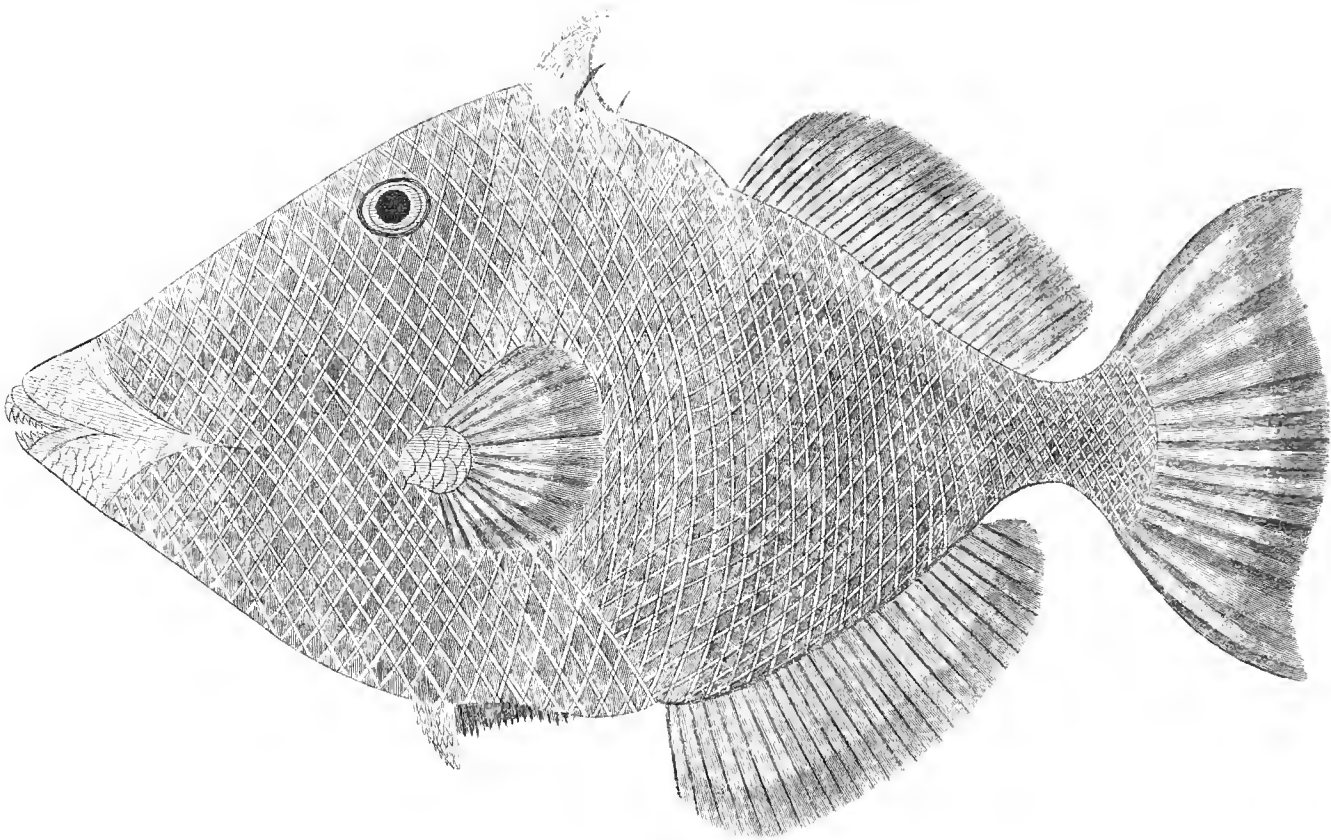
BOKEE SORRA.





POOLLEE MAKUM.





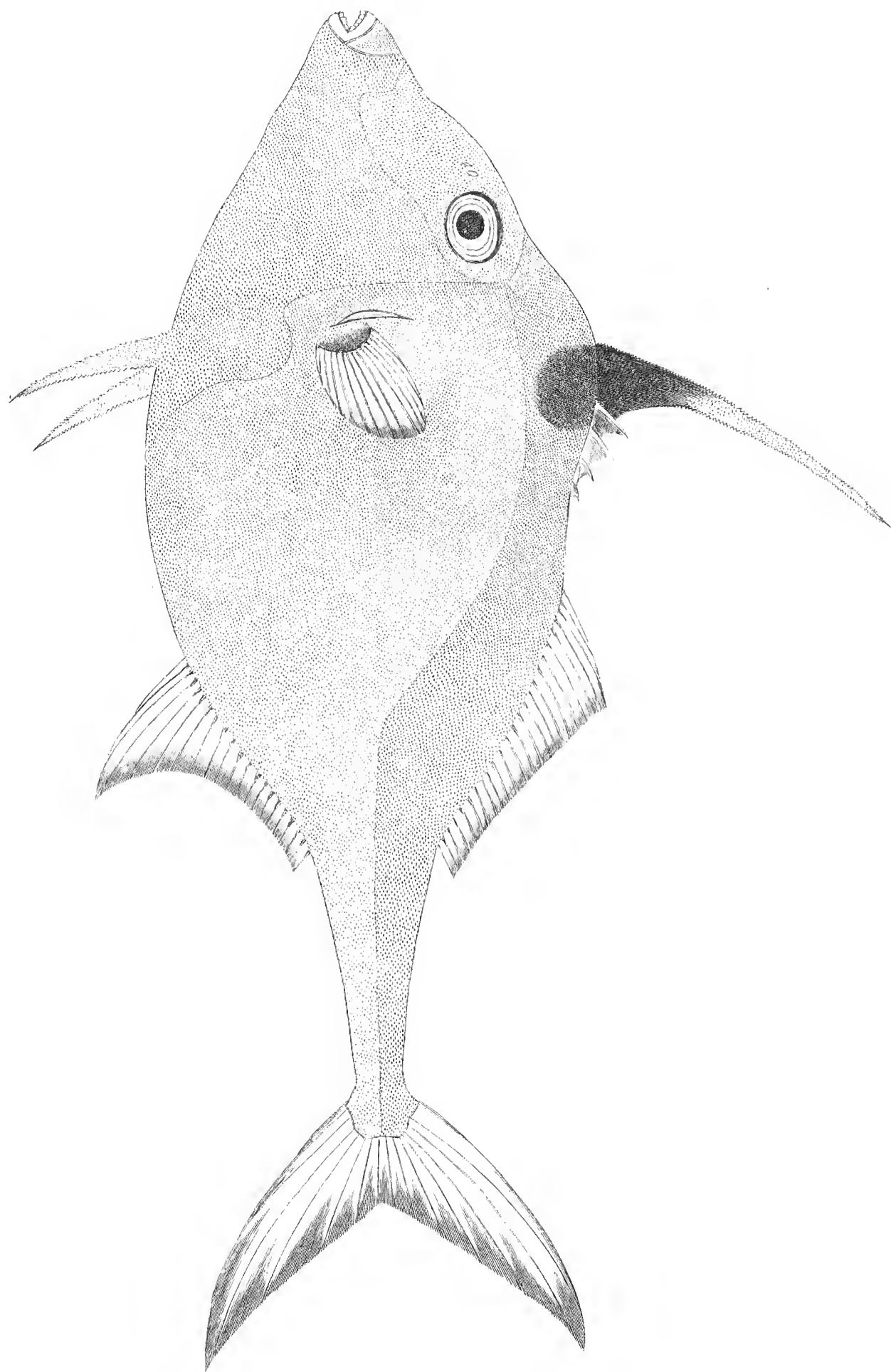
XX.

XIX. KAPPA MURA MOIA.

XX. RAEPUPU YETI, AKAU.

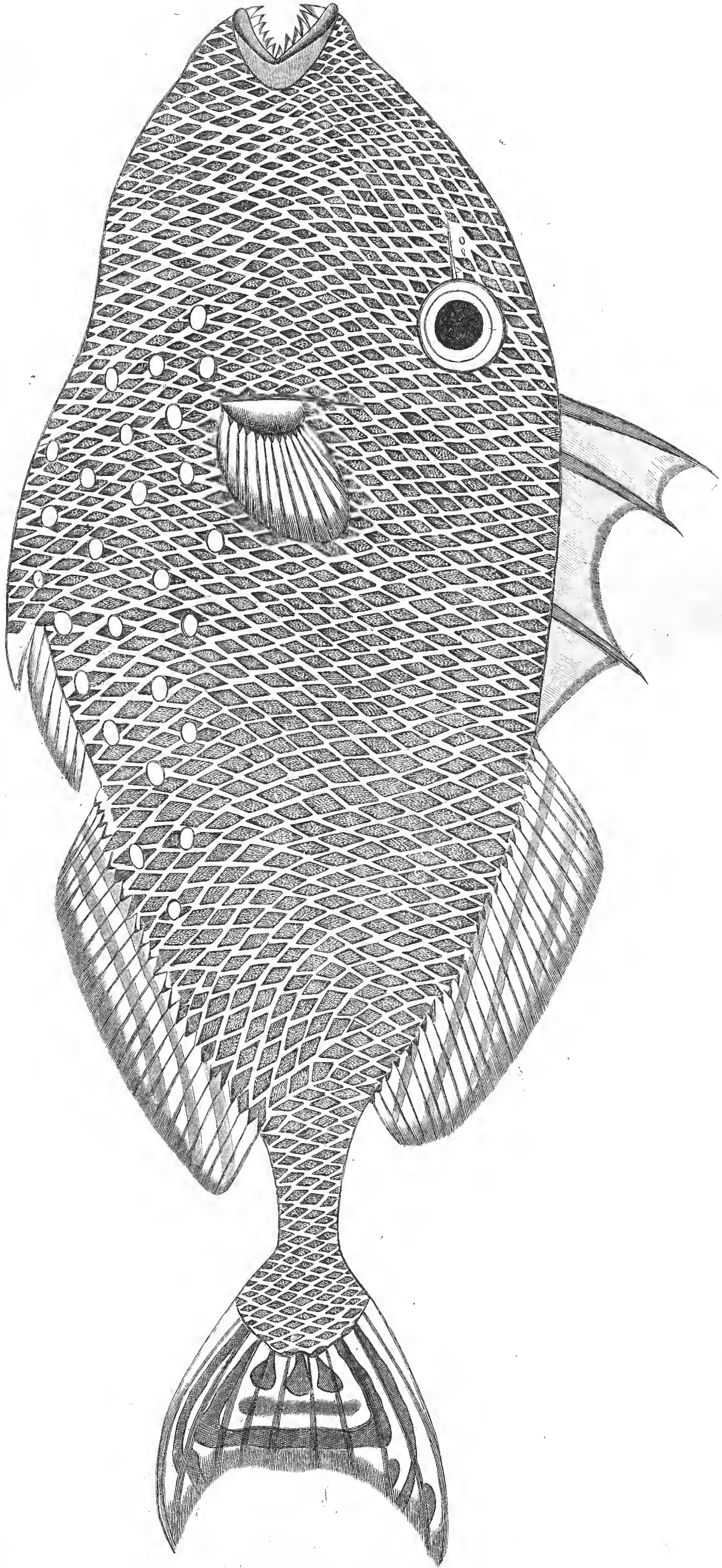






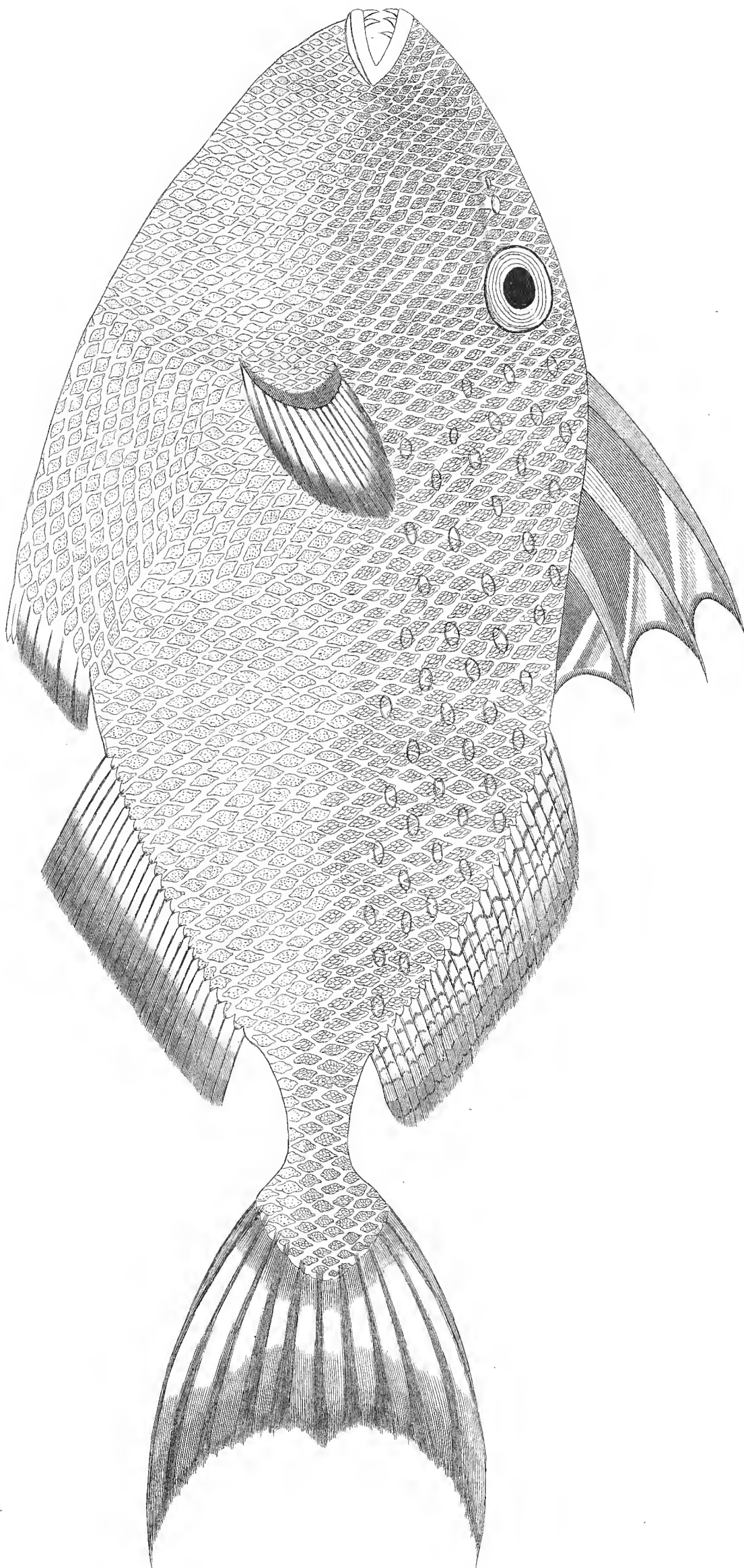
BOWREE *or* ABATOO.





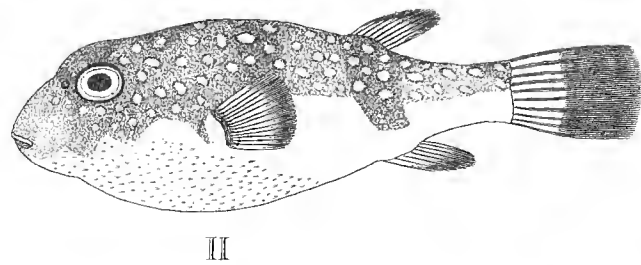
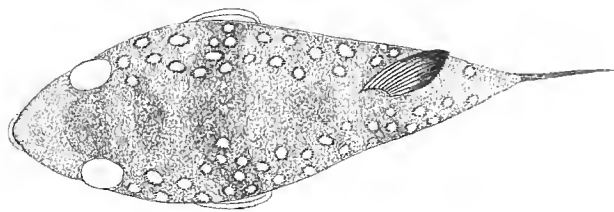
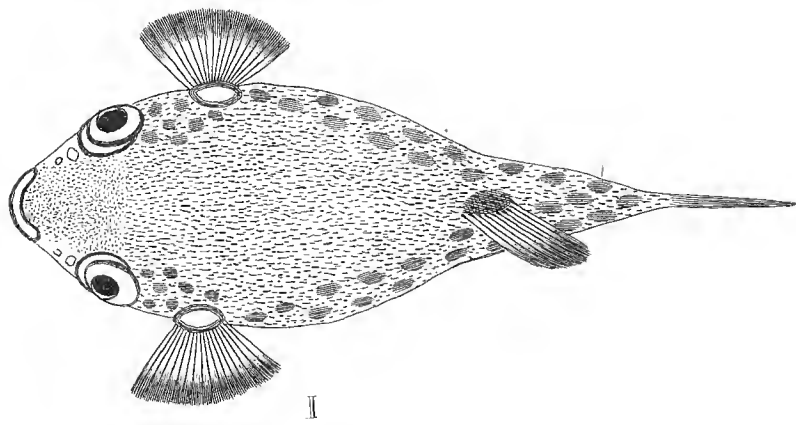
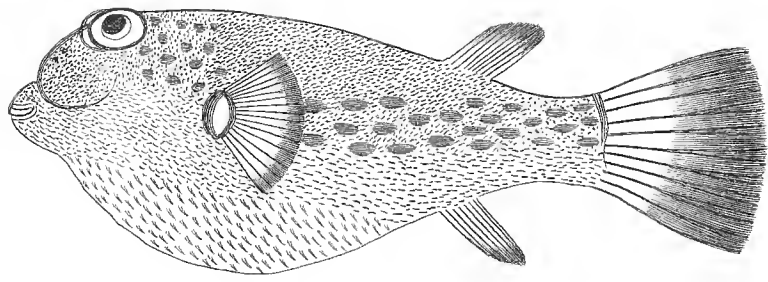
LAMA YELLAKAH.





SOMDRUM YELLAKAH

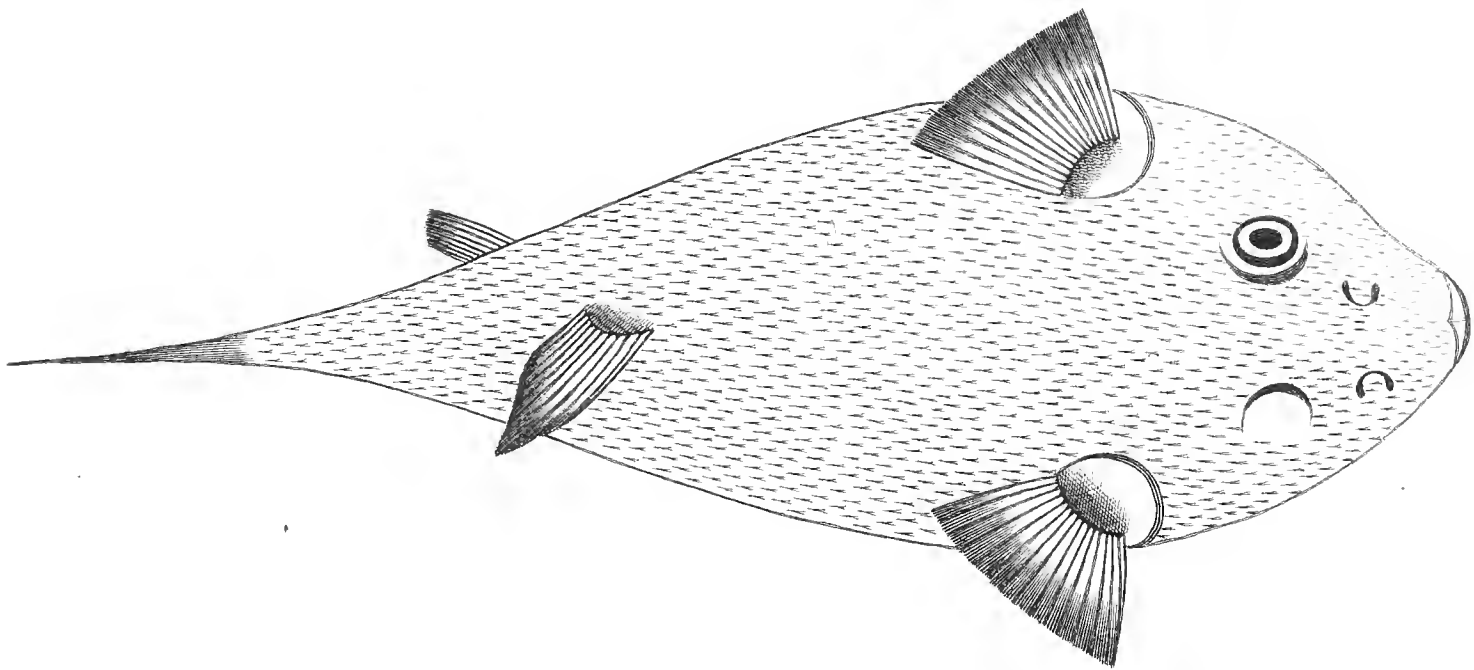
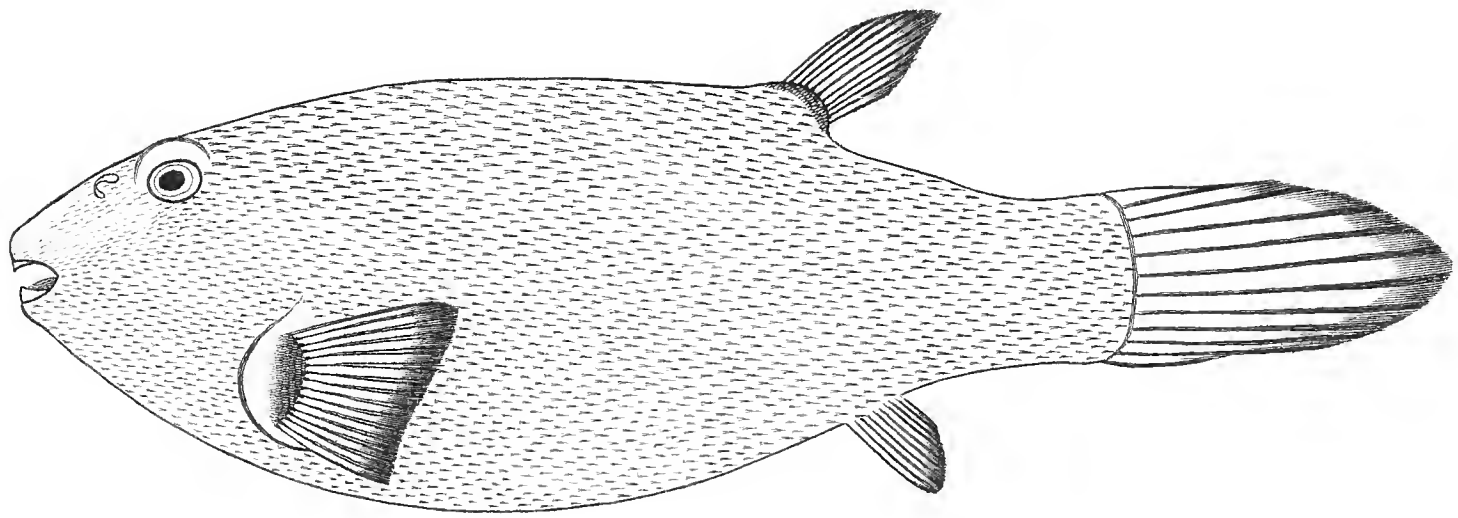




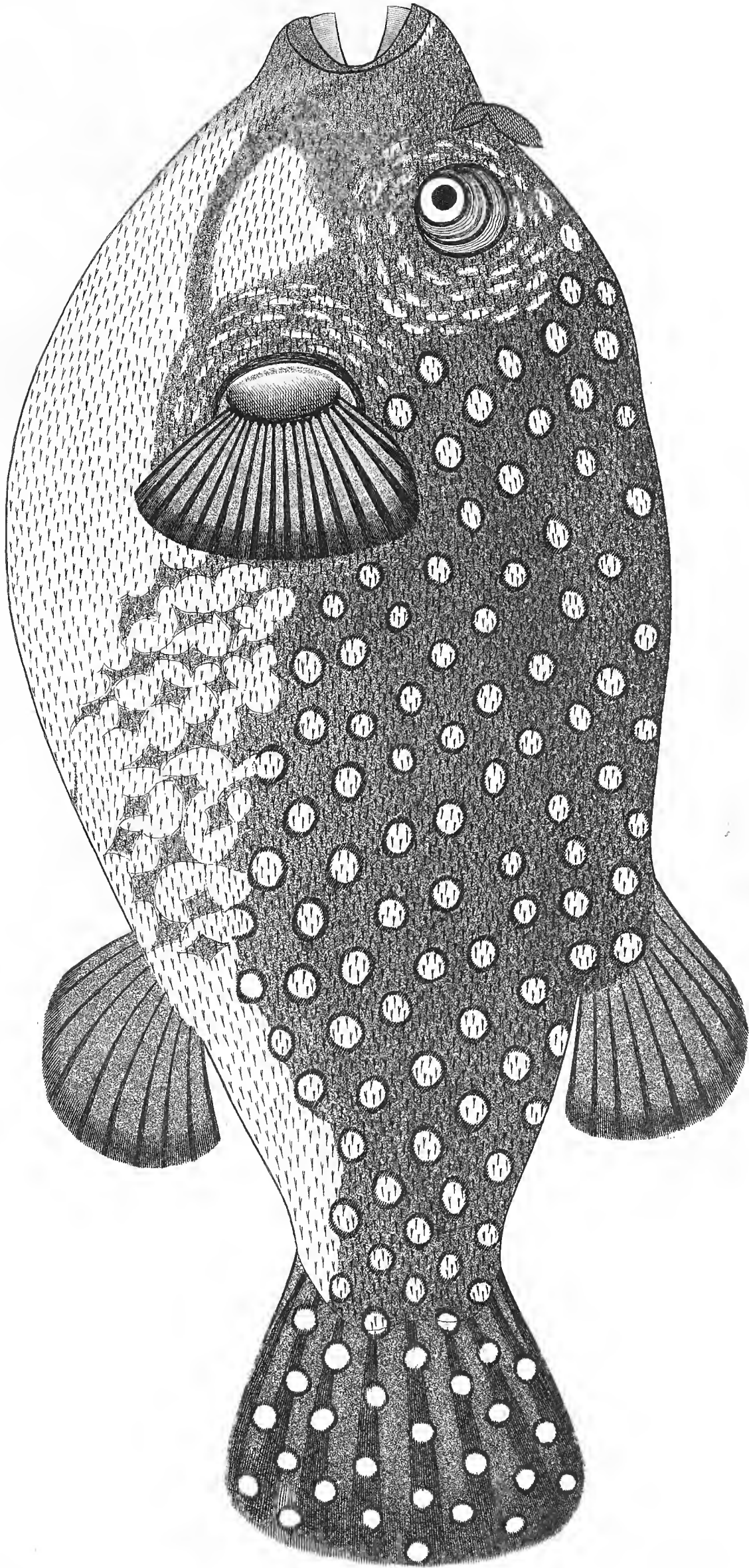
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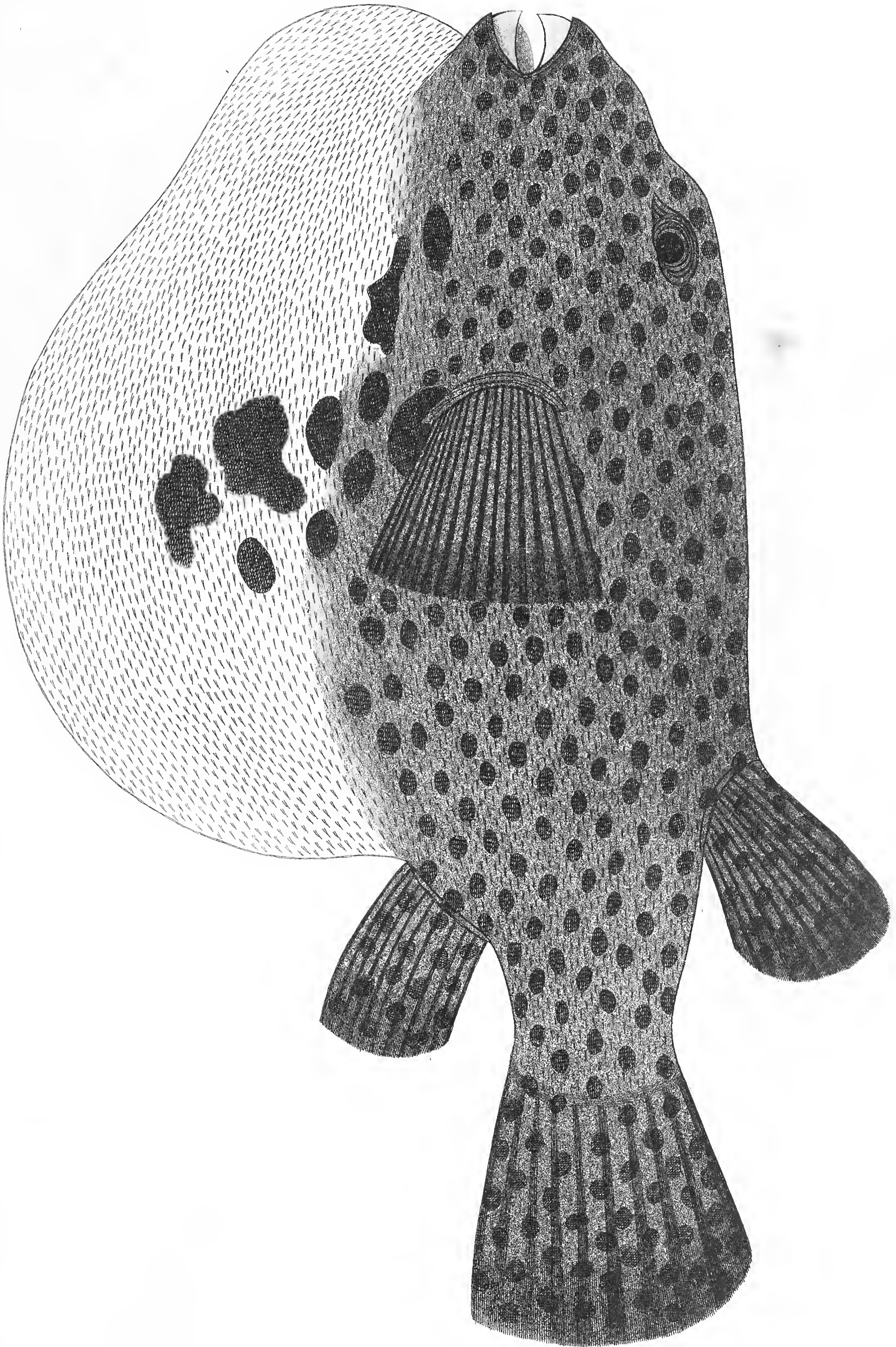






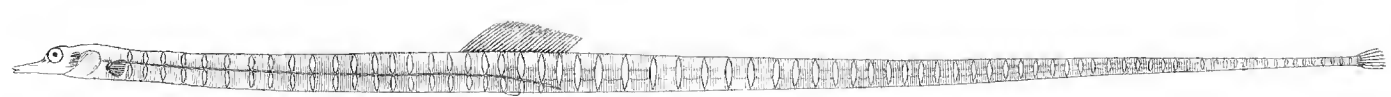
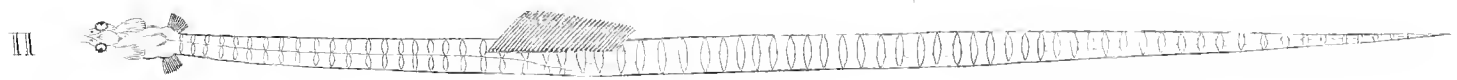
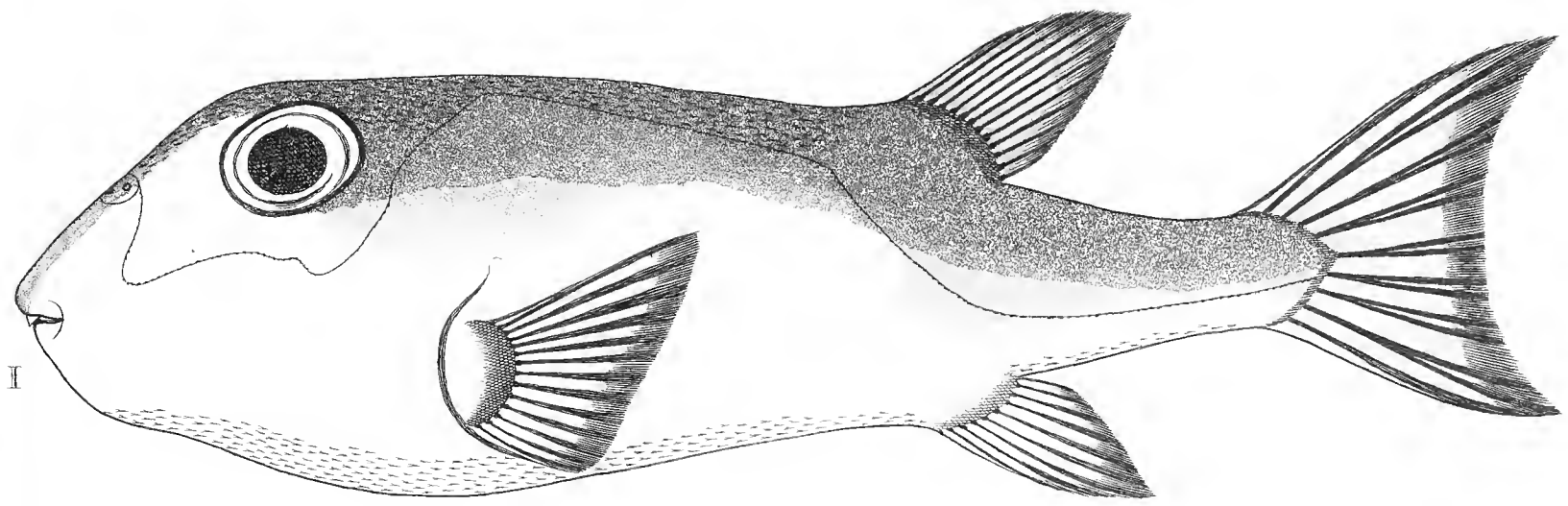
BONDAROO KAPPA.





CALAMARAH KAPPA.



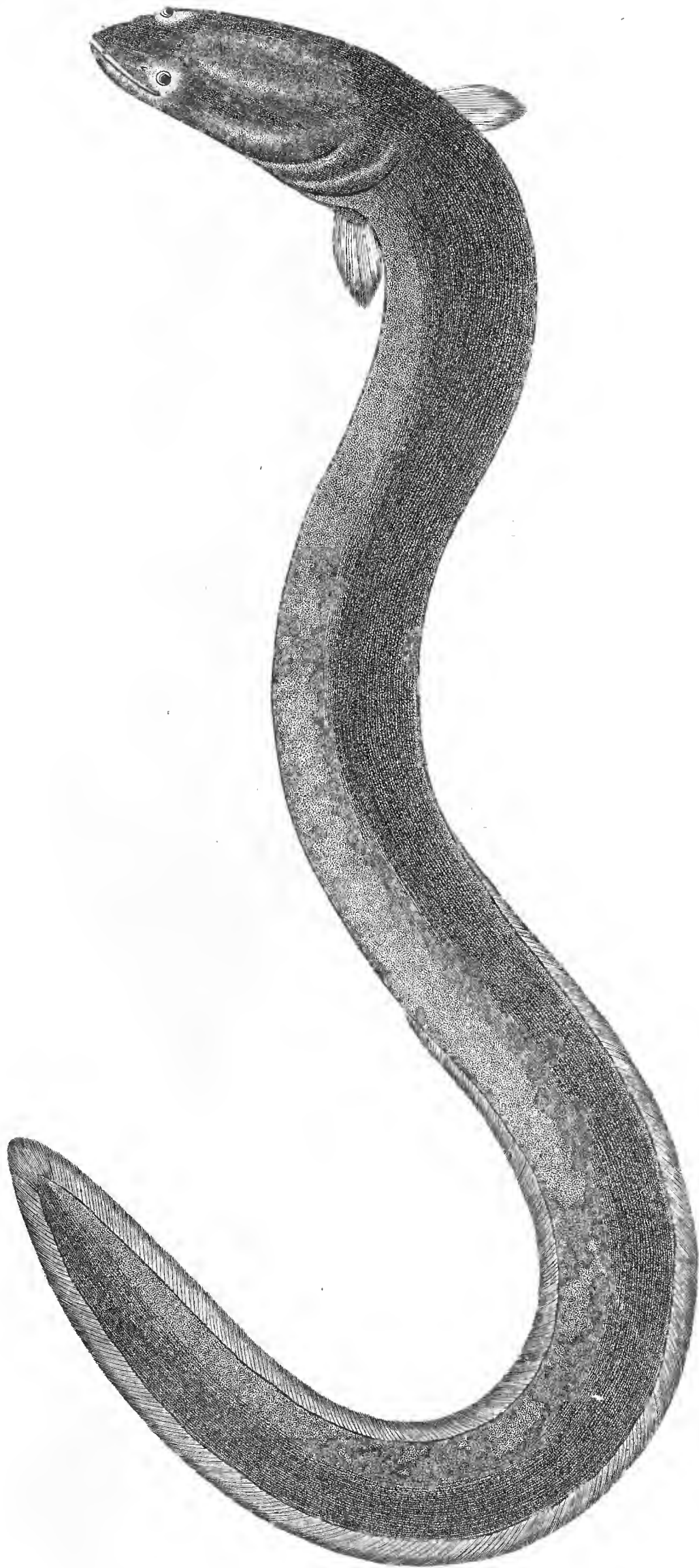


I. KAPPA KOORAWAH.

II. GOORAHPOO SUBBOOKOO.







CHOWLOO PAMOO OF MALGUMARA.





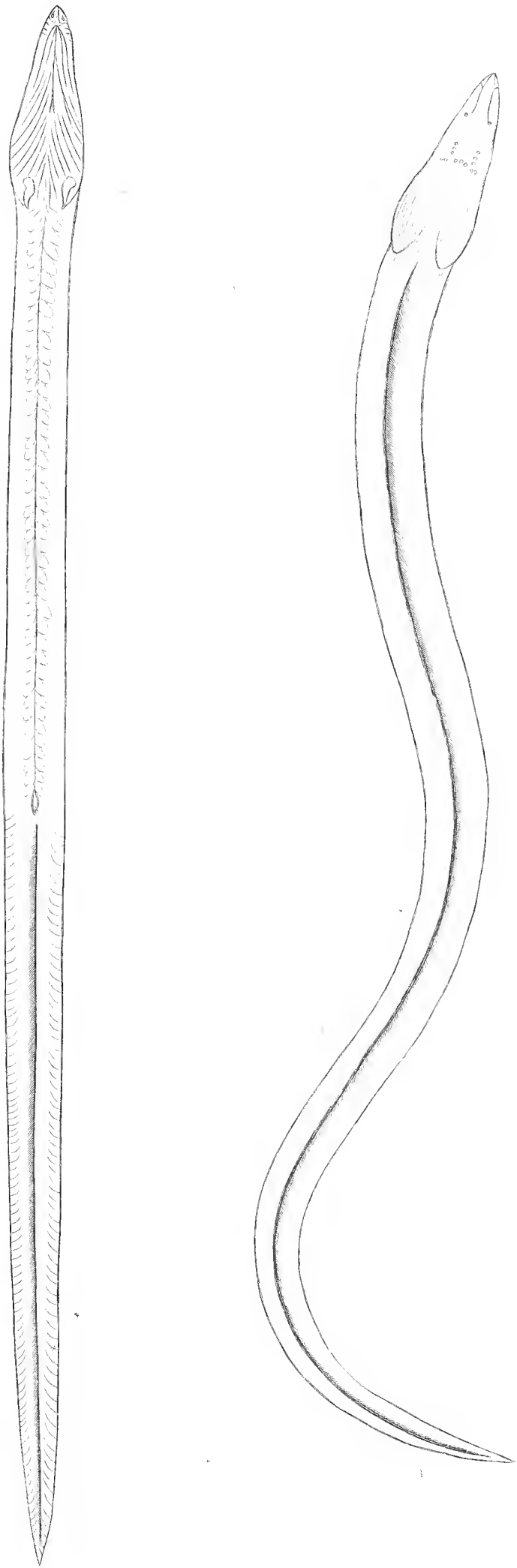
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DONDOO PAUM.

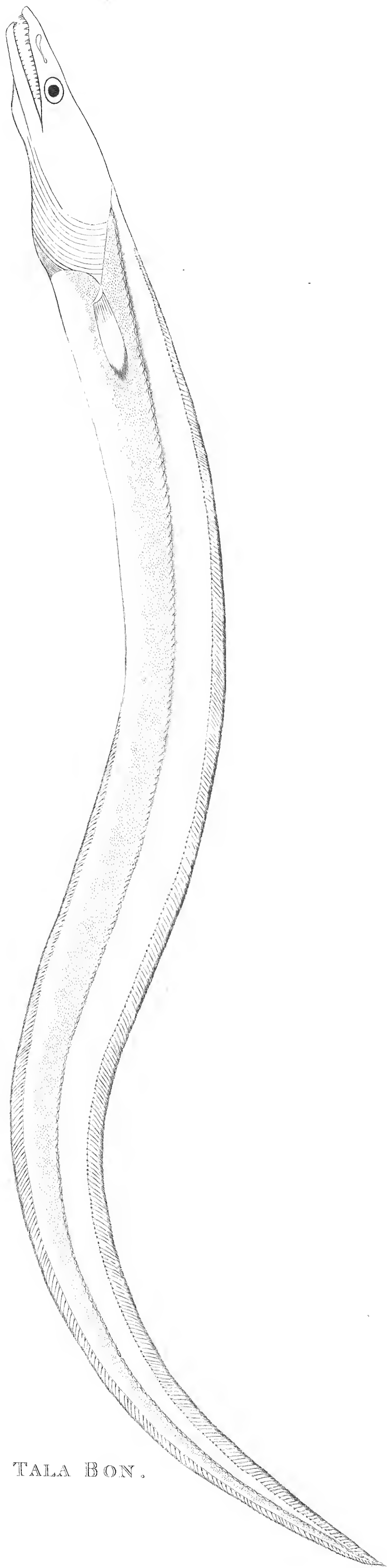




MANTI BUKARO PAUMU.

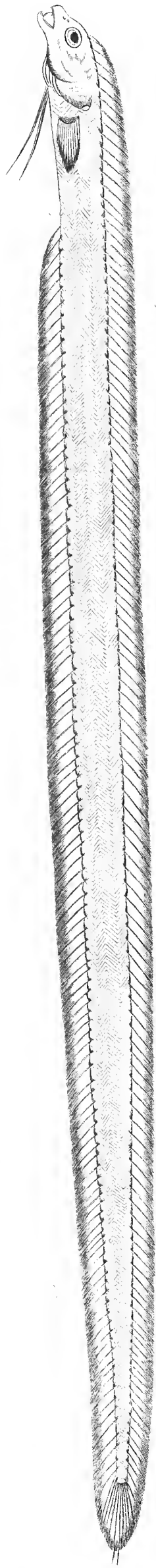






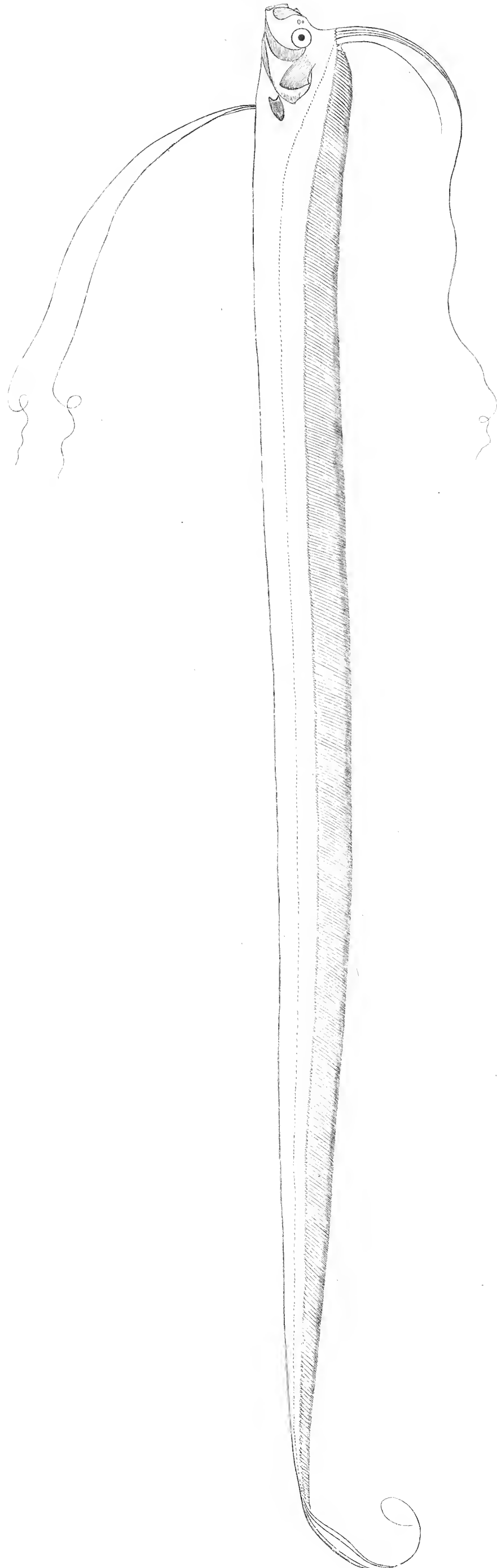
TALA BON.



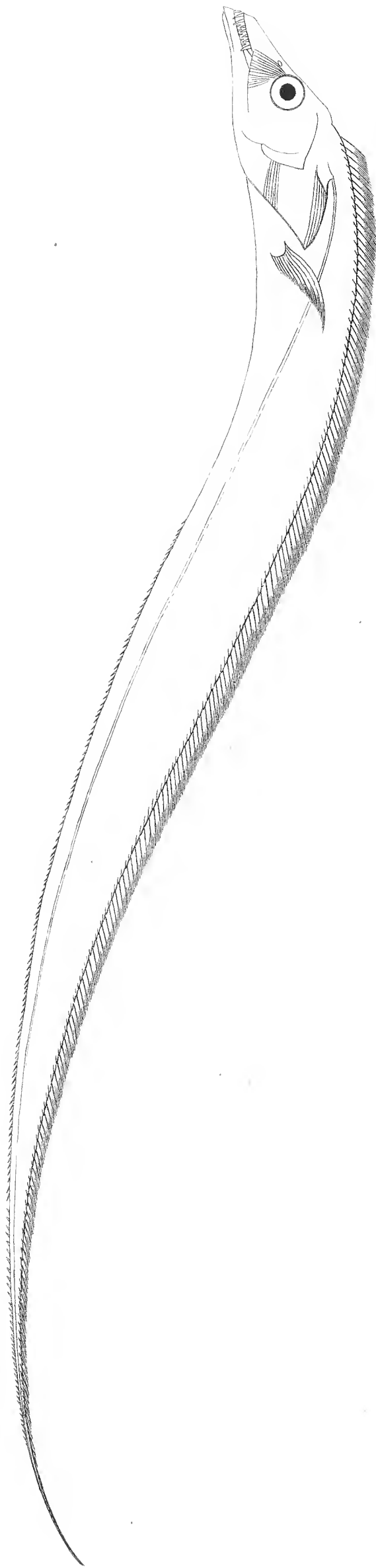


TONKAH TALAWAREE .





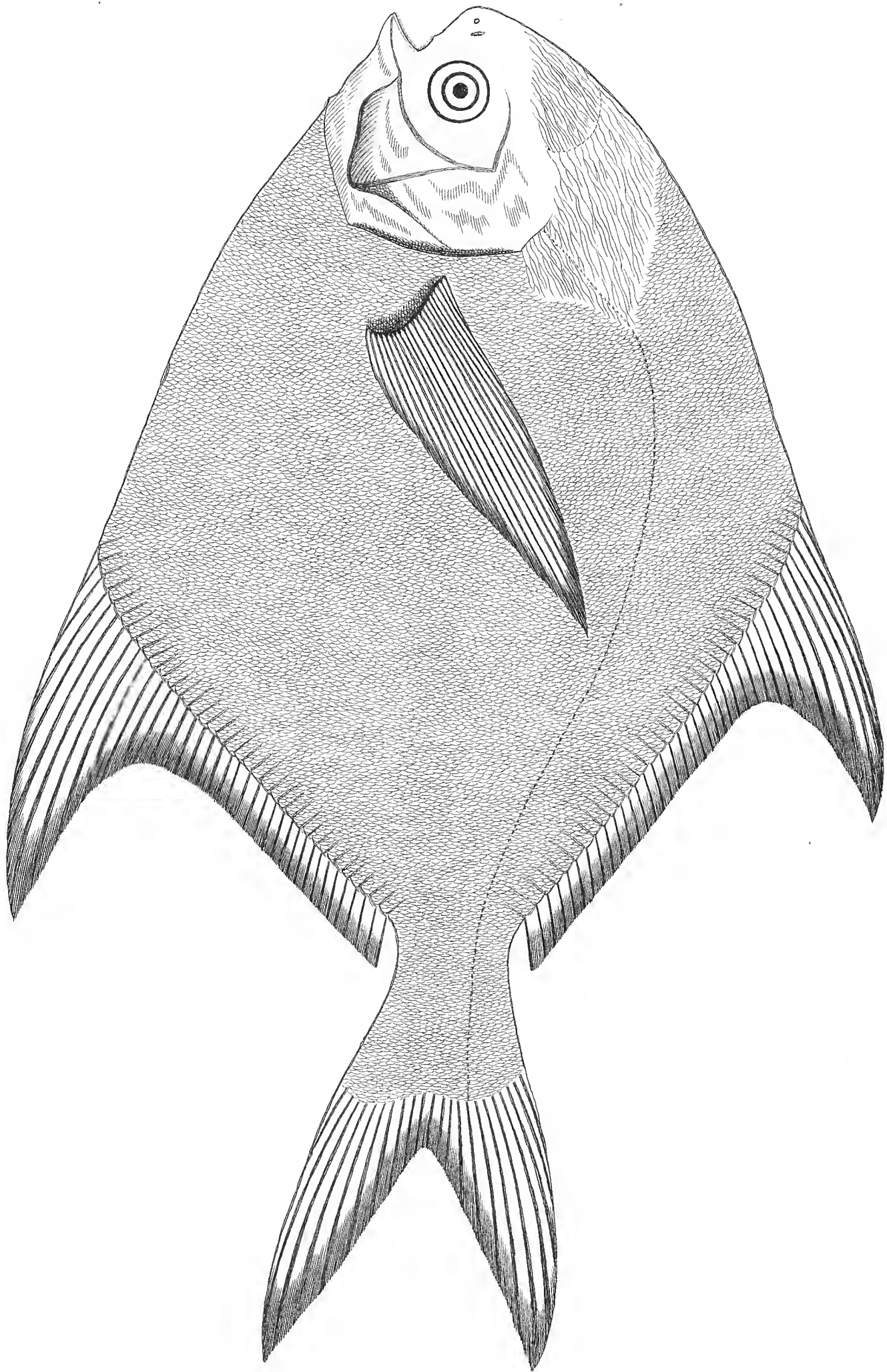




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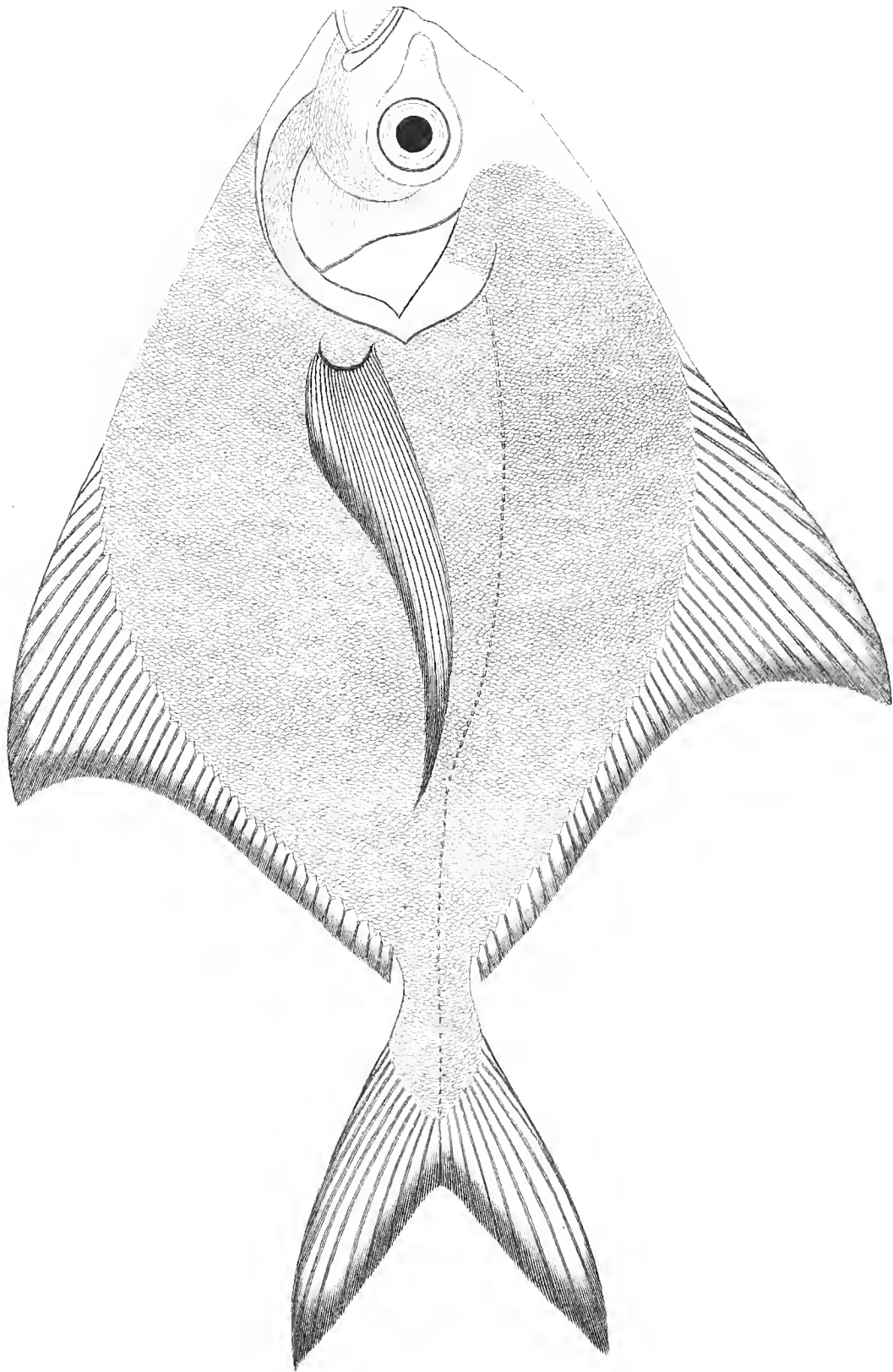






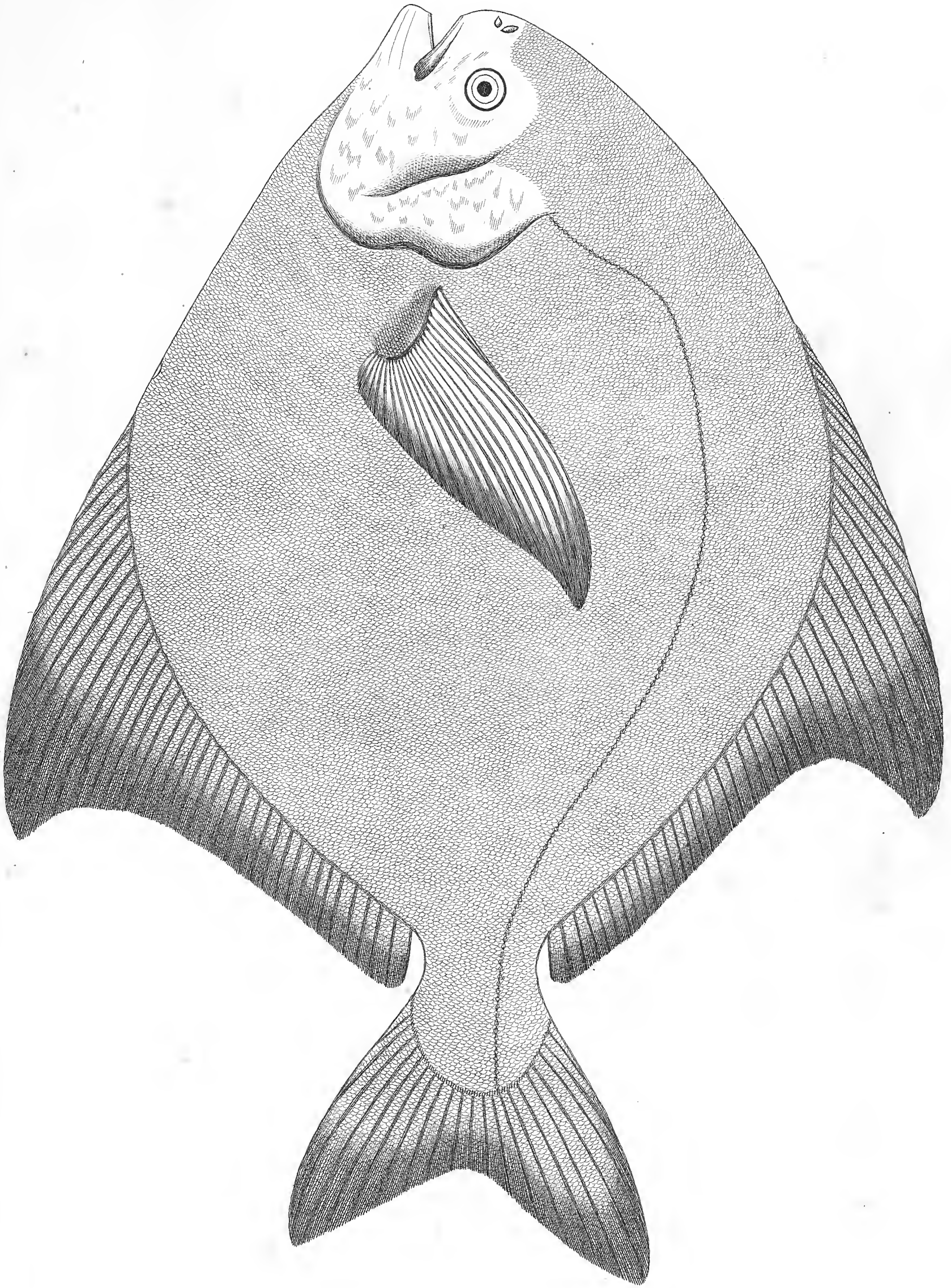
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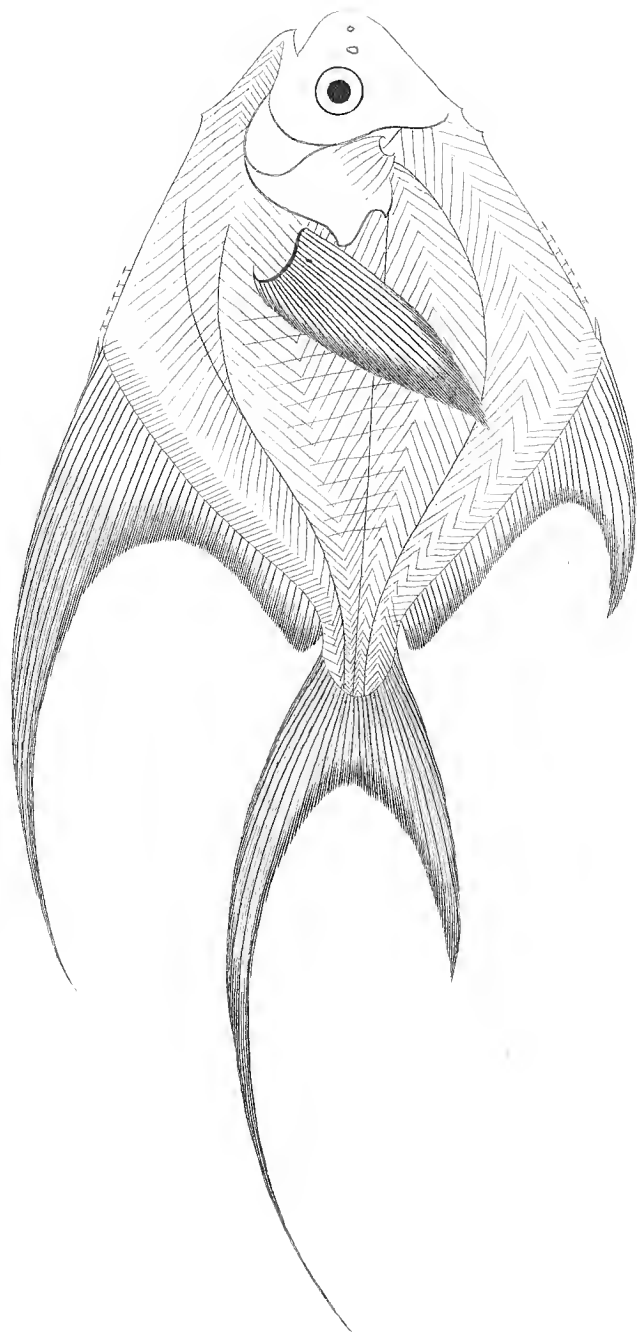
NALLA SANDAWAH





ΑΤΟΟ ΚΟΙΑ.

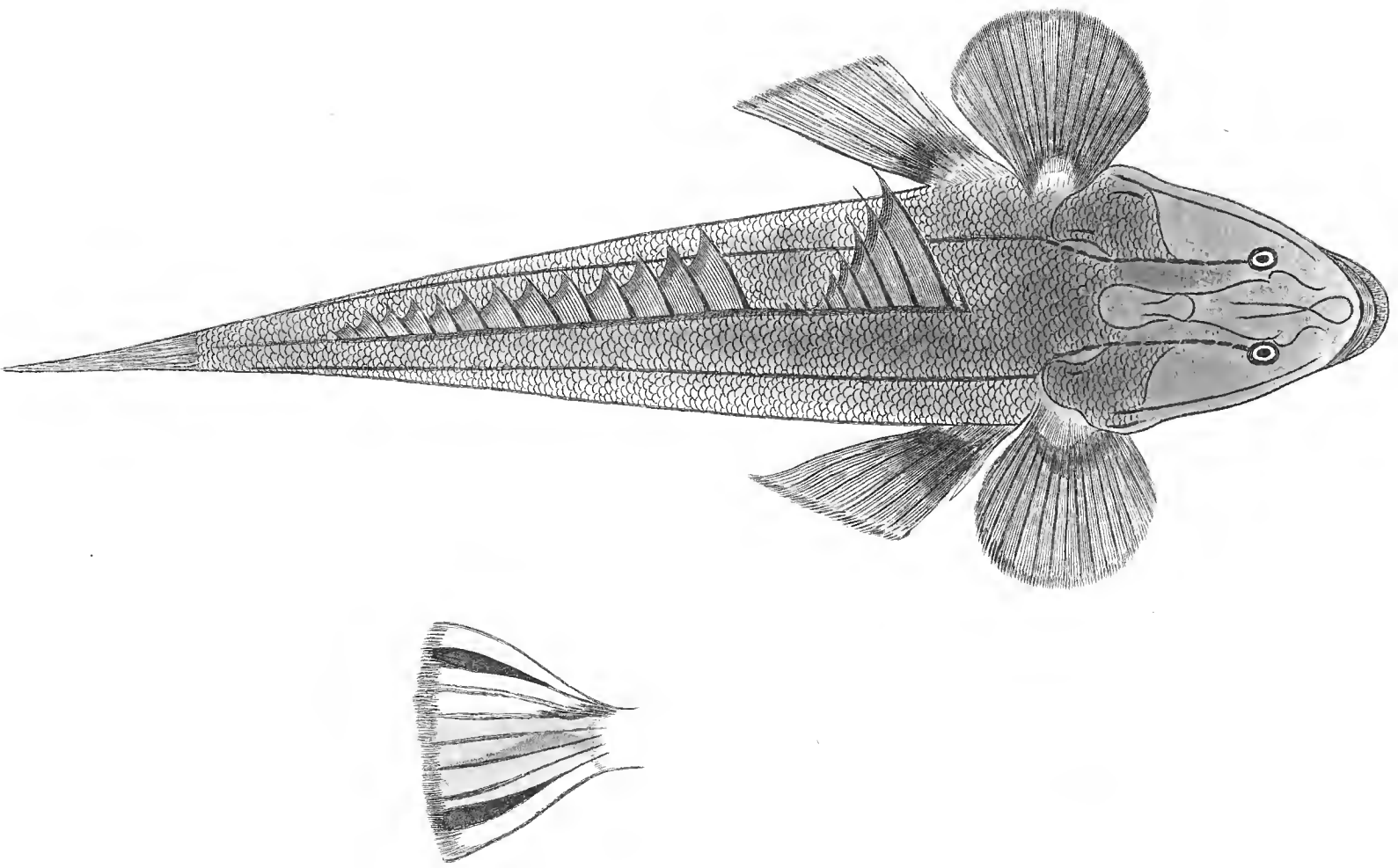




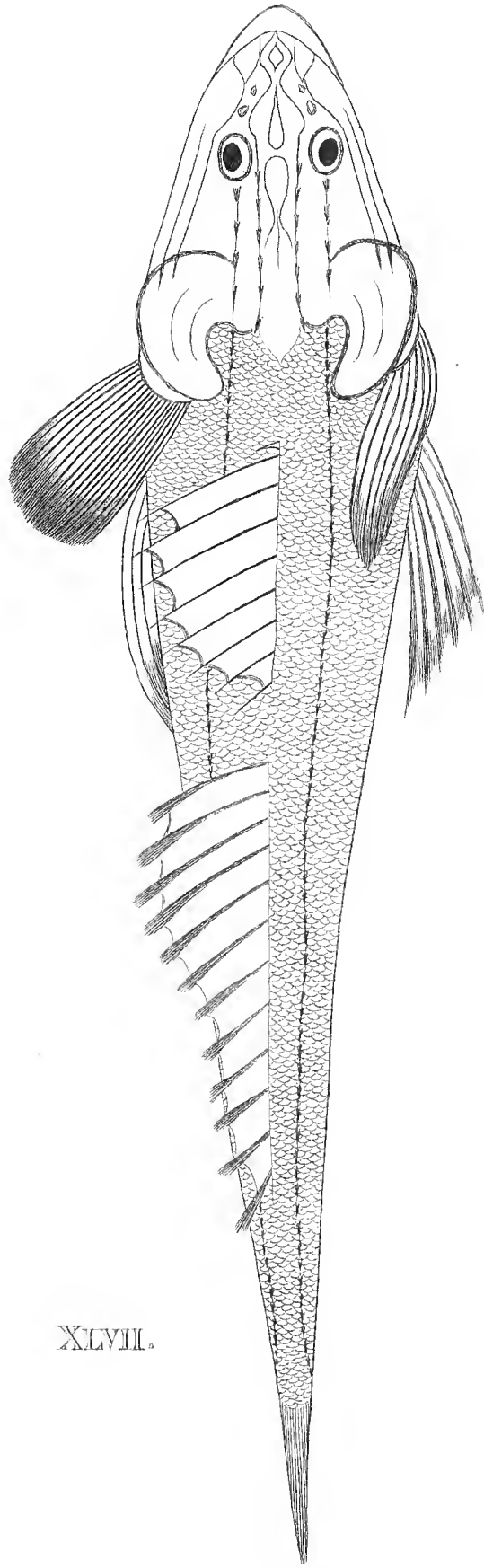
SUDI SANDAWAH.



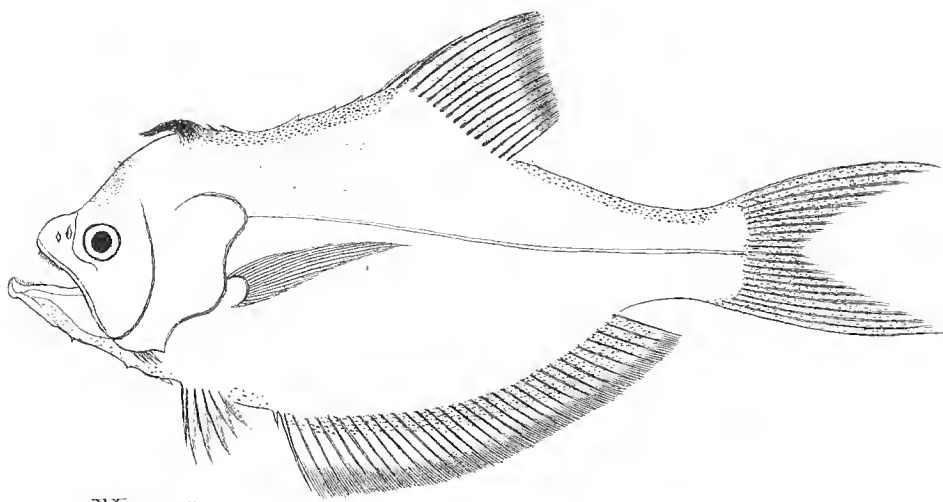






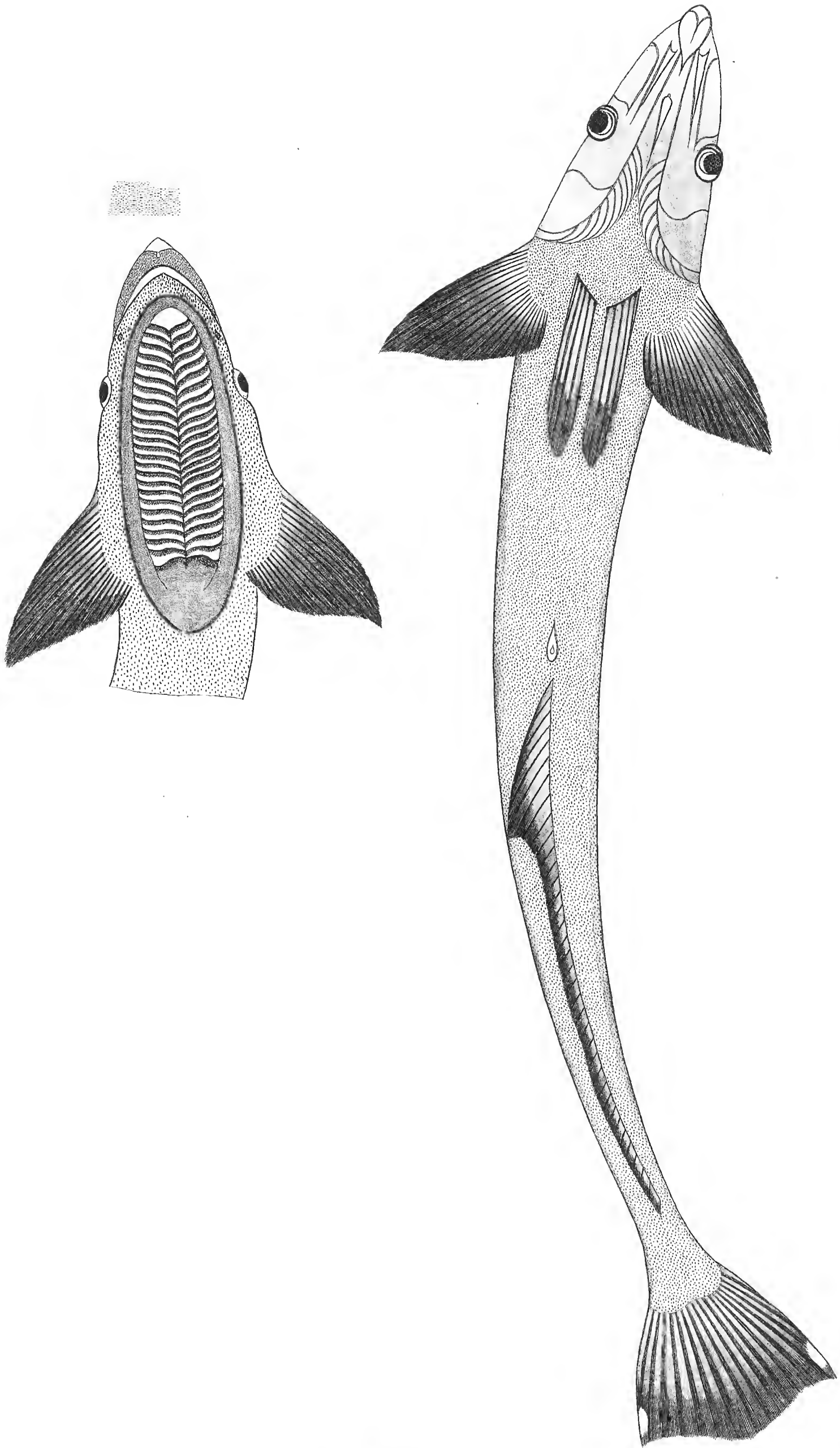


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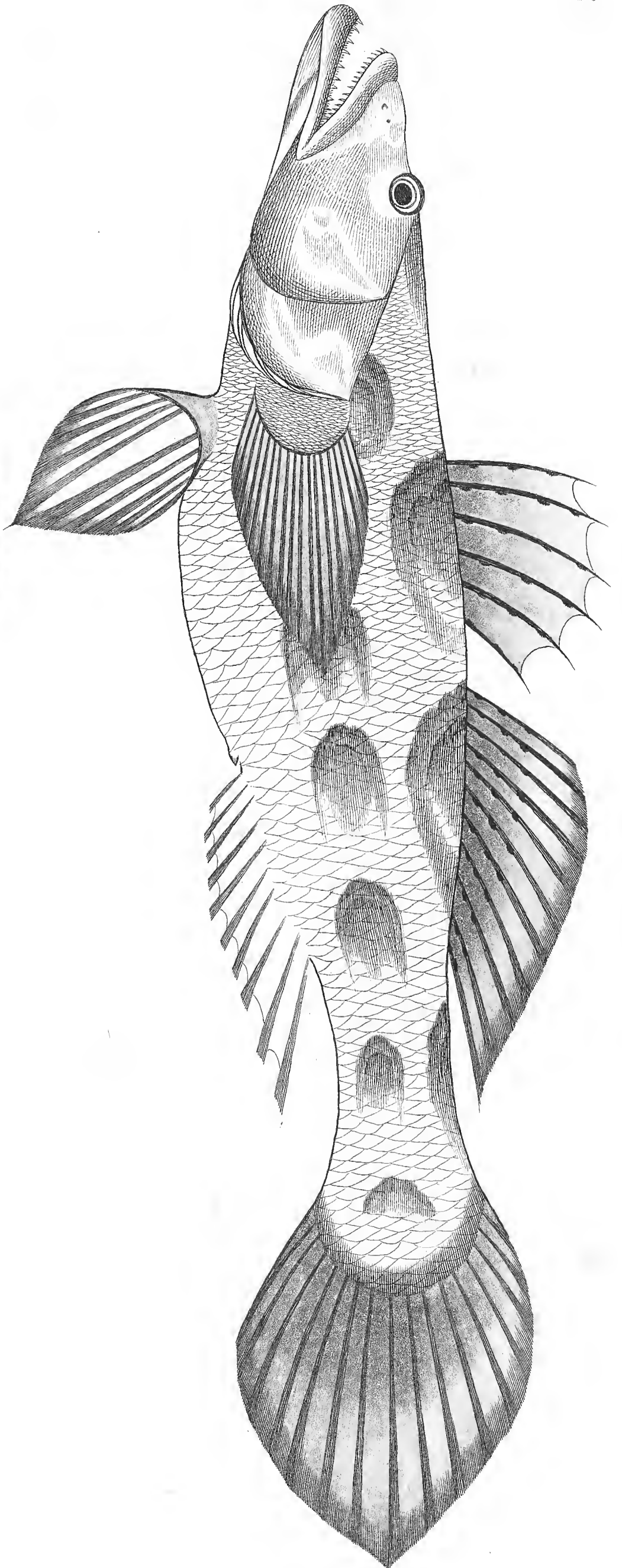
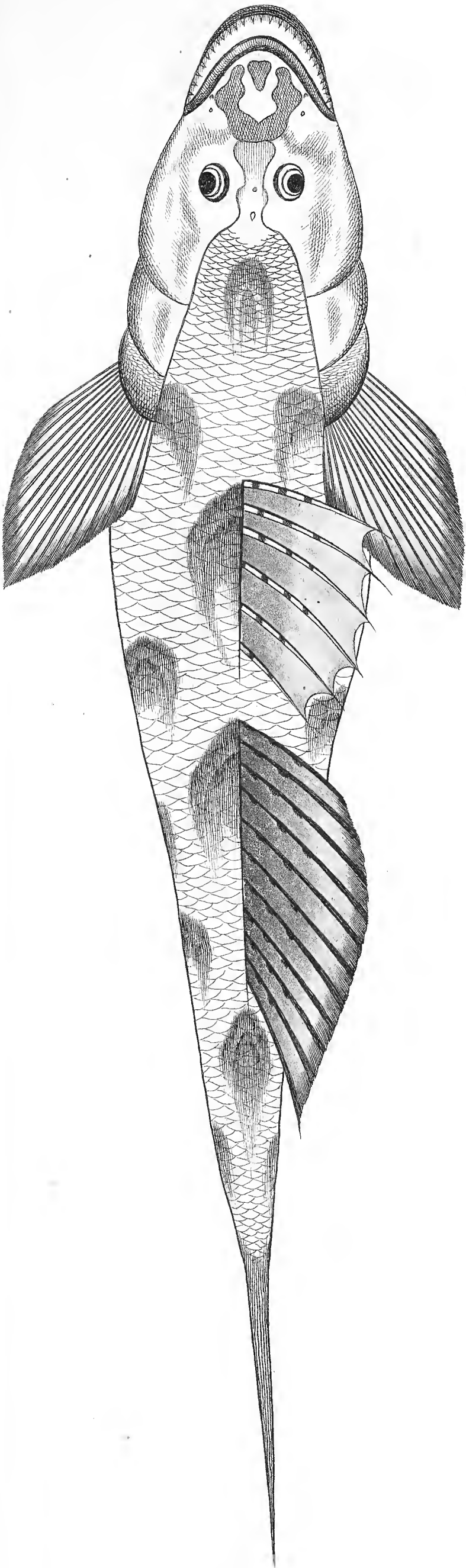
XLVIII.





ALA MOTTAN.

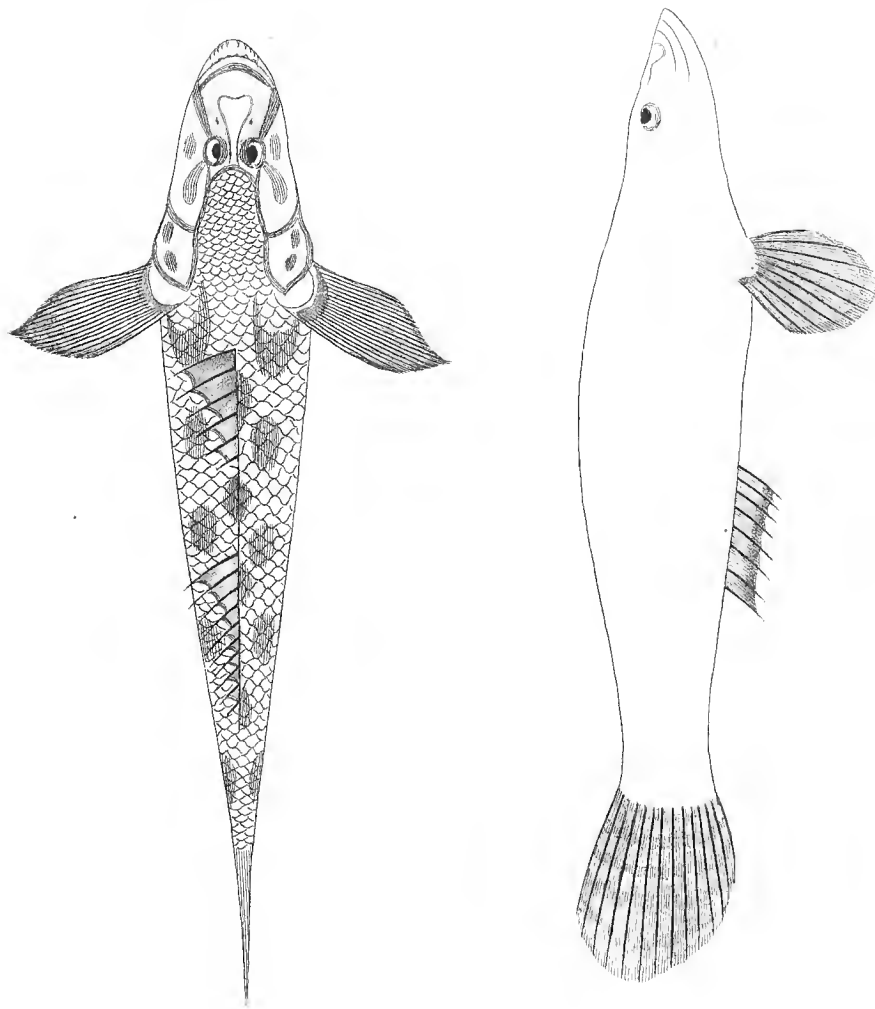




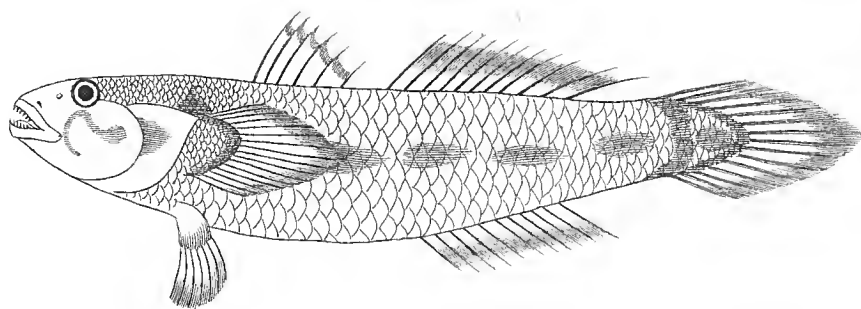
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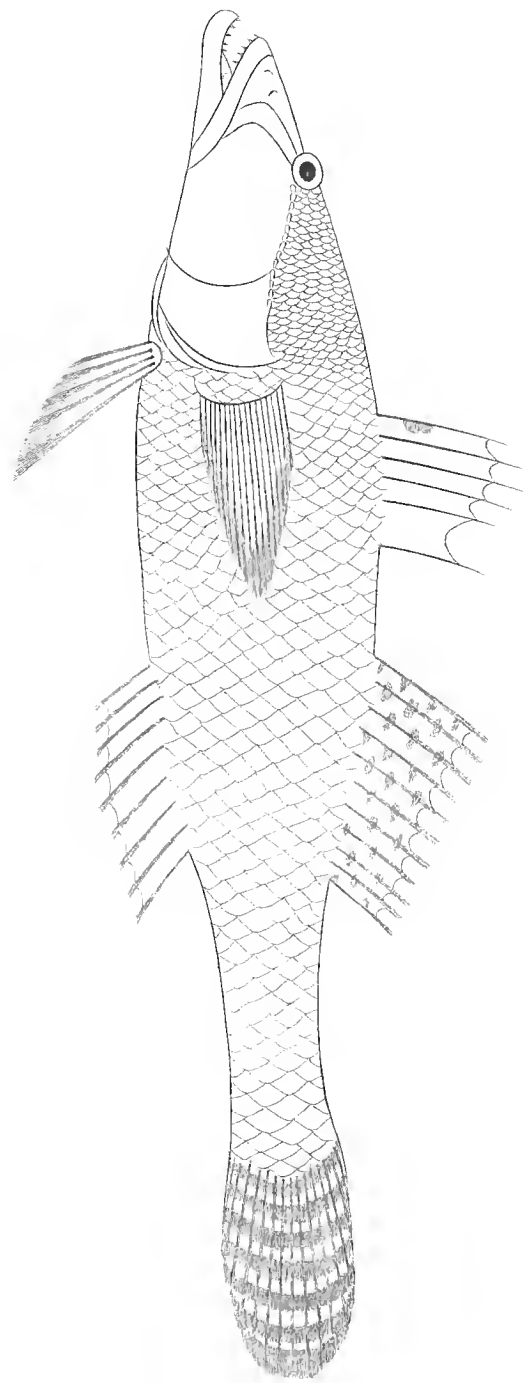
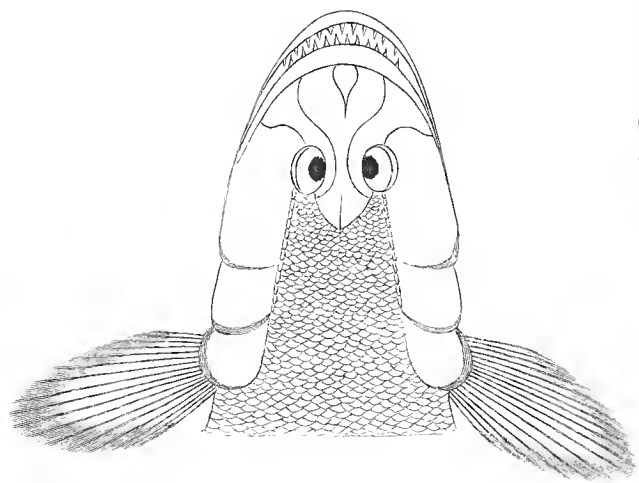
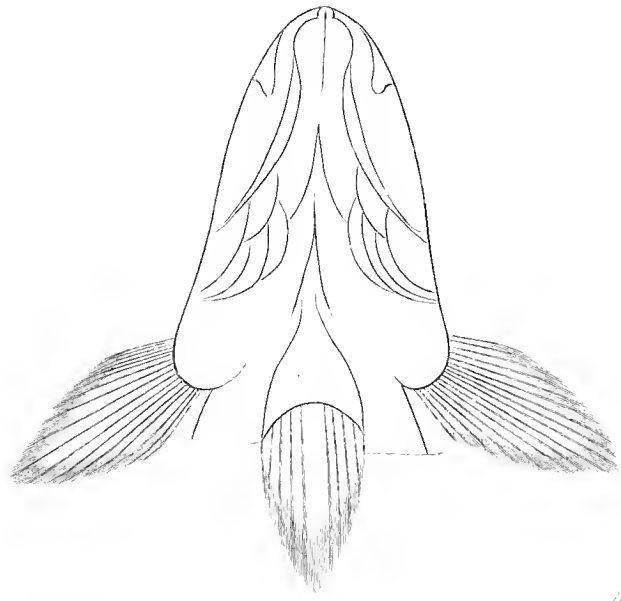


KOKU.



NUNA MOTTA.

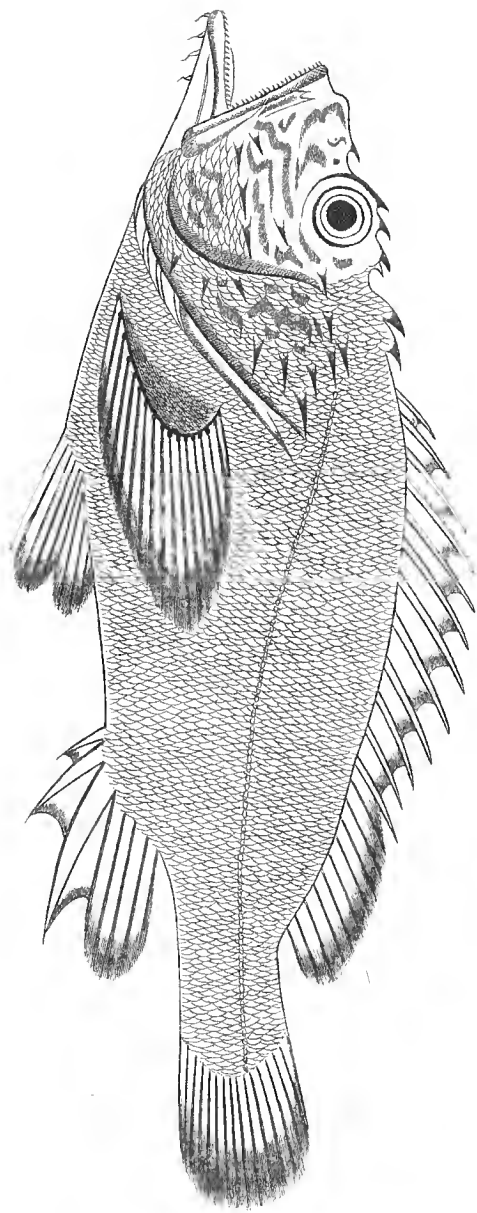




LIII. BULLEE KOKAH.

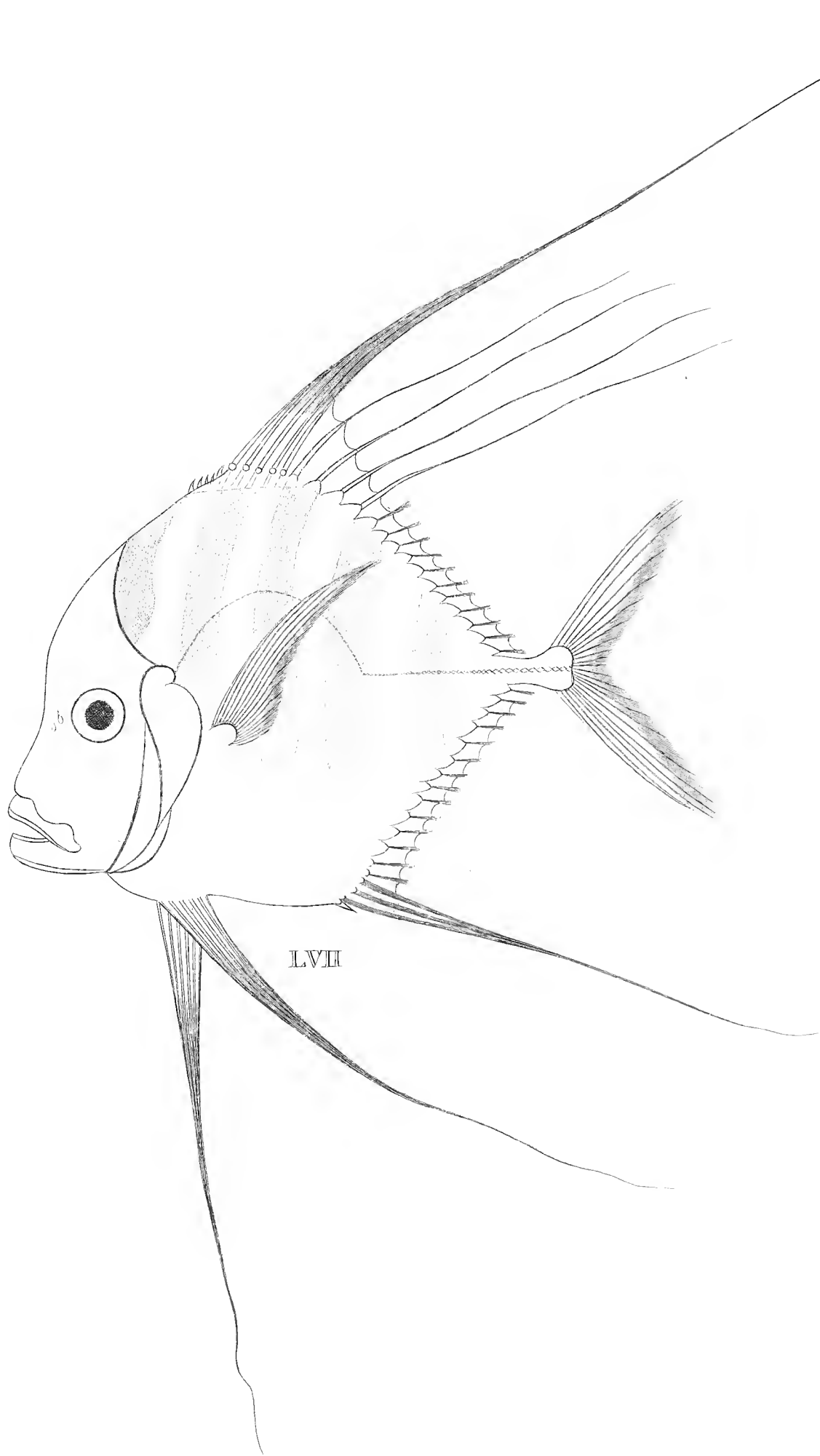
LIV. NETTEE KUNLA MOTTAN.



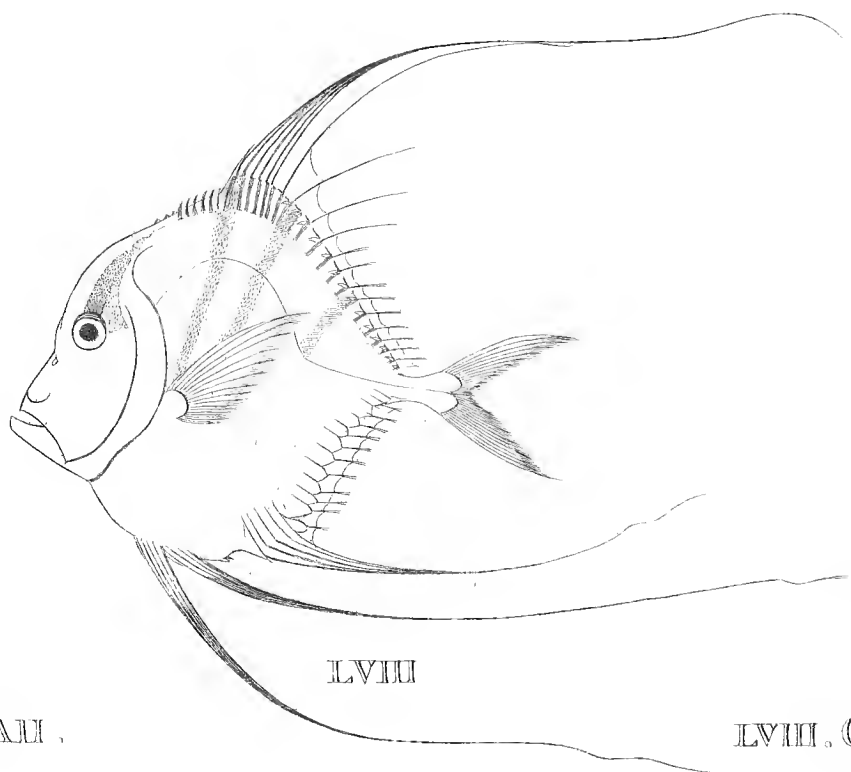


MOOROO BONTOO.





LVII



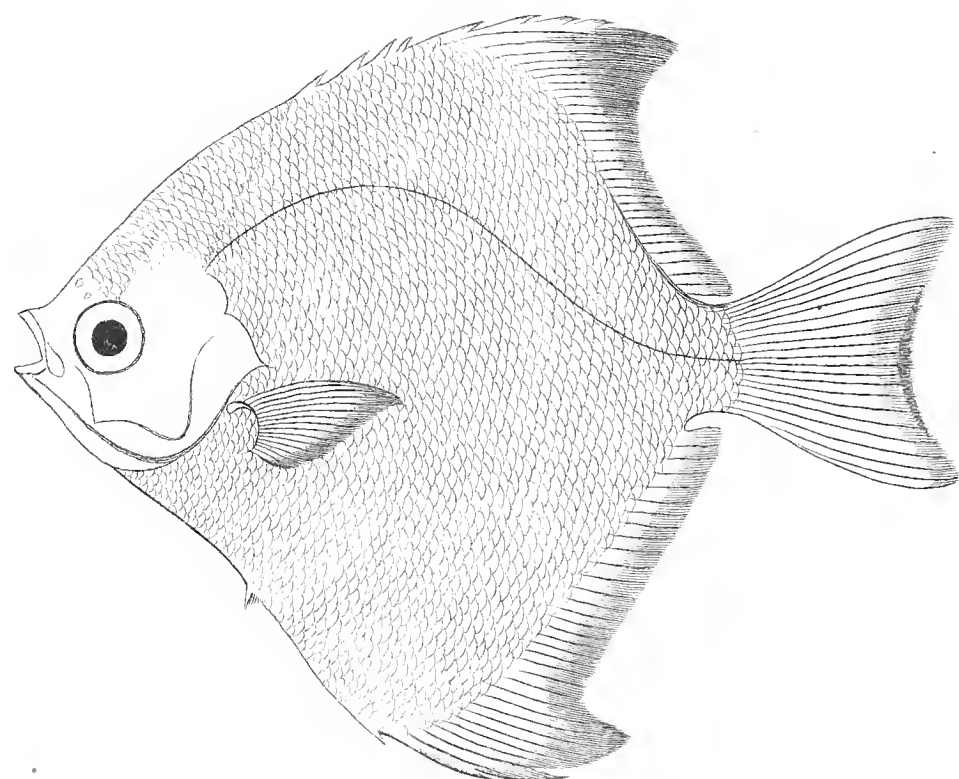
LVIII

LVII. GURRAH PARAH.

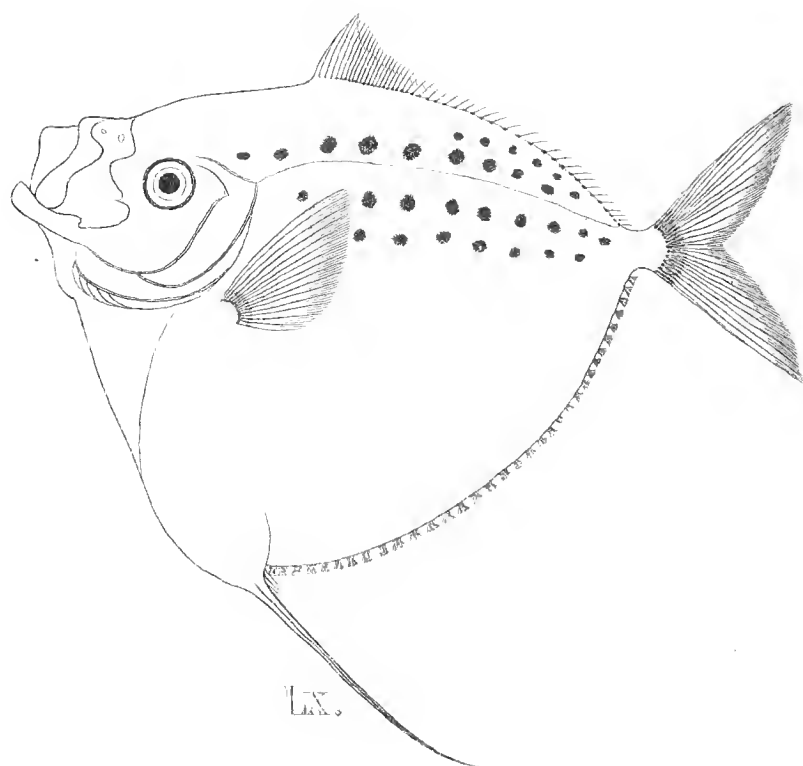
LVIII. CHEWOOLA PARAH.





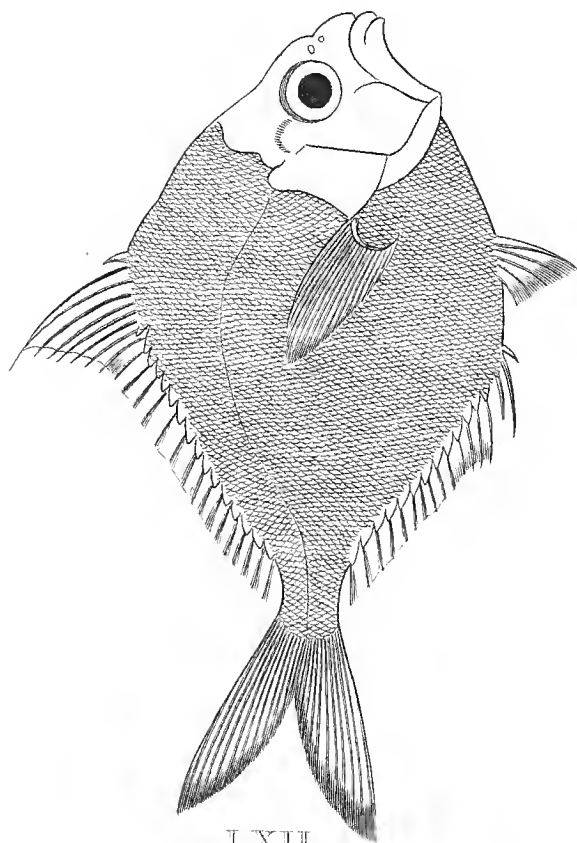


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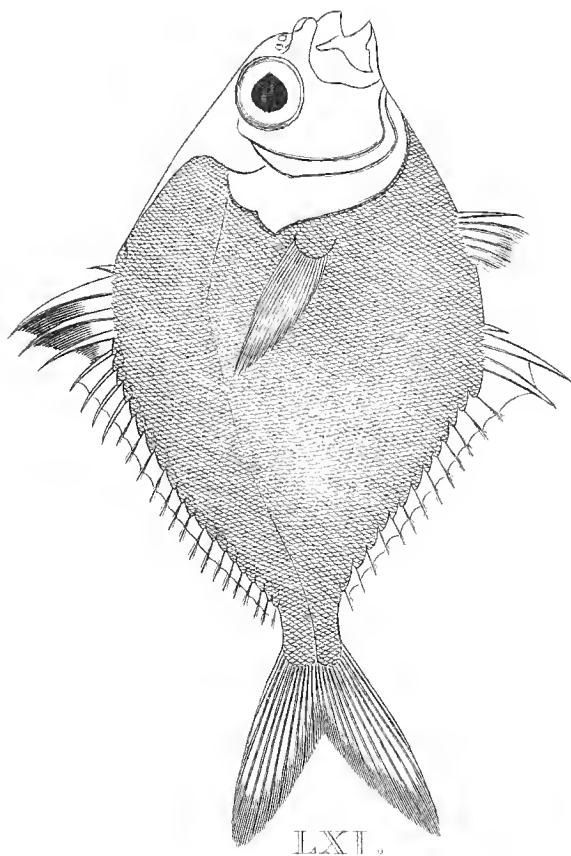


LX.





LXII.

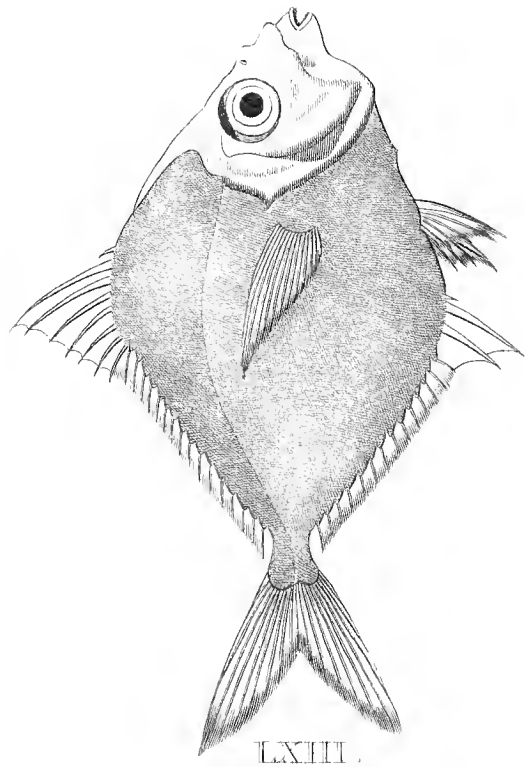


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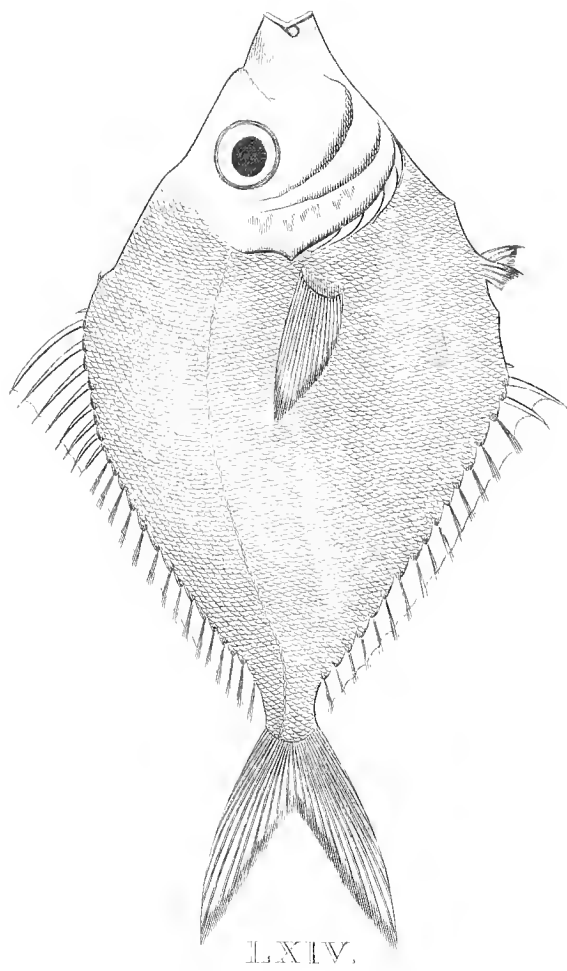
GOOMORAH KARAH.

TOTTAH KARAH.





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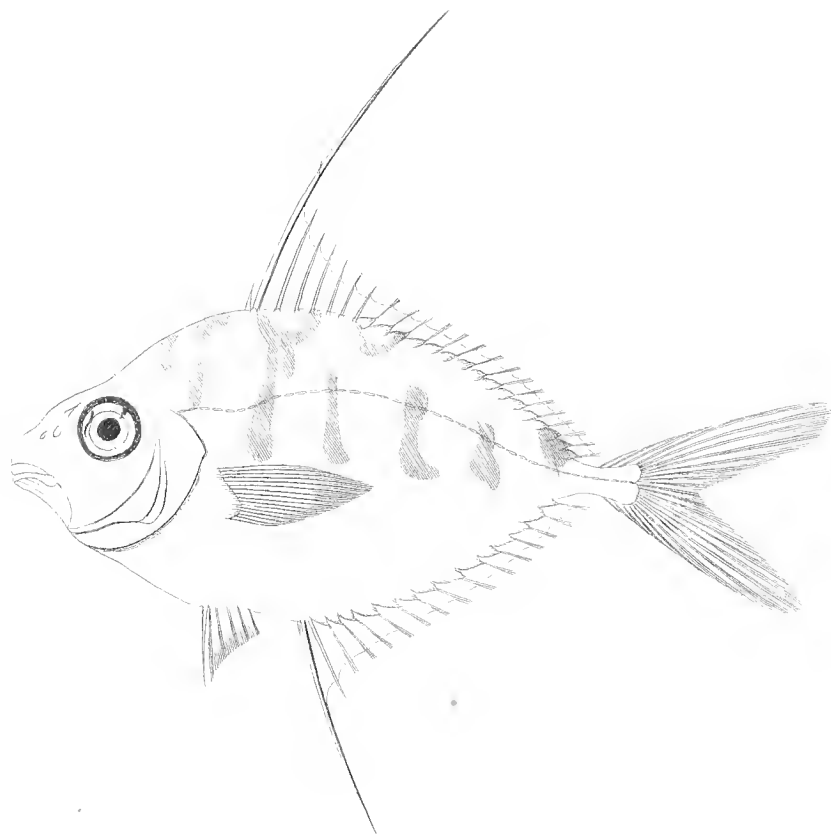
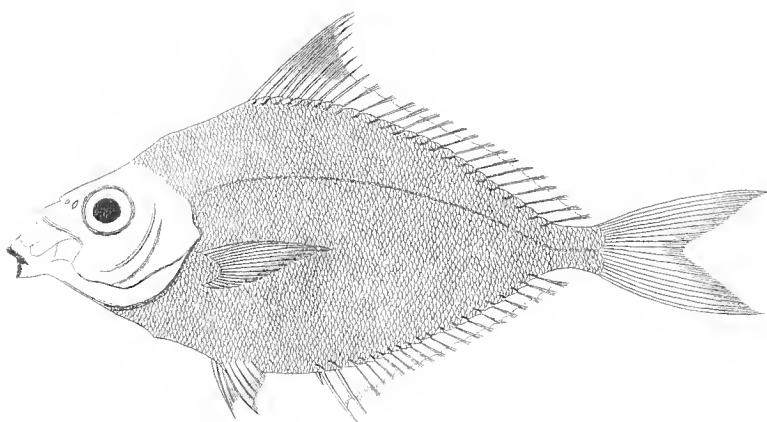


LXIV.

KOMAH KARAU.

BINDOO KARAU.



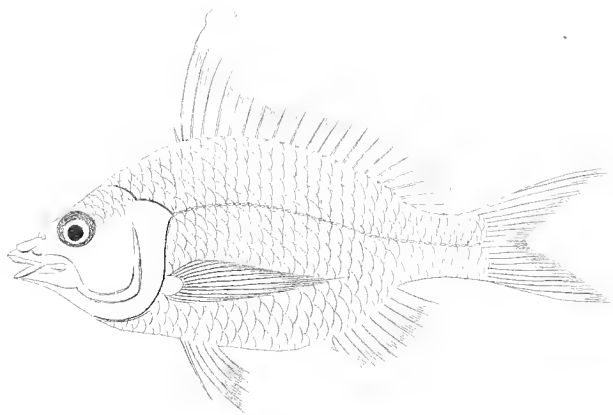
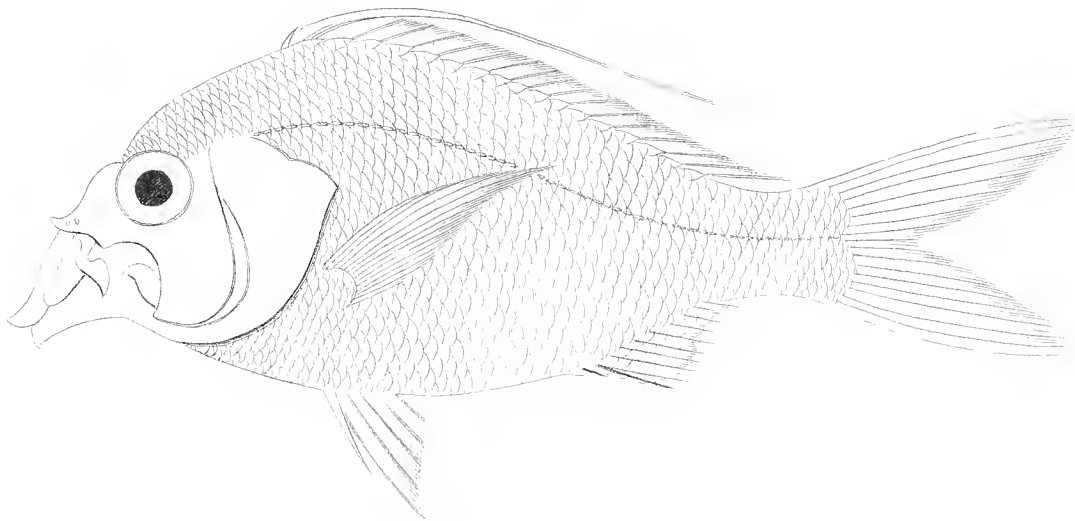


DACER KARAH

KARAH



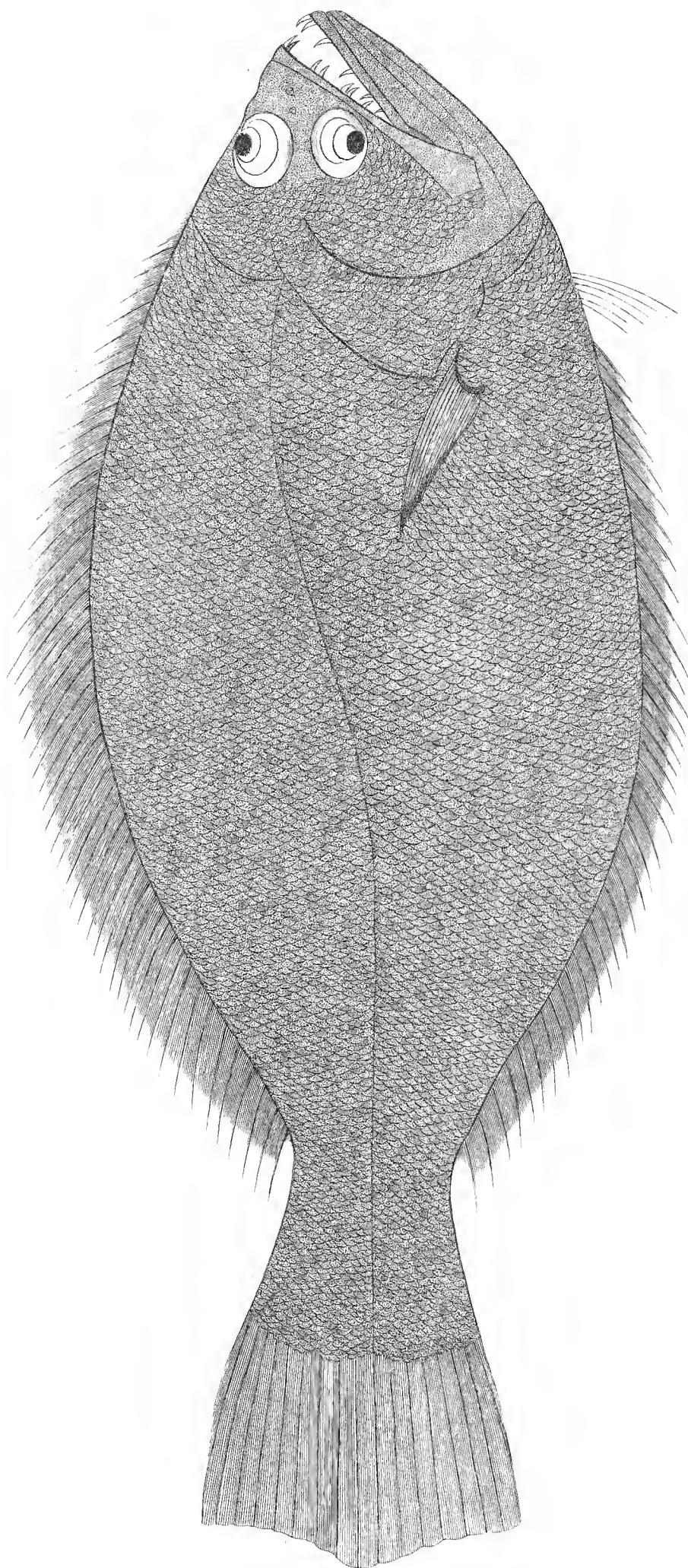




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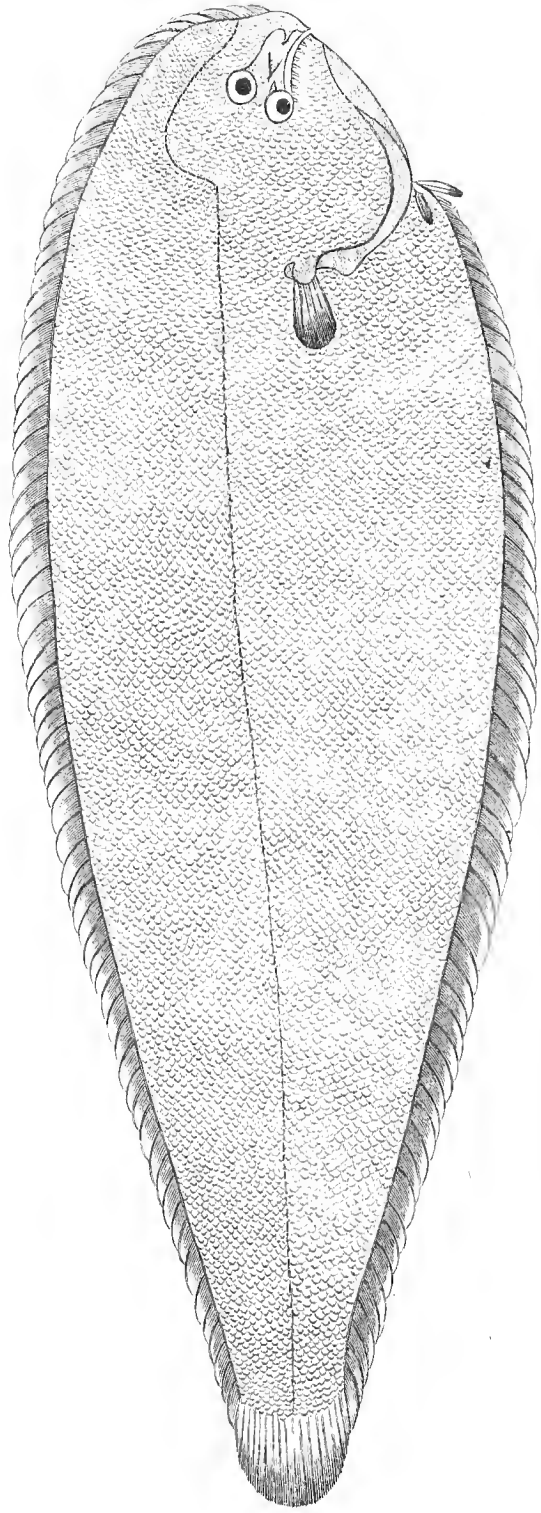
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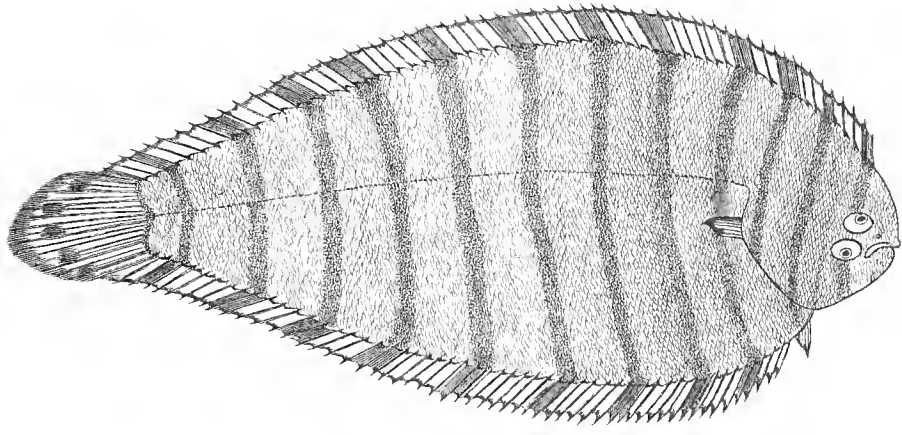
ADALAH.



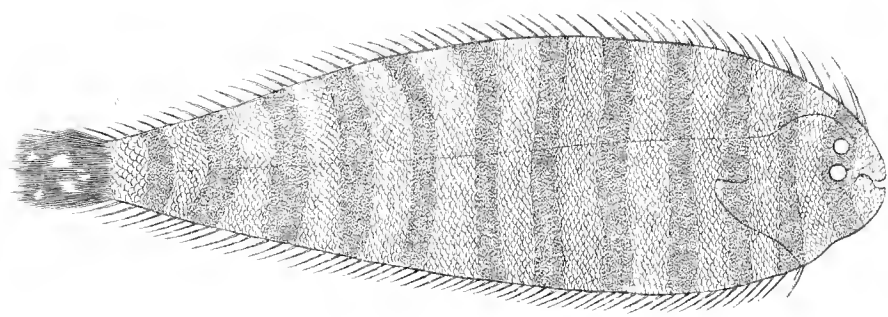


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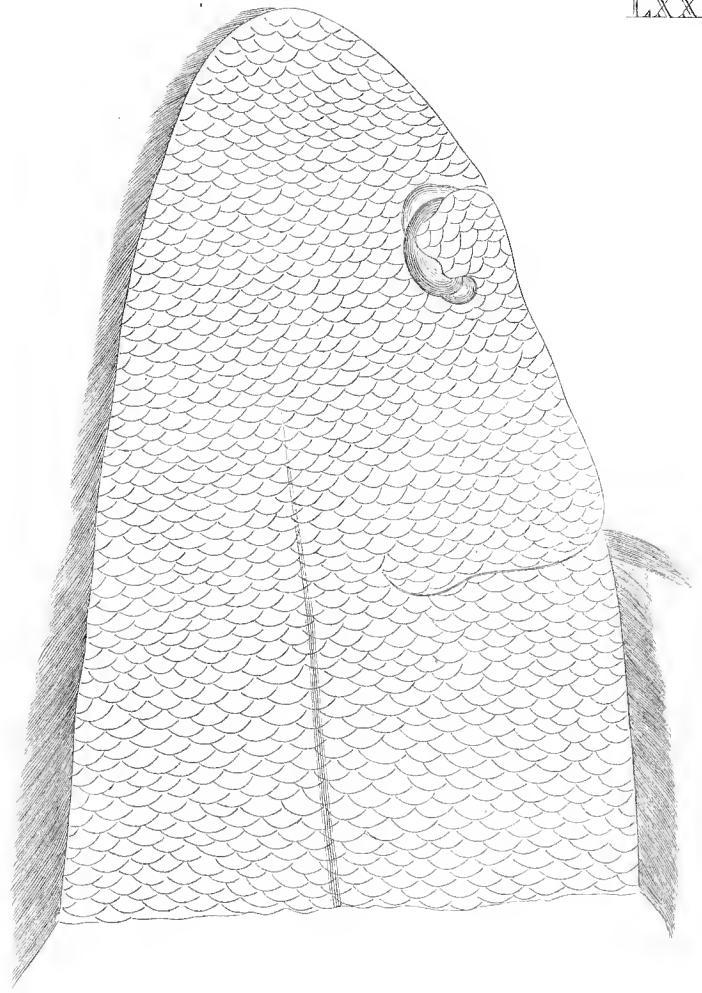
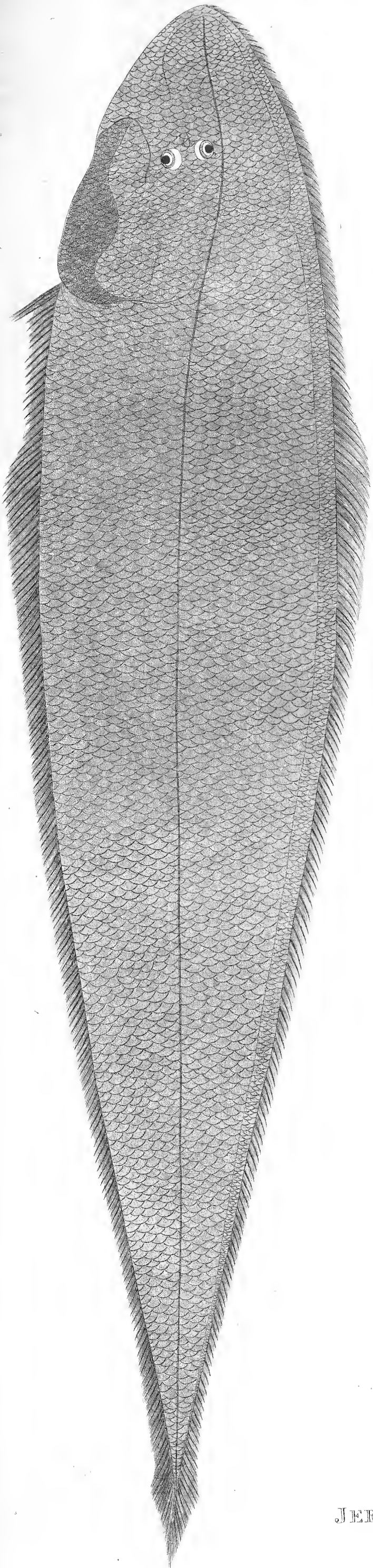
LXXI



LXXII

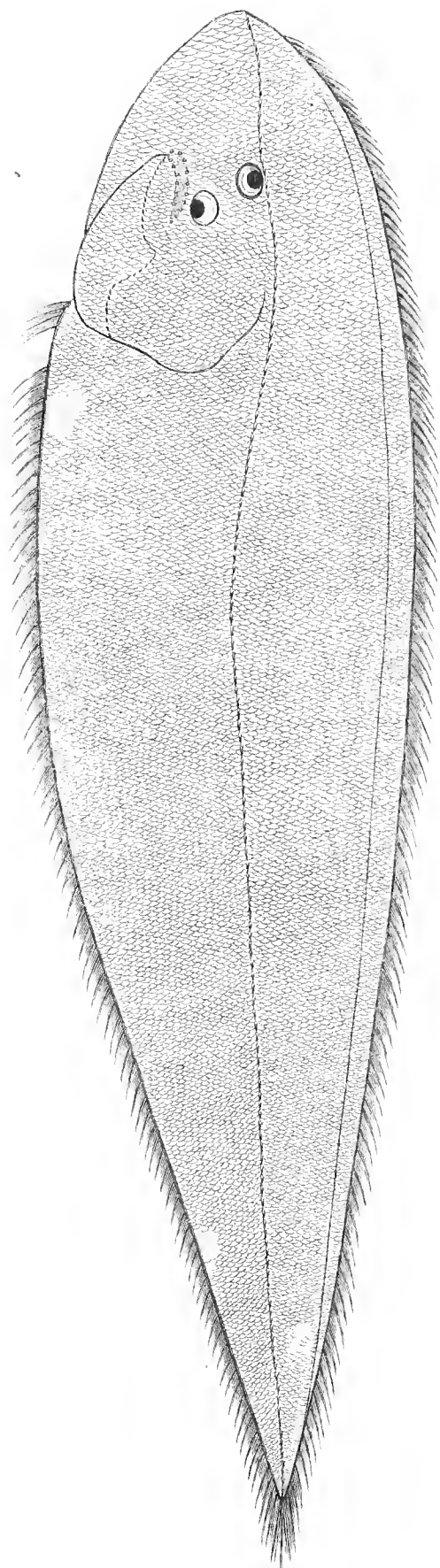






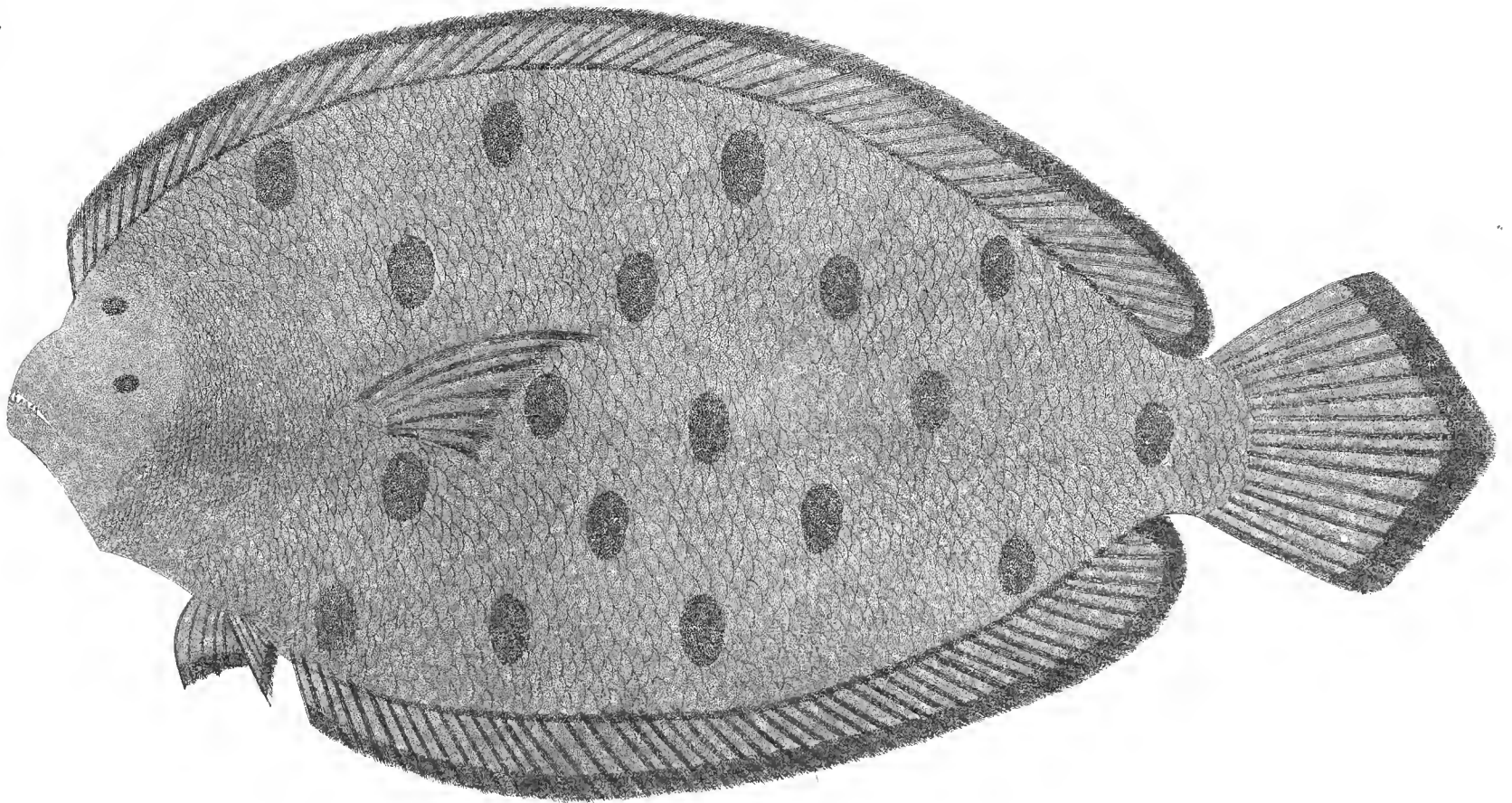
JERREE POTOOD.





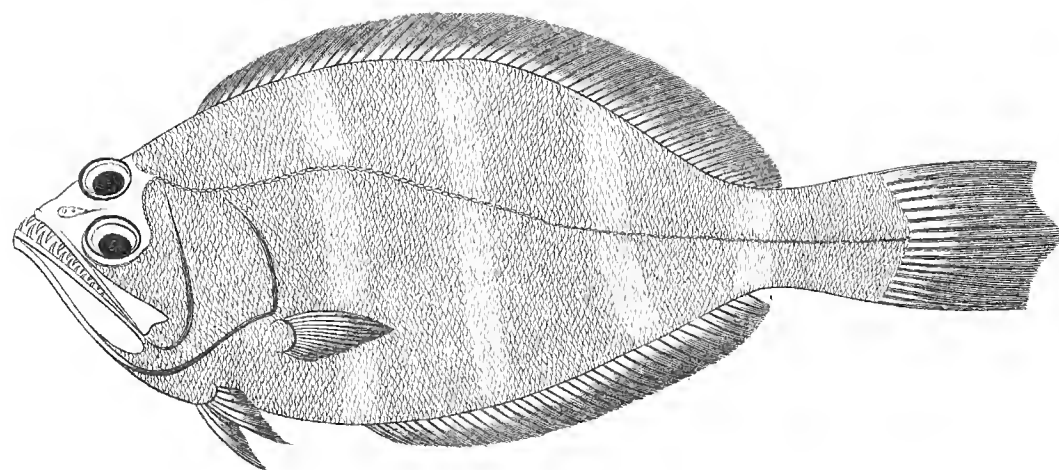
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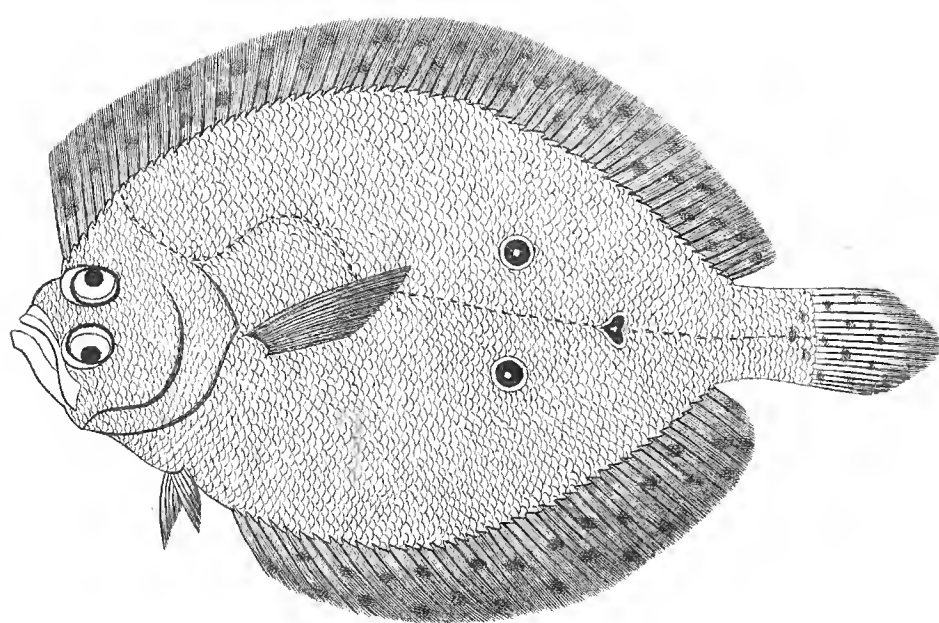


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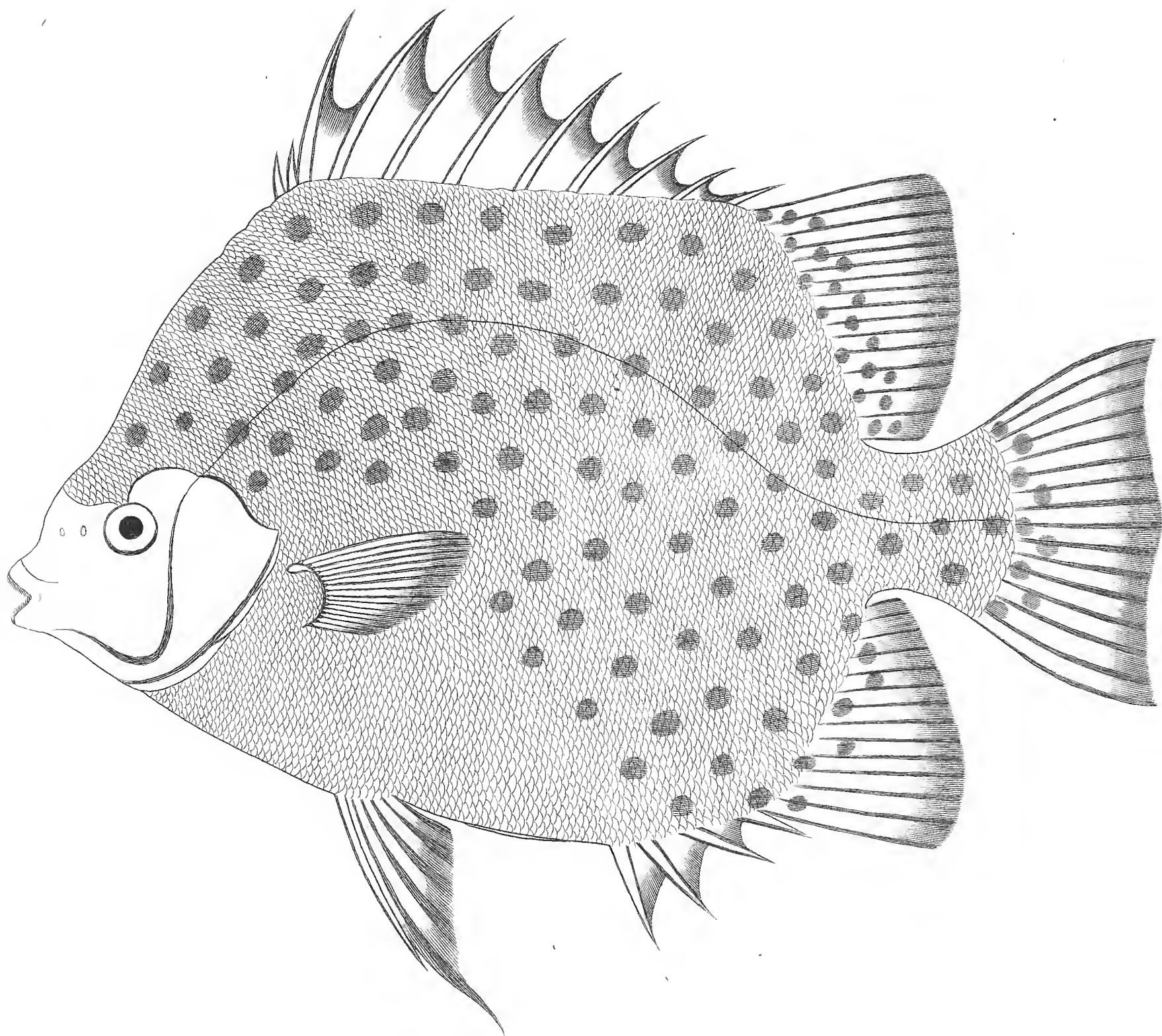
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LXXVI.

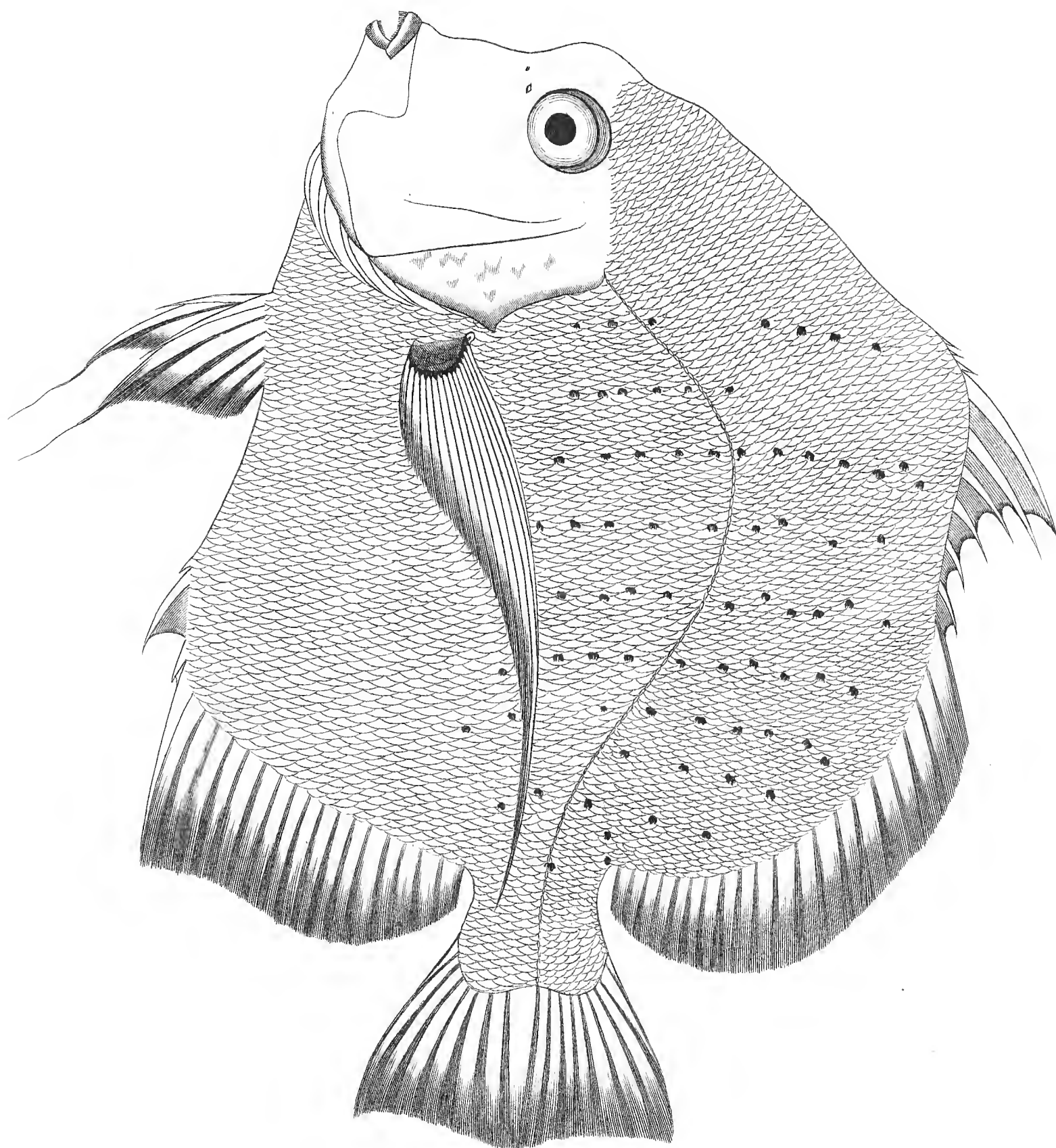






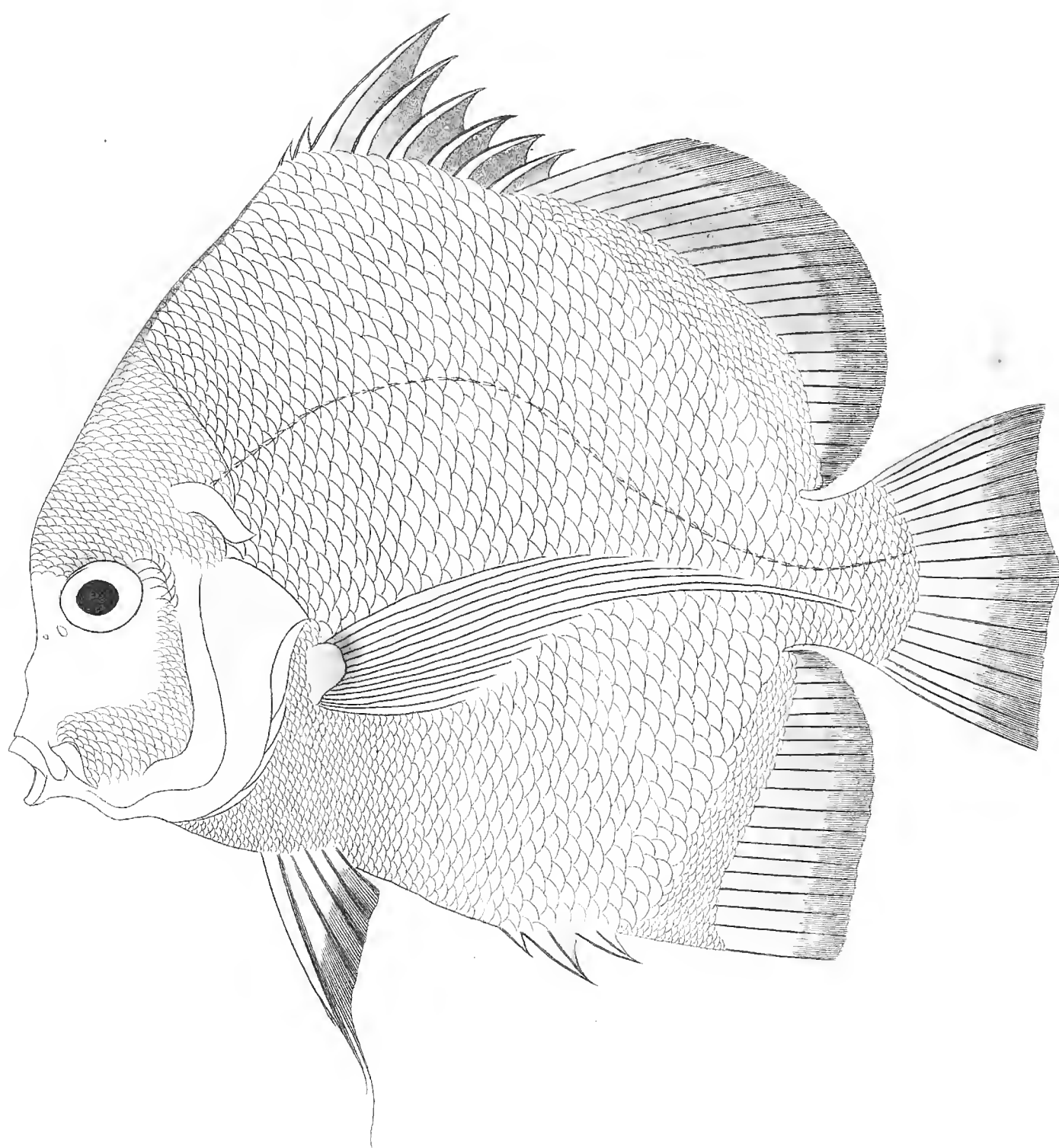
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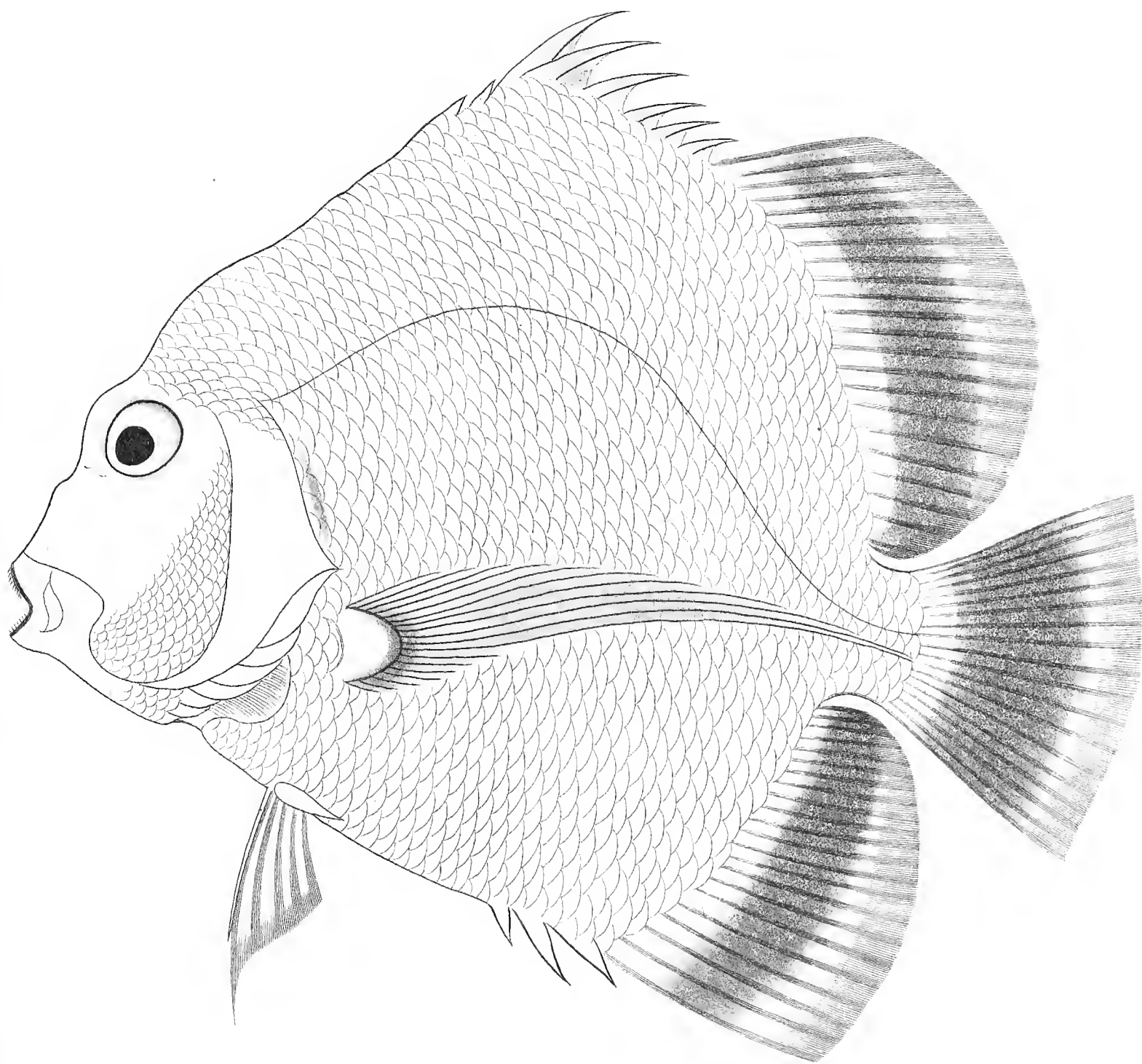
LATTE.





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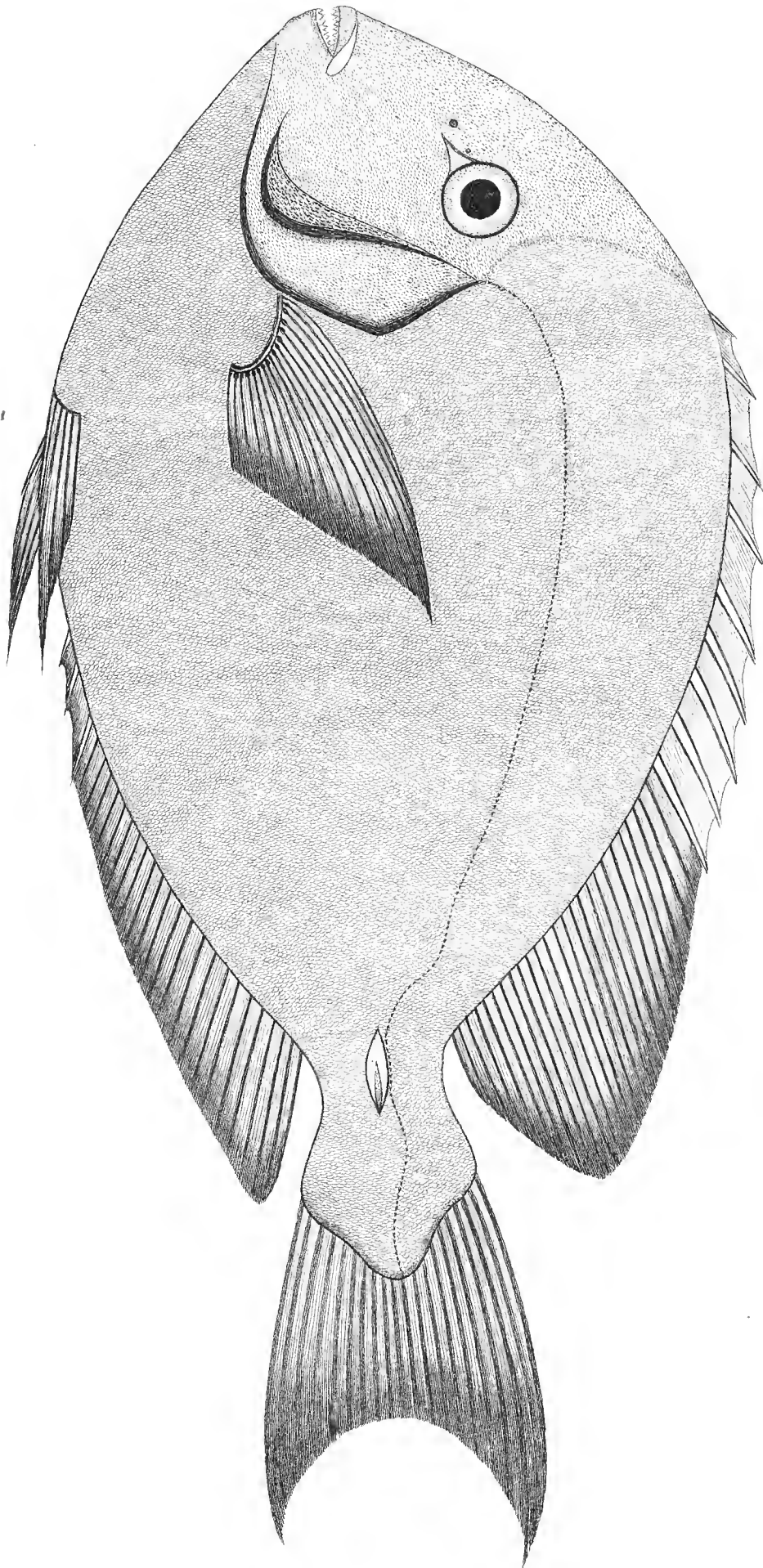




TERLA. B.

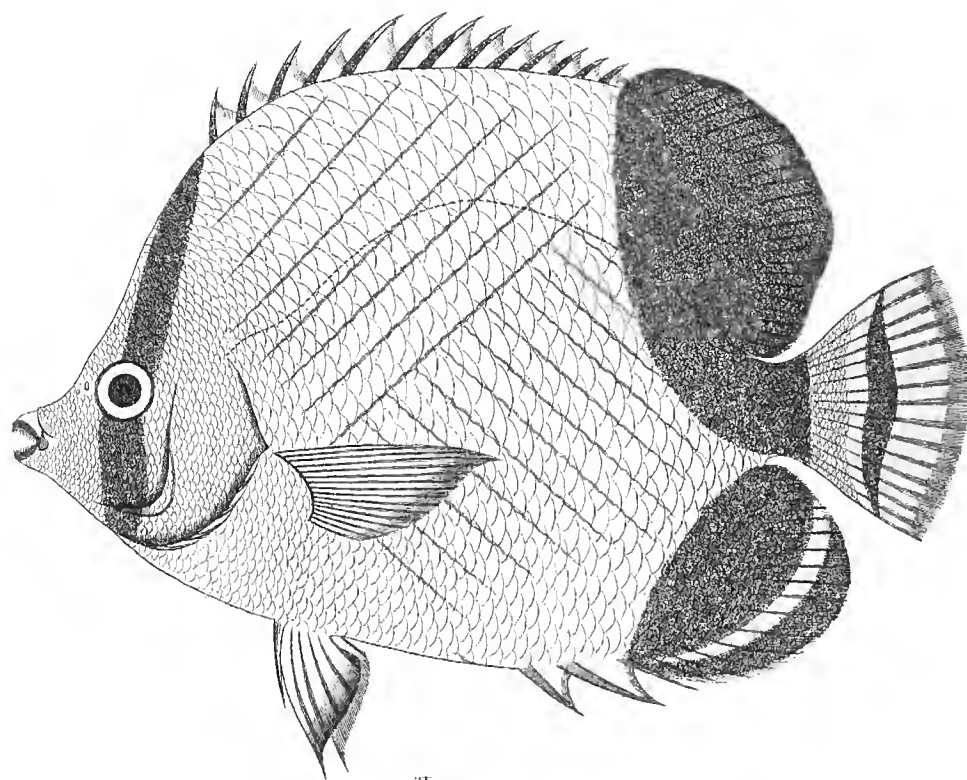




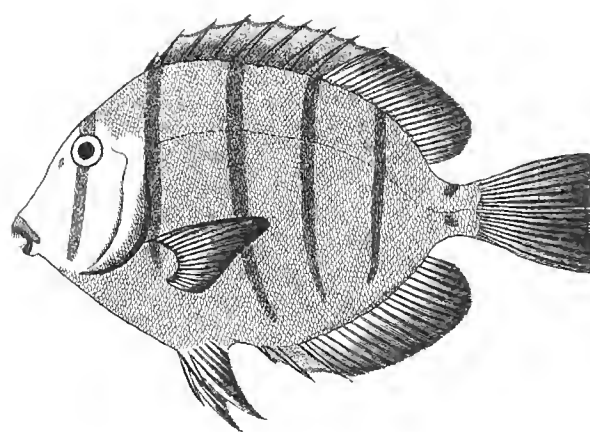


MATA.



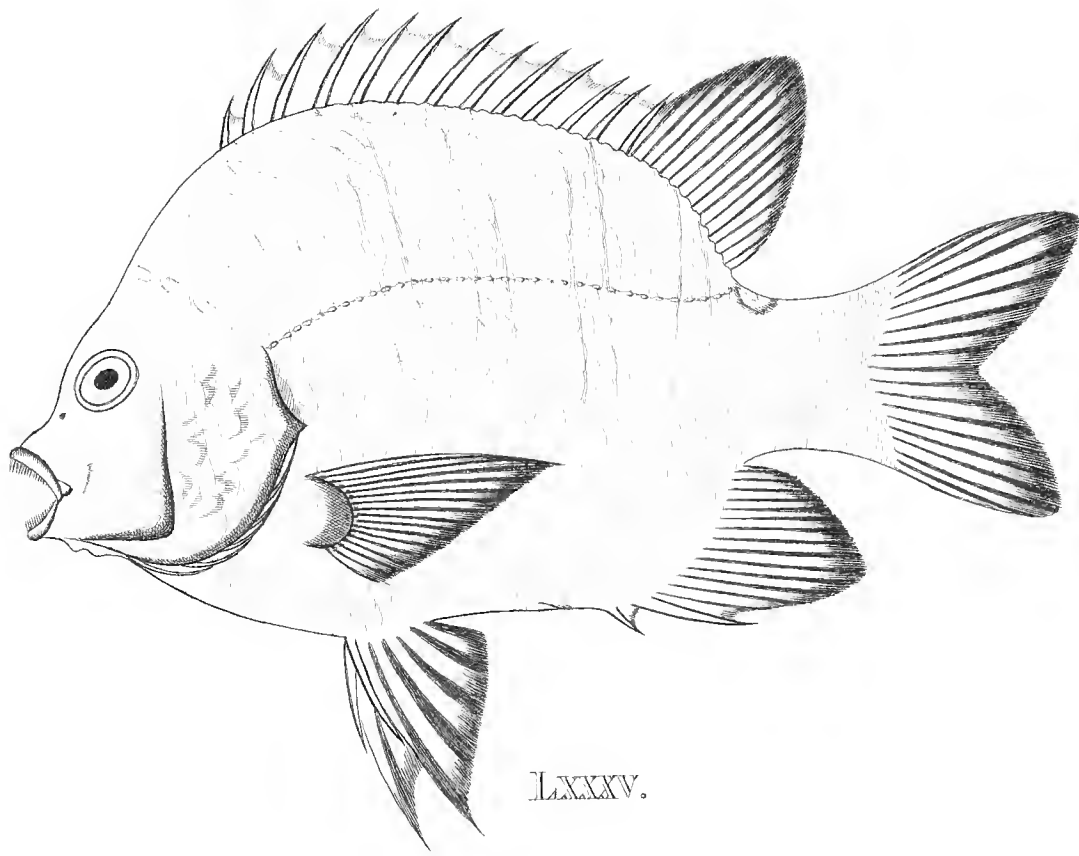


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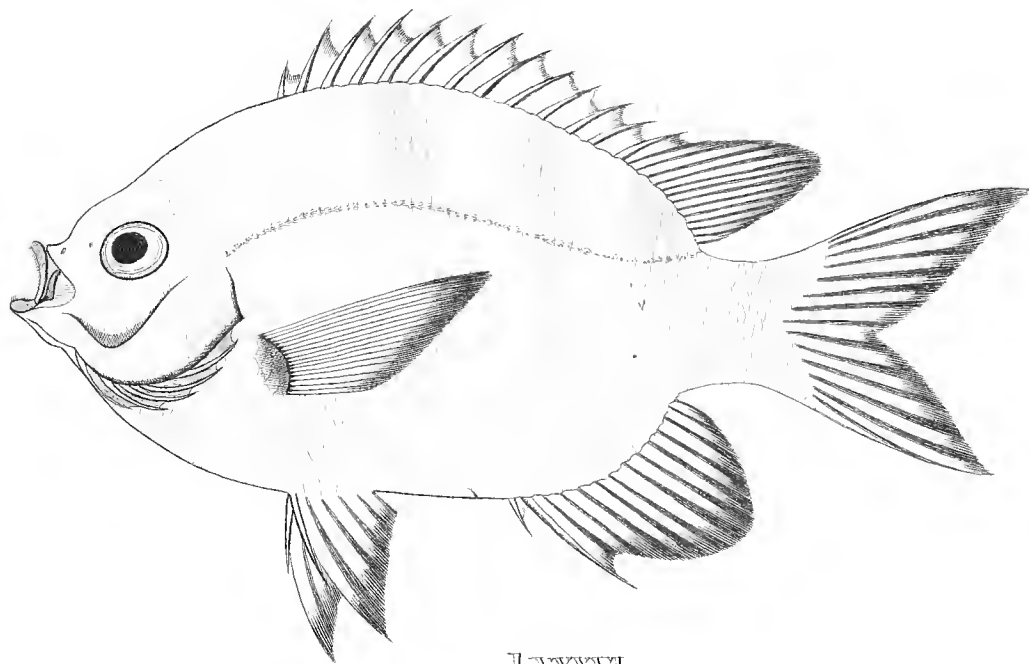


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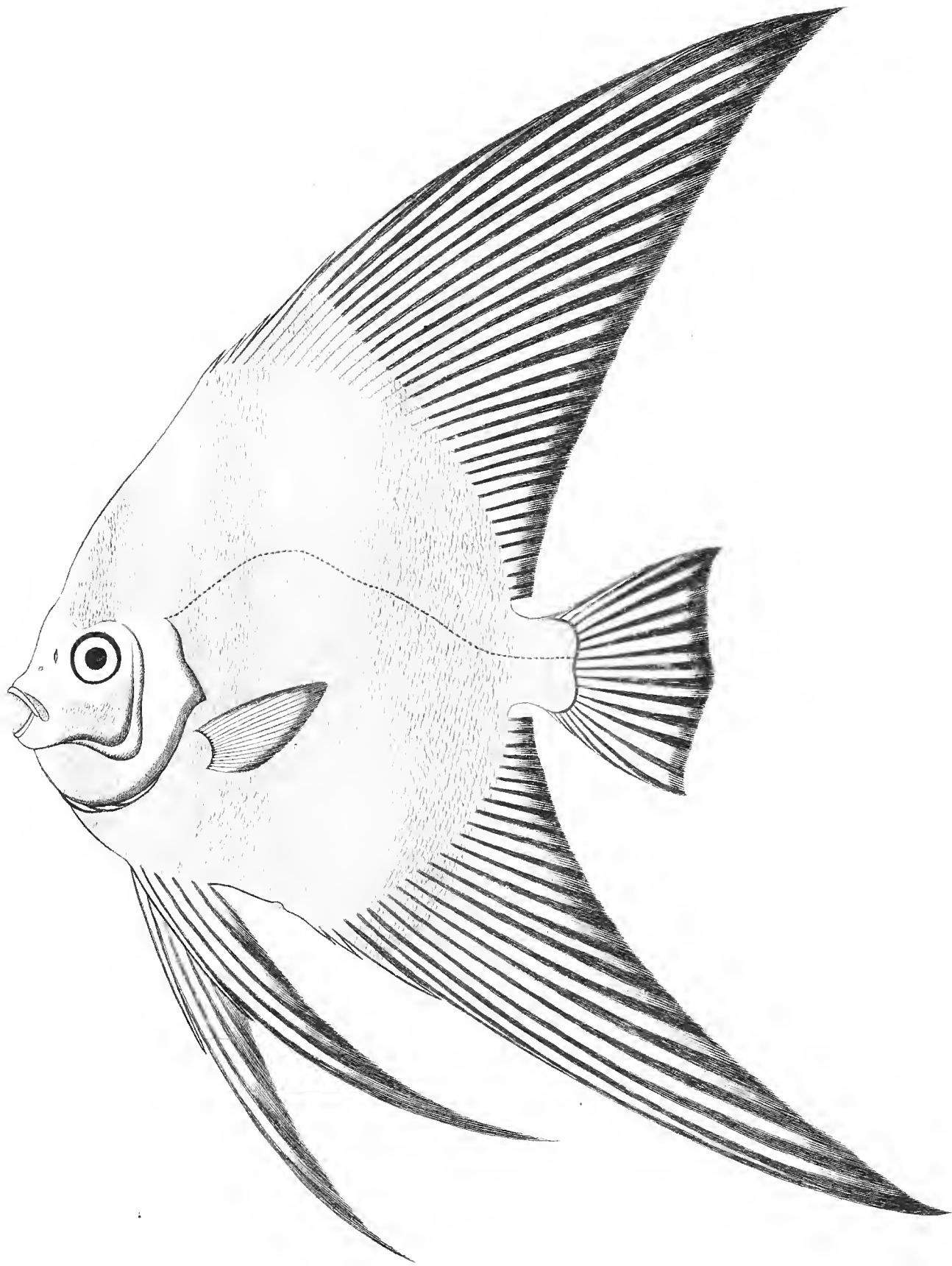


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LXXXVI.

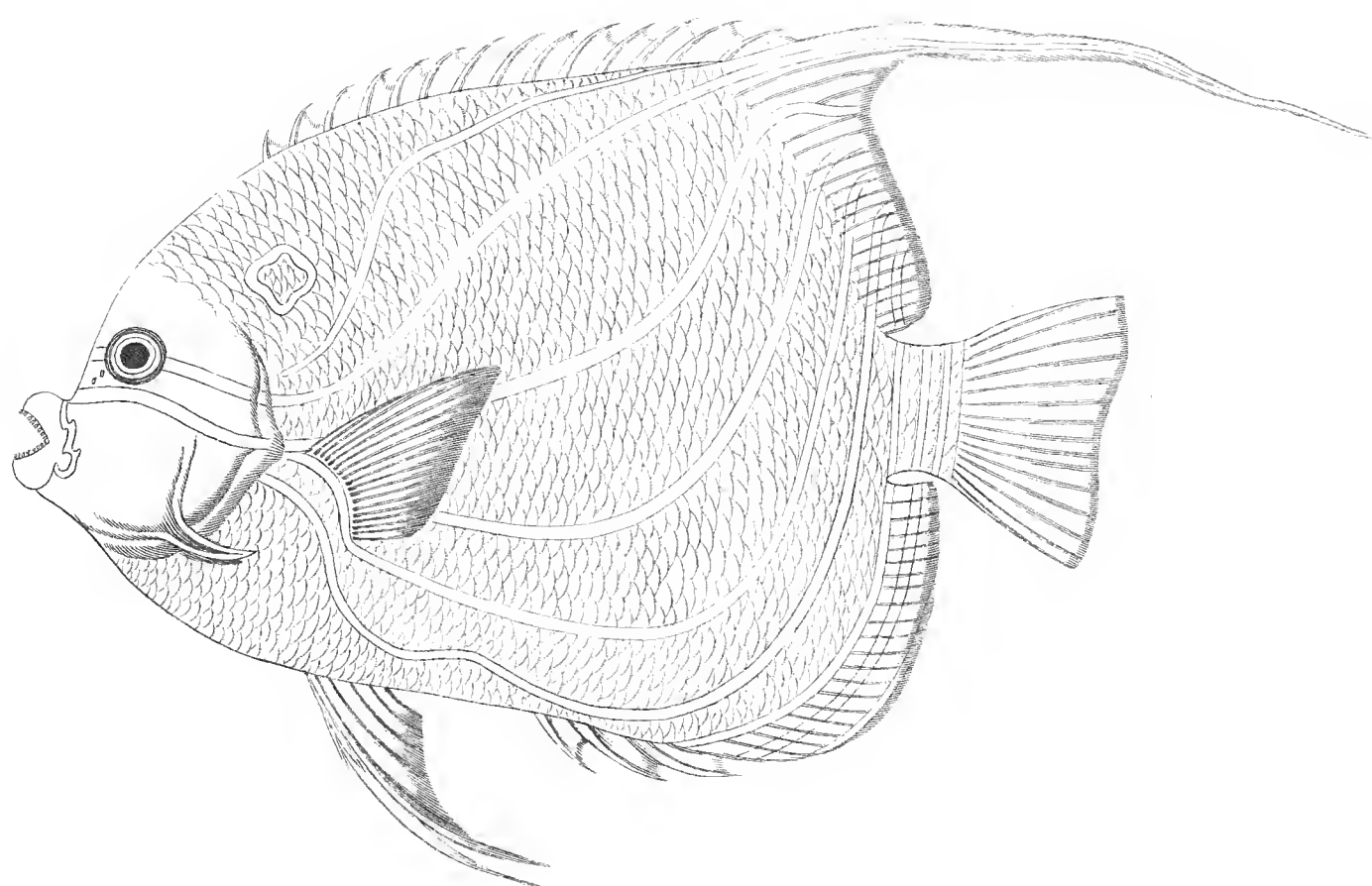




KAHI SANDAWA.

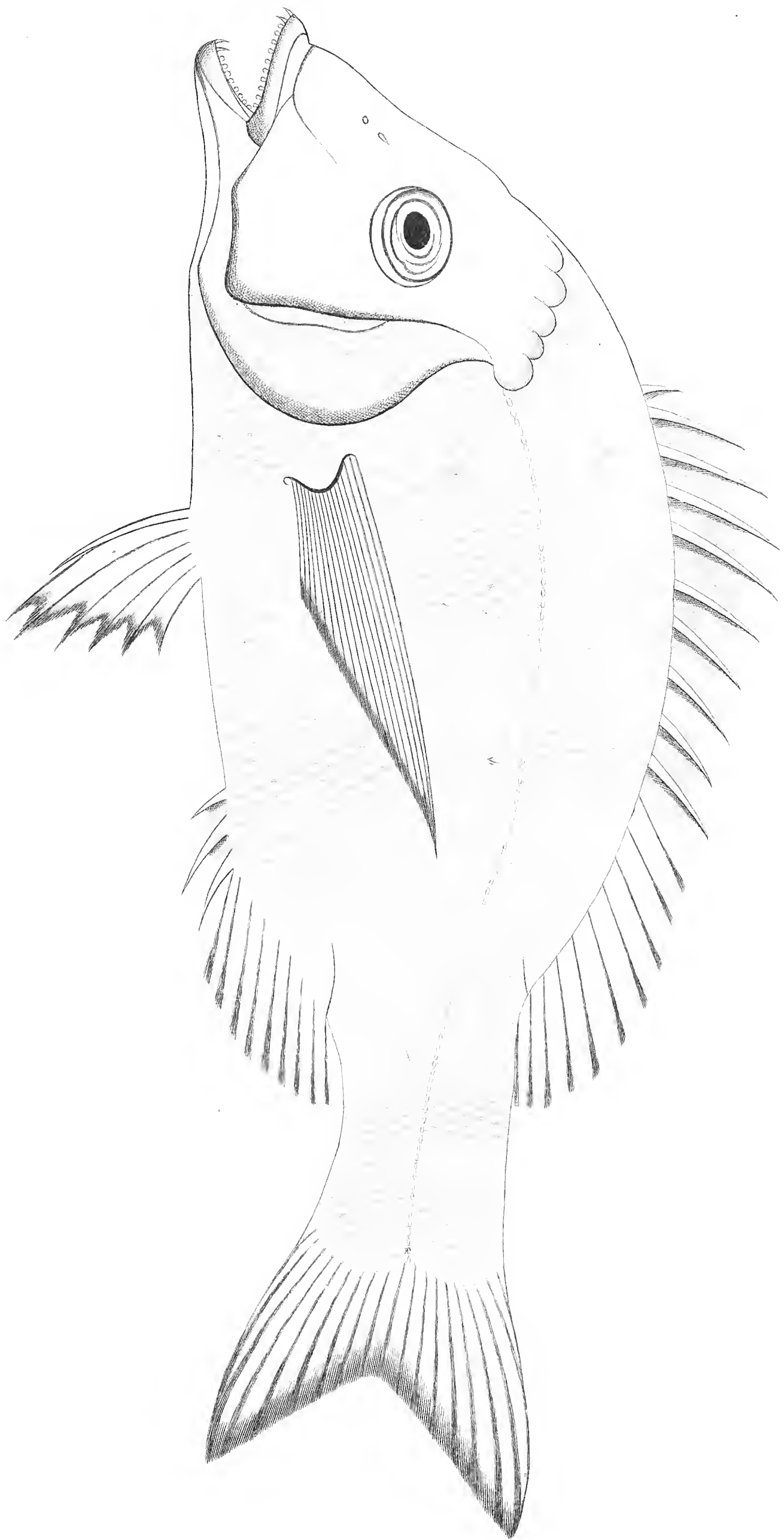






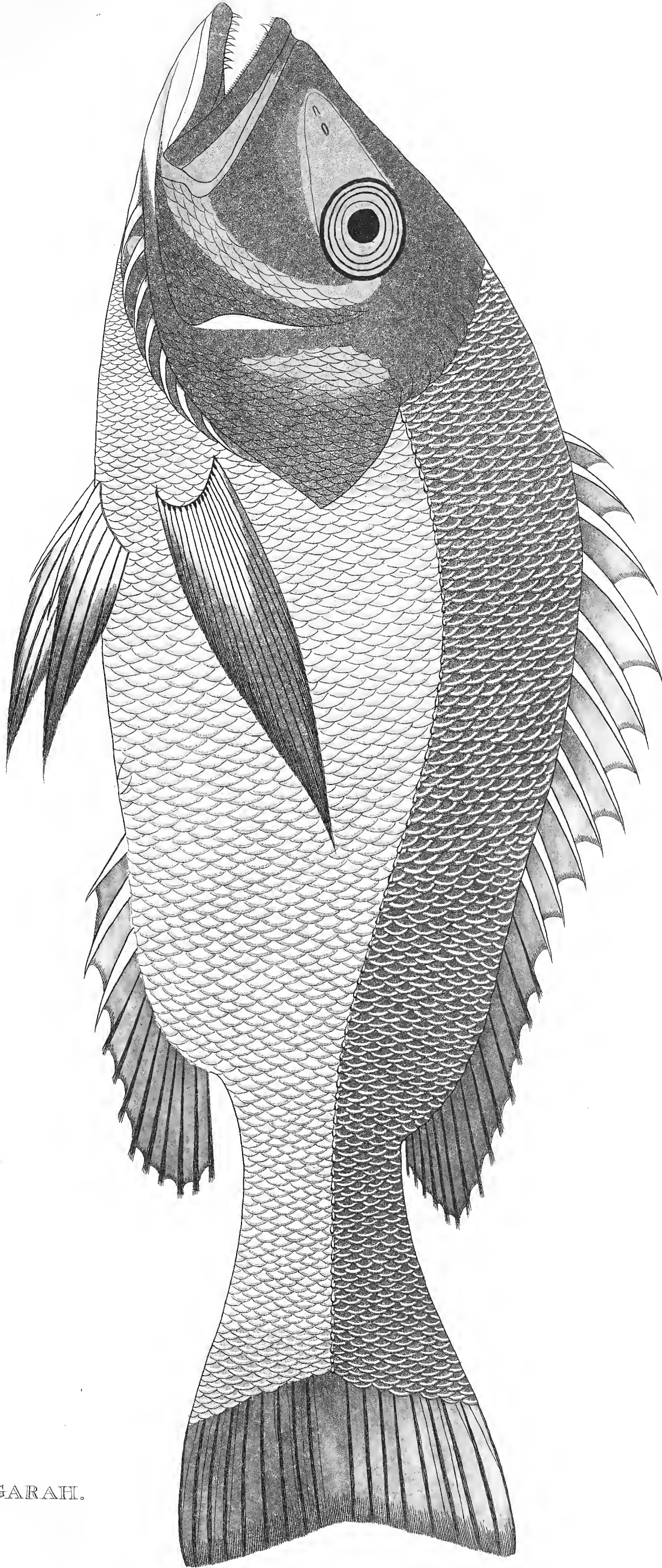
SAHNI TCHAPI.





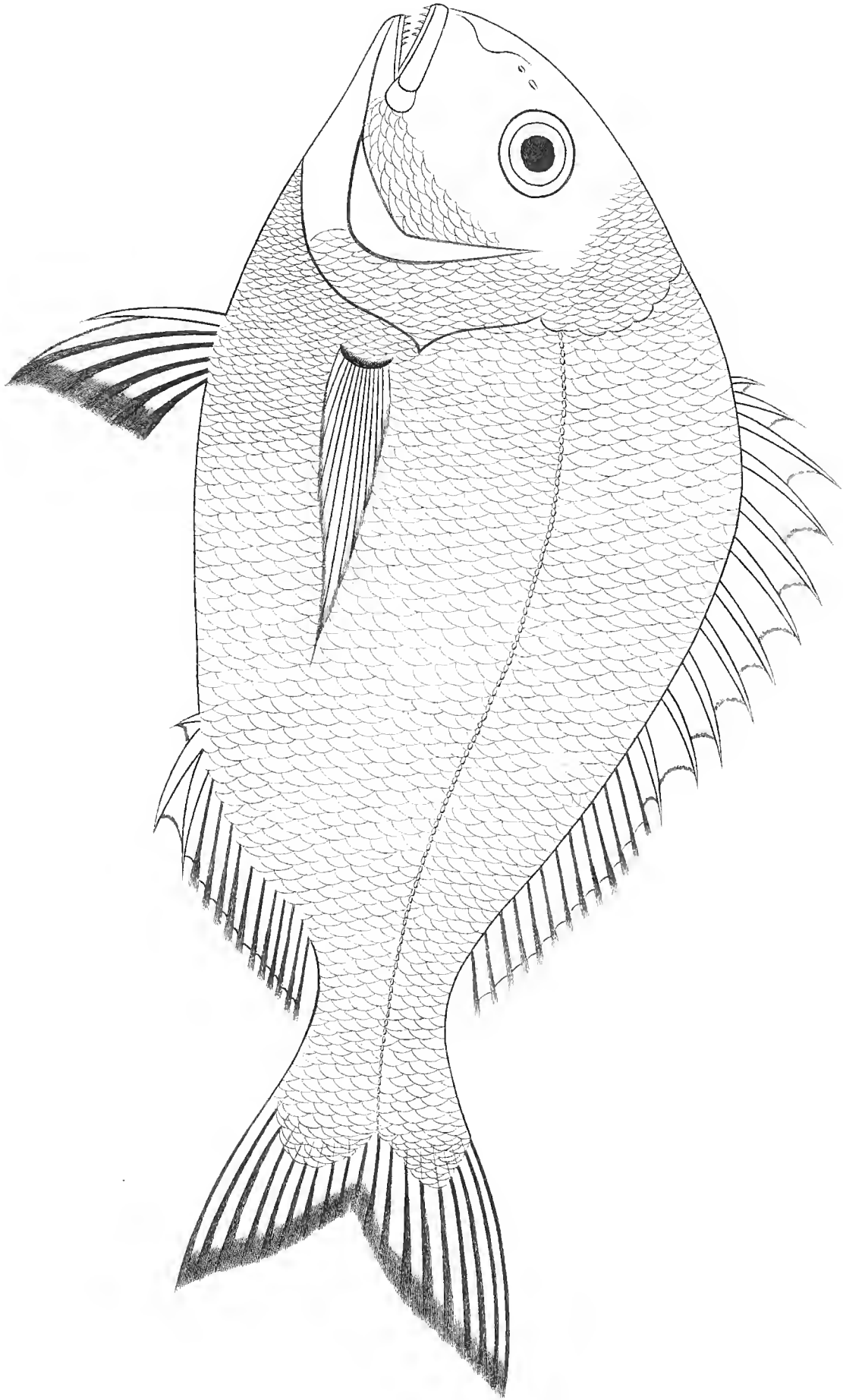
KARWA.





IAHNGARAH.

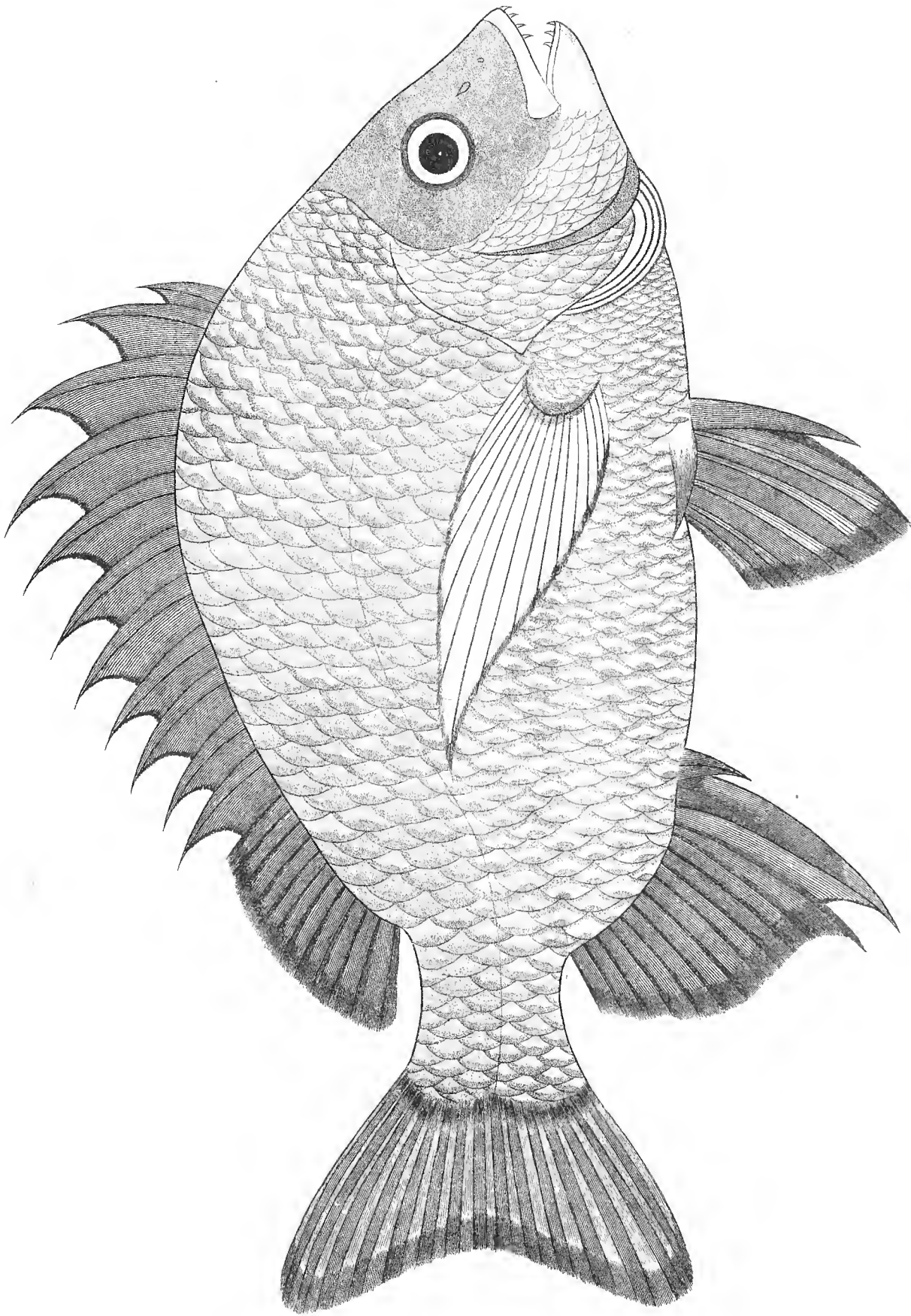




CHITCHILLEE.

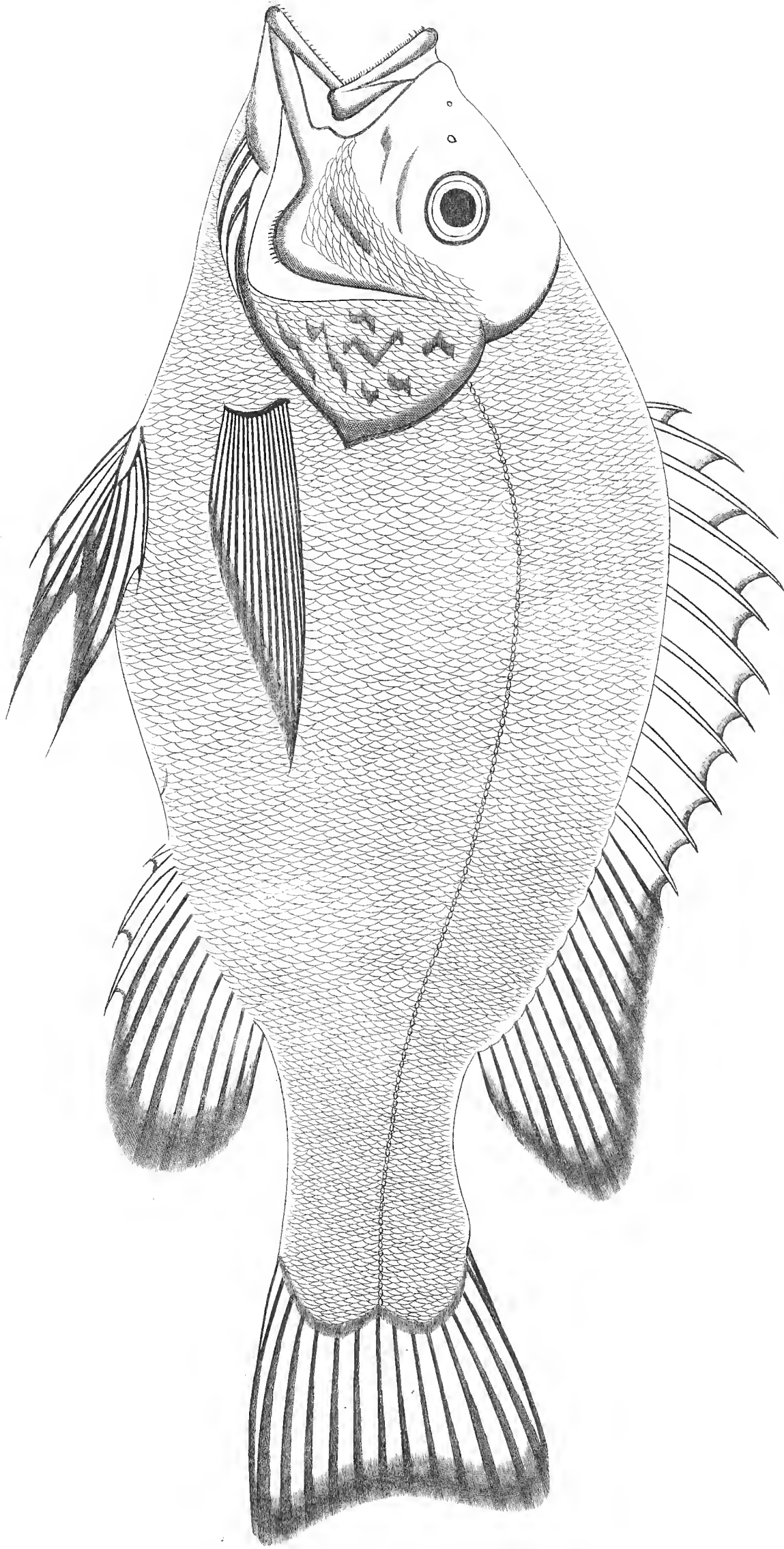






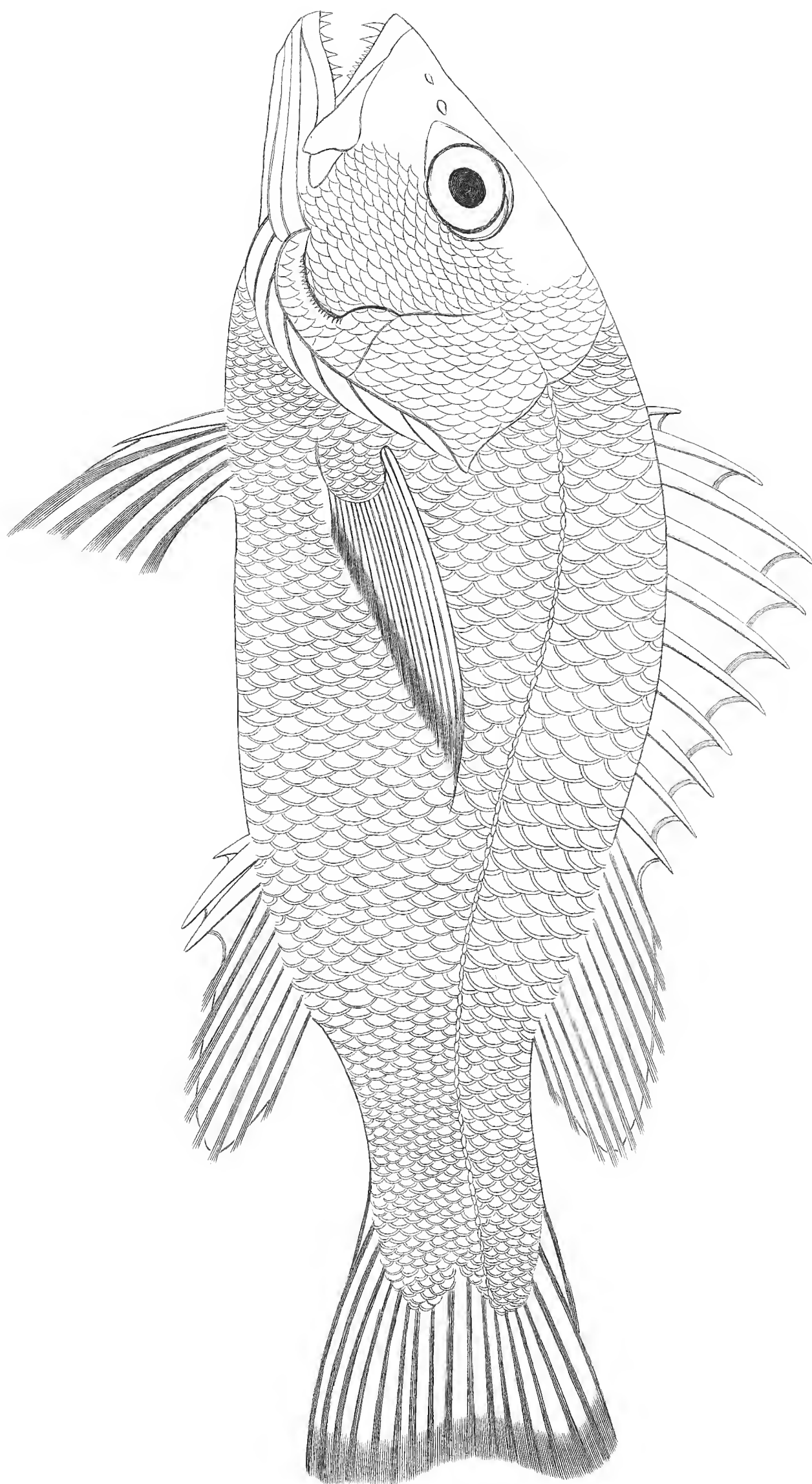
CALAMARA.





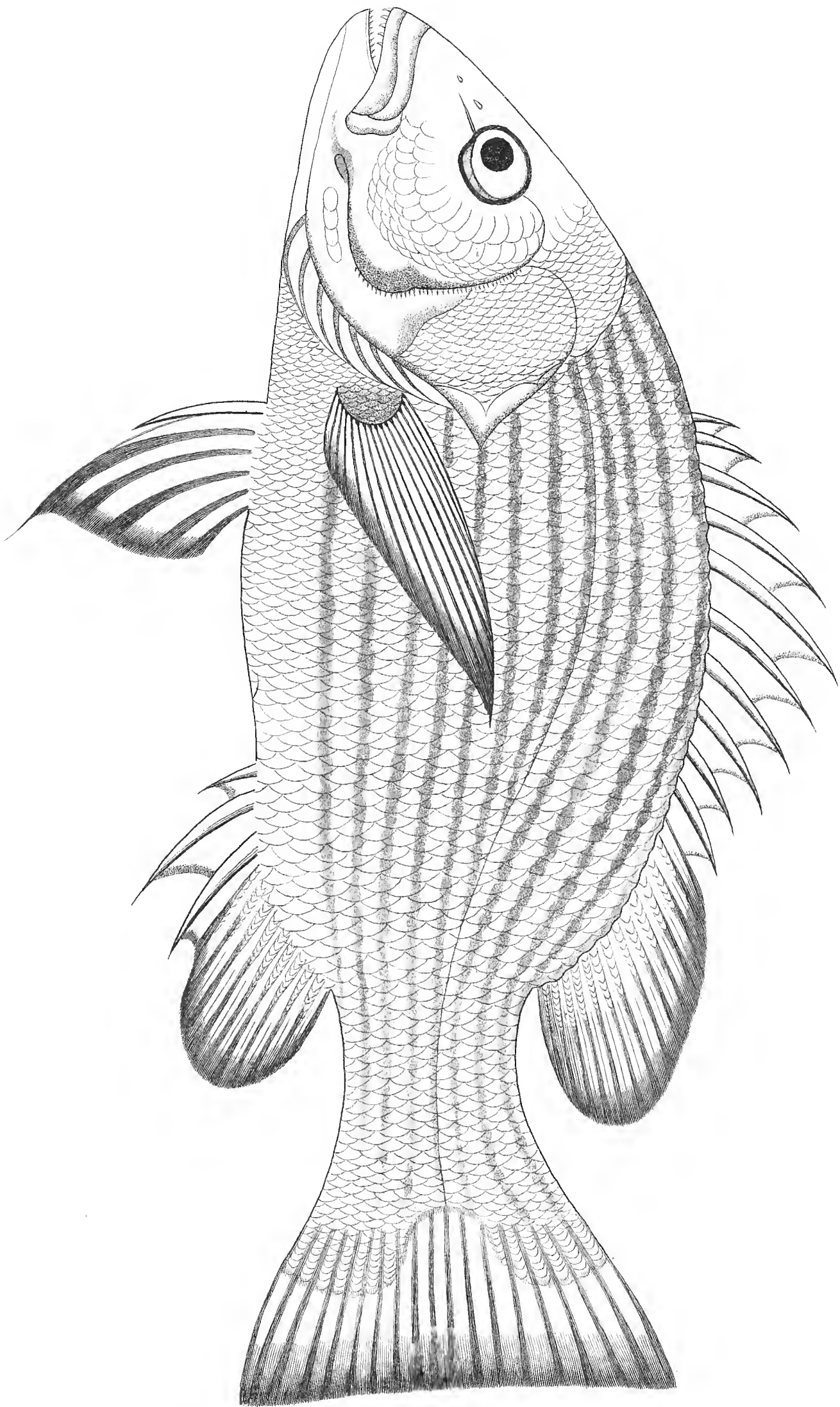
CHIRTAH.





RANGOO.

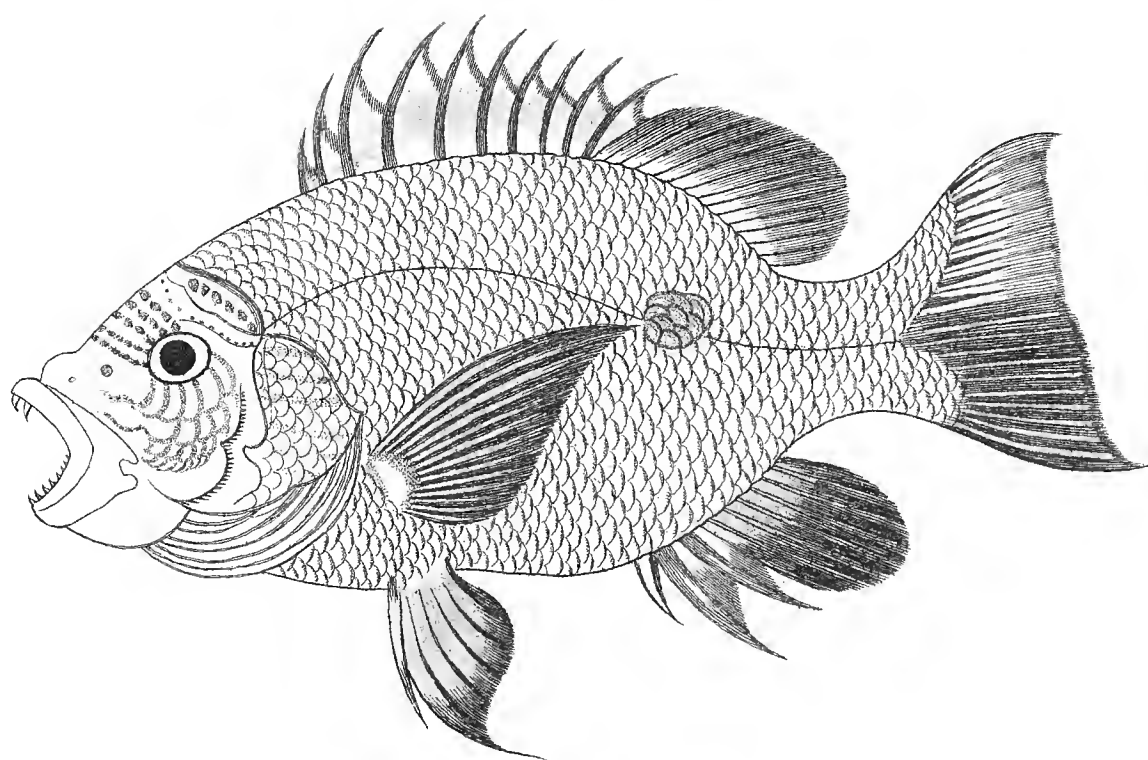




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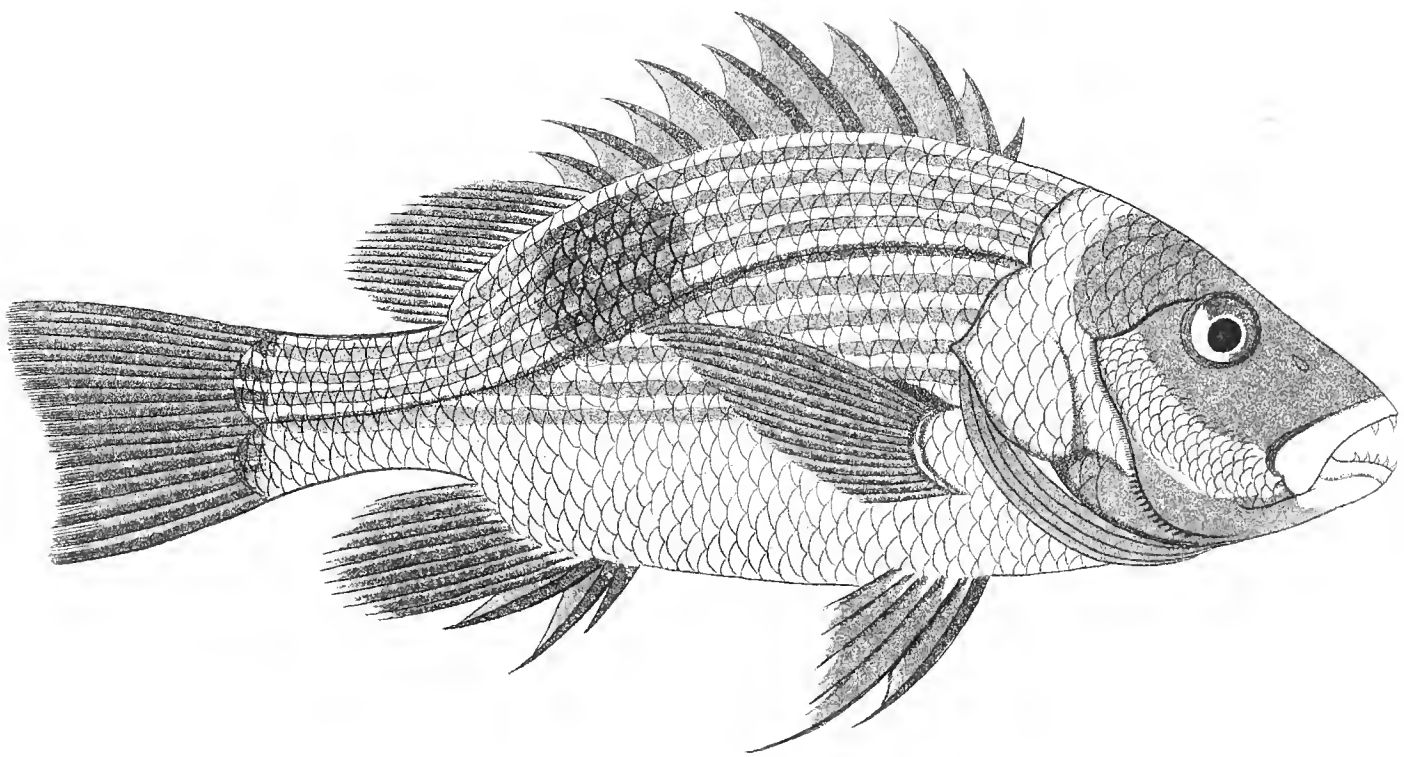






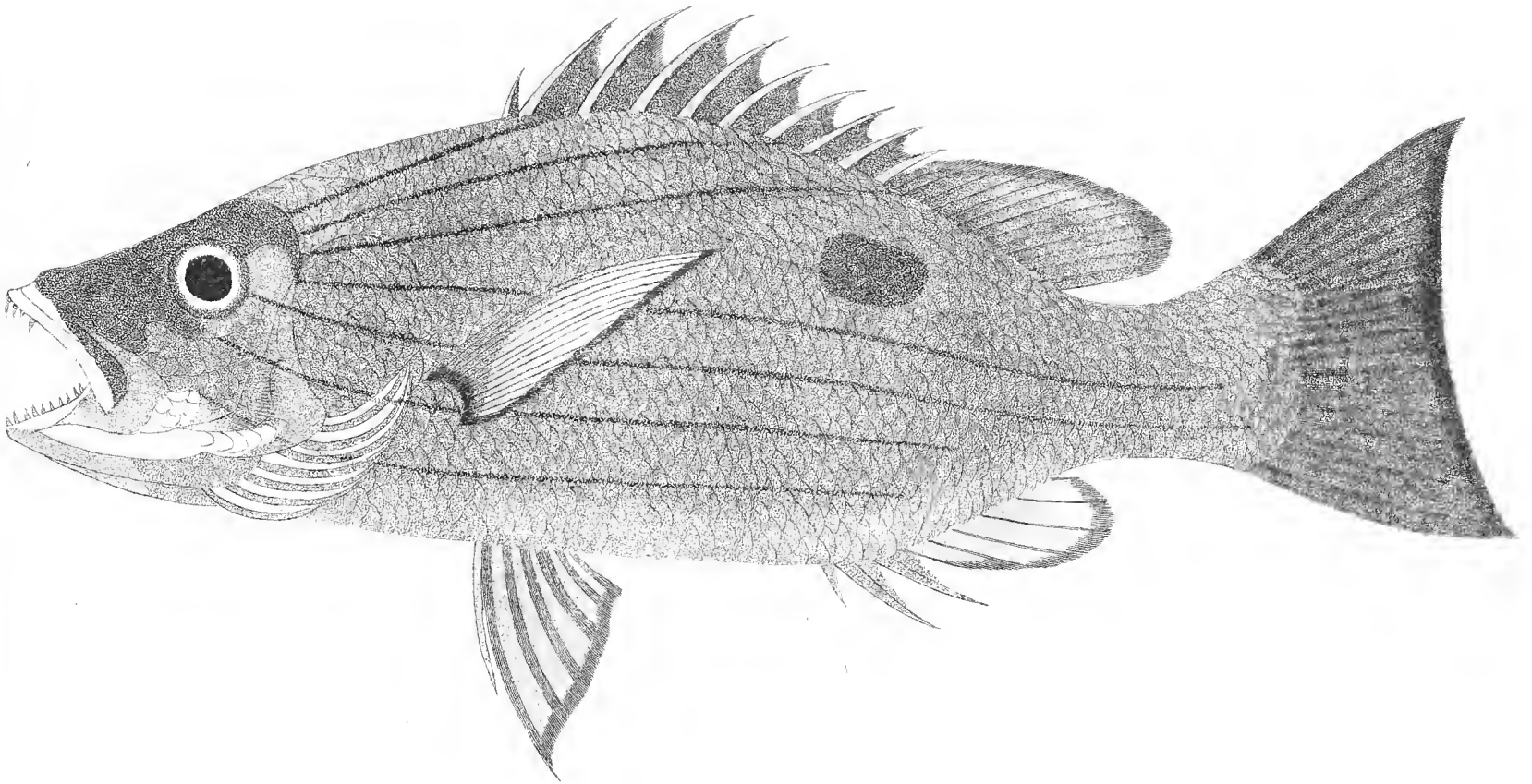
KALLEE MAEE.





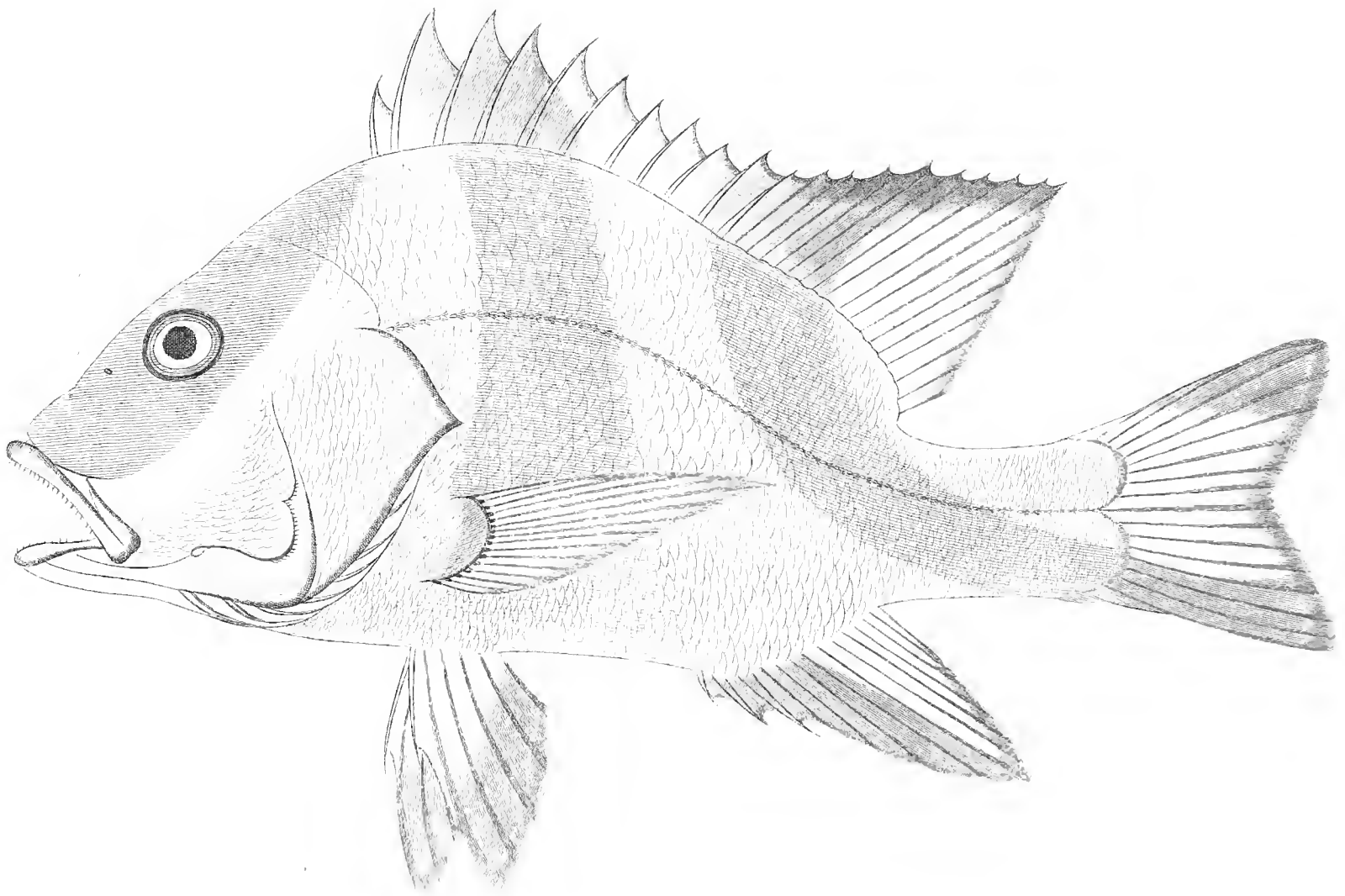
D O N D I A W A I L.





ANTIKA DOONDIAWAH.

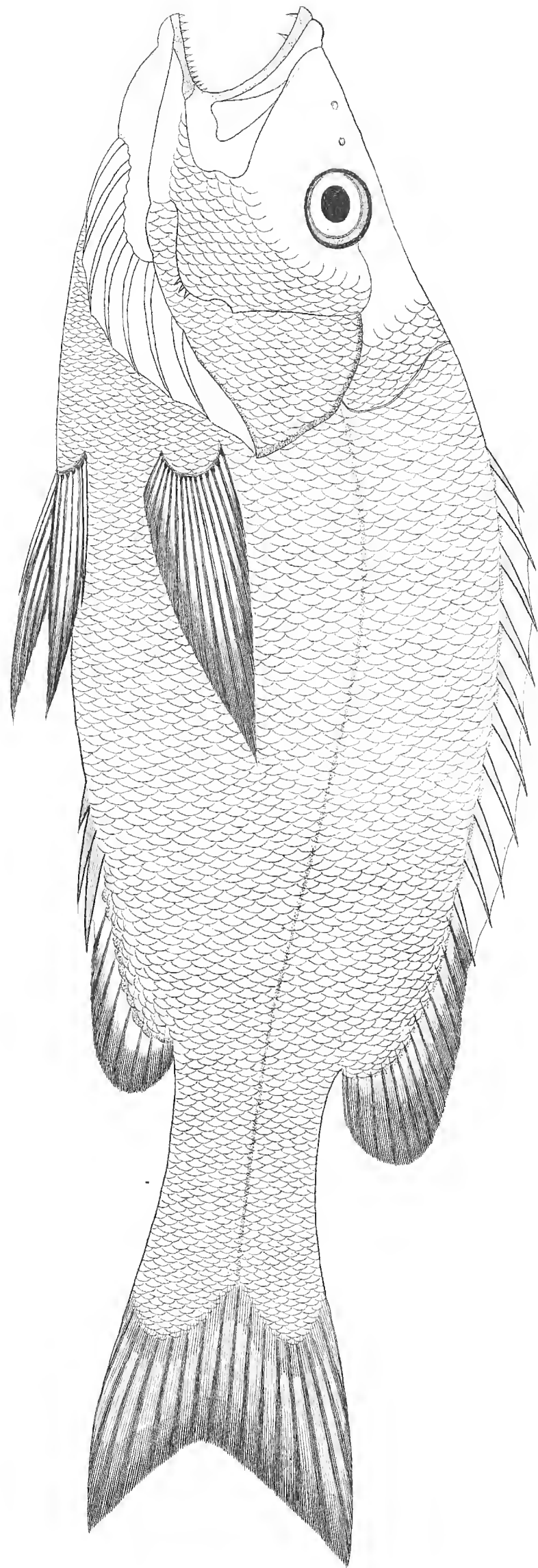




BOFFAWOO CHEMPALL.







SILAO.



# SYSTEMATICAL INDEX

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4	Isaccurah Tenkee - 3	4	Chemmentreka.
5	Tenkee Shindraki ib.	5	Shemberaca.
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DESCRIPTIONS AND FIGURES  
OF  
TWO HUNDRED FISHES;

COLLECTED AT  
VIZAGAPATAM ON THE COAST OF COROMANDEL,

BY  
PATRICK RUSSELL, M. D. F. R. S.

PRESENTED TO  
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MDCCCLIII.





# INDIAN FISHES.

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## PISCES THORACICI.

### SPARUS.\*

#### No. CI.

*SPARUS cauda bifida ; pinna dorsi spinis quinque, et radiis septem setaceis longioribus ; corpore sub-orbiculato, lineis vittisque roseis.*

The SPARUS with a forked tail ; five spines in the dorsal fin, and seven long filiform rays ; the body nearly orbicular, with rose colour lines and fillets.

*Sparus spinifer* Forsk. No. 23.

Called by the Natives KOOROTA.

*B.* v. *D.*  $\frac{5}{23}$ . *P.* 15. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{12}$ . *C.* 18.

**T**HE *body* sub-orbicular, compressed ; scales compact, tenacious.

The *head* compressed, front very steep, face striated. The mouth low ; jaws, teeth, tongue, palate, eyes and nostrils, as usual in this genus. The opercula squamous, and cover the branchial membrane ; rendering it difficult to count the ossicles.

The *trunk*. The back arched, carinate ; the breast and belly less arched ; sides compressed ; tail roundish. The lateral line moderately arched to the end of the dorsal fin, then straight to its termination at the upper part of the caudal fin. The anus middle.

The *fins*. The dorsal differs remarkably from that of the usual form. There are first two spiculi in front, then seven setaceous rays, three of which are nearly the length of the body ; to these succeed three spinous and eleven ramous rays half an inch long. The pectoral fins long, acuminate in the middle ; the ventral shorter, the second ray terminating in a setaceous tail ; the anal in shape resembles the hinder portion of the dorsal, but narrower ; the caudal bifid.

The *colour*. The colour stone white, with pale reddish, curve lines, above the lateral line, and straight fillets of the same colour under it ; the belly and throat white ; the fins a faint reddish yellow.

The membrane of the dorsal fin remarkably thin and tender.

\* For the Generic Character, see Vol. I. p. 71.

## No. CII.

SPARUS *cauda sub-lunata*; *spinis ventralibus duabus, analibus septem*; *corpore lato-ovale, micro-lepidoto, lineolis punctisque cyaneis.*

The SPARUS with a sub-lunate tail; two ventral spines, and seven anal; a broad oval body with small scales, and short azure lines and dots.

*Sparus spinus* Linn. *S.N. p.* 471?

Called by the Natives WORAHWAH.

*B.* 5. *D.*  $\frac{13}{23}$ . *P.* 17. *V.*  $\frac{2}{5}$ . *A.*  $\frac{7}{16}$ . *C.* 20.

The *body* oval, compressed, squamous; scales very small, imbricate, tenacious.

The *head* small, oval, compressed, without scales, the front depressed. The jaws projecting, form when shut a short rostrum; the mouth very small, roundish; no lips. Jaws extractile, of equal length; teeth equal, numerous, small, sharp. The tongue thick, smooth, immoveable. Palate narrow, smooth. Eyes high, large, orbicular: the anterior edge of the orbit somewhat rough. Nostrils double, distant from the eye and from each other, the hinder largest and oval. The opercula consist of three laminae, smooth, not serrated; the branchial membrane covered; the aperture very small.

The *trunk*. The back, breast, and belly arched; the sides compressed; the tail small, roundish. The lateral line hardly discernible, curved, supreme. The anus nearer the head than the tail.

The *fins*. The dorsal occupies the whole of the back, the spinous rays arched, the posterior part of the fin round pointed; the anal is of the same form, but has seven spinous rays; the pectoral very low, the length of the head, acuminate above; the ventral short, remarkable for having two spinous rays, one on each side; the caudal long, and lunate.

The *colour*. The upper part of the head and lower opercula brown, with an obscure mixture of green, and powdered with pale blue dots, the cheeks of a sulphur yellow. The back and sides a dark brown, with blue dots, oval spots, and short lines, but towards the belly, with parallel fillets blue, and reddish brown, alternately; the breast slightly tinged of a dark orange. The pectoral fins are of a light colour, all the others dark, streaked here and there with orange.

	Inches.	Lines.
<i>Length</i> , from the rostrum to the caudal fin - - - - -	9	0
caudal fin - - - - -	2	6
Greatest breadth - - - - -	4	6

## No. CIII.

*SPARUS cauda sublunata; corpore lato-ovale, alepidoto, cute coriaceo tecto; spinis pinnae analis septem, pinnae ventralis duabus: aculeo parvo recumbente ante pinnam dorsalem.*

The SPARUS with a sub-lunate tail; a broad oval body, without scales, and covered with a coriaceous skin. Seven spines in the anal fin, and two in the ventral: a recumbent small spine before the dorsal.

Called also by the Natives WORAHWAH.

*B. v. D.  $\frac{13}{23}$ . P. 17. V.  $\frac{2}{5}$ . A.  $\frac{7}{16}$ . C. 20.*

THIS species agreeing so nearly with the one last described, it will be sufficient merely to mention the circumstances, in which they differ.

The *body* is covered with a coriaceous skin, without any visible scales. The head is more declivous and sharp, resembling that of a Balistes. There is a recumbent spine pointing forwards, in front of the dorsal fin: and in both dorsal and anal fins, the skin on each side forms a groove for the roots of the ossicles.

The *colour* of the breast and belly a dull white, all the rest almost black, marbled with dusky brown, and dull yellowish streaks.

*Length*, including the caudal fin, seven inches.

## No. CIV.

*SPARUS capite aculeato, oculis permagnis; corpore ovato compresso, squamis largis, pectinatis, tecto; radii octo in pinna ventrali, spinæ anales quatuor; spiculis quinque ad latera caudæ bifidæ supra subterque.*

The SPARUS with a prickly head, and very-large eyes; an ovate body, covered with large pectinated scales; eight rays in the ventral fin, and four spines in the anal; the tail bifid, and on each edge, above and below, are five reflex spiculi.

Called by the Natives SULLANEROO KUNTEE.

*B. vii. D.  $\frac{11}{25}$ . P. 15. V.  $\frac{1}{8}$ . A.  $\frac{4}{16}$ . C. 20.*

THE *body* ovate, compressed; scales large, pectinated.

The *head* large, the crown striate and channeled; the cheeks striate, or covered with pectinated scales, and there is a pectinate semi-circle under the orbit. The mouth very wide; jaws long, extractile, unequal, the under one longest, with a few spiculi at the extremity. The teeth very small. The eyes uncommonly large, orbicular, stained deep red on the upper part. Nostrils round, small, close together, in a dent between the orbit and the nose. Tongue sharp-pointed. Opercula serrate, and each lamina has one or two spiculi. The branchial membrane half exposed.

The *trunk*. The back gently arched from the crown to the end of the dorsal fin, where the tail becomes small and roundish, but again expanding to receive the fin, is armed on each edge with small, reverted, spiculi.

The lateral line bends gently, not parallel with the arch of the back, and terminates not exactly in the middle of the caudal fin. Anus remote.

The *fins*. The dorsal spines in a groove; the posterior portion of that fin and the anal, as well as the pectoral and ventral fins, acuminate above; the caudal bifid. The first anal spine very small, the third remarkably strong.

The *colour*. The head and back of a deep red, the sides striped longitudinally with white, red, and pearl fillets. The fins light gray, tipped with red.

The *length*, including the caudal fin, seven inches.

### No. CV.

*SPARUS capite aculeato, oculis permagnis; corpore oblongo, lato, compresso, squamis largis, asperis, striatis et pectinatis; radii octo in pinna ventrali; spinis analibus quatuor; cauda bifida, spiculis quatuor ad latera, supra subterque.*

The SPARUS with a prickly head, and very large eyes; an oblong, broad, compressed body, covered with large, rough, striated, pectinated scales; eight rays in the ventral fin, four anal spines. The tail bifid, and on each edge, above and below, are four reflex spiculi.

Called by the Natives BOTCHE.

*B.* viii. *D.*  $\frac{11}{25}$ . *P.* 15. *V.*  $\frac{1}{8}$ . *A.*  $\frac{4}{10}$ . *C.* 21.

THIS species is particularly distinguished by the spinous head and scales; large eyes, eight rays in the ventral fin; and spines on the edges of the tail.

The *body* oblong, remarkably broad at the shoulders, compressed, covered with large, strong, bony scales, striate, pectinate, imbricate, tenacious.

The *head* large, compressed; the front short, the crown rough, channeled; the orbit half surrounded with a double row of short spiculi, and the scales, as on the trunk, serrate. The mouth very wide; no lips; the jaws long, bare, striate on the outside, the upper longest, emarginate. Teeth in several rows, small, orbicular, rough. Tongue short, ovate, rough, bridled. The palate wide, rough on the fore part. Eyes supreme, extremely large, orbicular. Nostrils large, oblong.

The opercula serrate, and a flat spine on the edge of the posterior lamina. The branchial membrane much exposed; it has eight ossiculi, of which the two inferior are small and rough; the aperture wide.

The *trunk*. The back a little round, but convex, towards the tail carinate; the breast and belly prominent; the sides compressed, yet roundish: the shoulders broad, and the body contracts but little till near the anal fin, where it diminishes abruptly. The branchiæ consist of four laminæ, the two exterior pectinate, the interior denticulate. The lateral line high, almost straight. Anus remote.

The *fins*. The dorsal spines in a groove, the hinder portion of the fin acuminate in the middle; the pectoral low, short, acuminate above; the ventral as long as the pectoral, and remarkable for having eight rays; the anal resembles the opposite dorsal; the caudal fin bifid, with spiculi at the edges.

The *colour*. The head red; the membranous margin of the posterior lamina of the operculum the colour of black, coagulated blood; the breast and belly a yellowish red, mixed with white; the scales on the trunk,

whitish, with red edges. The dorsal, anal, and caudal fins, of the same colour with the head, but edged with white, and tipped black; the pectoral and ventral, pale pink.

	Inches.	Lines.
<i>Length</i> from the rostrum to the caudal fin - - - - -	8	0
caudal fin - - - - -	2	0
Greatest breadth - - - - -	3	8

No. CVI.

*SPARUS cauda bifida; spinis dorsalibus decem; lamina aculeata, serrata, infra orbilem; operculis serratis.*

The SPARUS with a forked tail; ten dorsal spines; the opercula serrated; and a serrated lamina armed with a spine under the orbit.

Called by the Natives KURITE.

*B. v. D.  $\frac{10}{21}$ . P. 16. V.  $\frac{1}{6}$ . A.  $\frac{3}{11}$ . C. 18.*

THE *body* ovate, compressed; the back arched, the breast and belly convex; the tail narrow.

The *head* declivous, compressed, squamous. Mouth small; lips rather thick; teeth numerous, very small, close. Eyes very large, oval. Nostrils oval. Under each orbit a squamous lamina armed above with a flat curve spine, the lower edge serrated; two lamellæ at the rise of the lateral line, the upper semicircular, which as well as the anterior lamina of the operculum were likewise serrated.

The lateral line high, arched, parallel to the back, conspicuous, but not carinate. The anus remote.

The *colour*. The head and back a darkish red, with an intermixture of yellowish green; the breast light coloured; the belly white with a slight yellow cast; the fins of a golden yellow.

The *length* of the subject eight inches.

REMARKS.

The two fish immediately preceding the subject just described, (No. CIV. and CV.) belong indisputably to the genus *Holocentrus* of Artedi: the eight ventral rays, and the spiculi on each edge of the caudal fin, sufficiently denote them. Though these characters are wanting in the present subject, there are others besides the big eye, which seemingly indicate an affinity.

It may be further remarked, that of the *Holocentri* described by Bloch, the first excepted, none have caudal spiculi, nor eight ventral rays: and the first only has eight branchial ossicles.

## No. CVII.

*SPARUS cauda bilobata; spinis mollibus pinnæ dorsi undecem; corpore lanceolato, vittis sub-rubris et flavis, alternè.*

The SPARUS with a tail unequally divided; eleven soft spines in the dorsal fin; the body lanceolate, with alternate reddish and tawny fillets.

Called by the Natives LAMA GULIMINDA.

*B. v. D.  $\frac{11}{19}$ . P. 16. V.  $\frac{1}{6}$ . A.  $\frac{1}{10}$ . C. 21.*

THE *body* lanceolate, compressed; scales large, rounded behind, but the anterior edge truncate, which is not uncommon.

The *head* ovate, compressed, the rostrum obtuse, the front a little depressed, the face striated; the mouth rather small; the teeth straight, regular, numerous. The tongue and palate smooth; the eyes high, backward, rather oval; the nostrils double, in a furrow near the orbit.

The squamous opercula consist of three laminæ, moveable, but hide the membrane.

The *trunk*. The back very little assurgent and slopes very gradually to the tail; the belly almost straight. The lateral line at first arched a little above the pectoral fin, descends afterwards parallel to the back; the anus middle.

The *fins*. The spinous part of the dorsal arched, the hinder part ascending; the pectoral middle, short, acuminate above; the ventral with a setaceous tail; the anal like the ramous part of the dorsal to which it is opposite: the caudal bilobed, the upper lobe longest.

The *colour*. The head and back have a reddish cast; the sides cinereous, with narrow fillets alternately pale red, and faint yellow; the throat and belly a bright silver; the dorsal and caudal fins nearly the colour of the back, the other fins whitish.

The *length*, ten inches.

## REMARKS.

The fish is firm and of good flavour, somewhat resembling the red mullet, and goes by the name Guliminda among the fishermen.

## No. CVIII.

*SPARUS cauda bilobata; spinis dorsalibus septem; corpore ovato-oblongo, alepidoto, albescente, dorso versicolore; macula nigra ad opercula; pinnis dorsalibus duabus.*

The SPARUS with a bilobed tail; seven dorsal spines; the body ovate-oblong, without scales, whitish, the back of changeable colours: a small black spot on the operculum. Two dorsal fins.

Called by the Natives CHUNDAWAH.

*B. vii. D. 7.—23. P. 16. V. 6. A. 26. C. 18.*

THE *body* ovate-oblong, compressed; no scales perceptible, skin striated, polished, whitish, resplendent.

The *head* ovate, compressed; the front convex, face smooth; the mouth oblique, large; the lower jaw longer than the upper, rises obliquely; the tongue small, smooth, moveable; palate rough. The eyes nearly

middle, large, round, iris pearl. Nostrils high, between the upper edge of the orbit and the front. The opercula two-leaved, with a black spot on the upper edge of the hinder lamina: the membrane easily discerned.

The lateral line somewhat carinate, a little arched, but less than the back. The anus middle.

The *fins*. Two dorsal, the one scapular of seven spines, the other lumbar, ramous, slender; the pectoral short, acuminate at the top; the ventral still shorter, acuminate at the middle; the anal longer than the opposite dorsal, but like it in form, and has two very small obscure spines, at its rise; the caudal unequally divided into two lobes, of which the under is the largest.

The *colour* a glossy white, but the back, like mother of pearl, reflects a variety of colours. The second dorsal, the anal, and caudal fins, have somewhat of a yellowish cast.

The *length*, nine inches.

The fish is of a very indifferent quality, being flabby and insipid.

### No. CIX.

SPARUS? *cauda integra acuminata; spinis dorsalibus undecem; corpore lanceolato, versicolore, resplendente.*

The SPARUS with a tail undivided, acuminate in the middle; eleven dorsal spines; a lanceolate body, of changeable colours and resplendent.

Called by the Natives POTTEE KANASAH.

*B* vii. *D.*  $\frac{10}{10}$ .  $\frac{1}{21}$ . *P.* 17. *V.* 6. *A.* 9. *C.* 16.

THE *body* oblong-lanceolate, compressed; scales close, ciliate, a little rough, tenacious.

The *head*, large, ovate, compressed, squamous, the front flattish. The mouth very wide, somewhat oblique; the upper jaw longest. Teeth as represented in the figure. Tongue ovate, thin at the point, smooth, moveable; palate tuberculate, throat denticulate; eyes high, near the rostrum, middle size, somewhat oval. Nostrils near the orbit, oval.

Opercula large, of three laminae, squamous, the anterior sub-serrated, the posterior acuminate. The branchial membrane half covered; the aperture proportional.

The *trunk*. The back carinate, rises a little at the dorsal fin and is then gently arched; the sides compressed, but convex; the belly slightly convex; the tail compressed, carinate above; the lateral line raised, conspicuous, rising from the upper edge of the opercula, at first a little arched, then descending (not parallel to the back) it runs straight to the middle of the caudal fin. The anus remote.

The *fins*. The dorsal interrupted; appears at first to be double, the anterior portion composed of declining, soft spines, the posterior, of ramous rays, nearly equal; the pectoral long, acuminate at the middle; the ventral short, has no spine, acuminate at top; the anal also remarkably short, rounded; the caudal acuminate at the middle, and remains distended after death.

The *colour* of the upper part of the head, and the back, green, dark blue, and golden, beautifully changing; the rest, below the line, pearl. The fins light, with a yellow cast.

The *length*, including the caudal fin, one foot two inches; the breadth, three inches and a half.

## No. CX.

*SPARUS cauda sub-integra; spinis dorsalibus decem; corpore quinque vittis cæruleis, macula magna, ovale, sub-cærulea, ad lineam lateralem.*

The SPARUS with a tail nearly entire; ten dorsal spines; five sky blue longitudinal bands on the side, and a large, oval, bluish mark on the lateral line.

Called by the Natives MUNGI MUPUDEE.

*B. vi. D.  $\frac{10}{24}$ . P. 16. V.  $\frac{1}{6}$ . A.  $\frac{3}{11}$ . C. 18.*

The *body* in this species is between ovate and oval; scales large.

The *head* declivous, vertex rough, front smooth, a little convex, the face without scales. The mouth, jaws, lips, and tongue as usual in the genus. The teeth in the fore part of both jaws crowded in several rows. There are teeth also in the palate. The eyes superior, oval. Nostrils distant from each other and from the orbit. The opercula squamous, the lower angle of the anterior lamina serrate, the posterior lamina acuminate. The branchial membrane half discovered.

The back arched, the belly straight; the sides compressed and convex; the tail broad. The lateral line high, but less arched than the back. Anus nearly middle.

The spinous portion of the dorsal fin arched, the ramous rounded at the point. The pectoral fin very low, long, acuminate above; the second ray of the ventral setaceous; the anal in shape like the dorsal, and two of its spines remarkably strong; the caudal almost intire.

The general *colour* a light gray; the front reddish, and five narrow light blue fillets, run from the front along the trunk; the belly is of a yellowish white; and above the lateral line, but touching it, is a pale bluish, oval spot. The fins are of a faint yellow, edged with orange.

The *length*, ten inches.

## No. CXI.

*SPARUS cauda integra parum acuminata; rostro obtuso; linea laterali sub-arcuata, conspicua.*

The SPARUS with an undivided tail, slightly pointed; an obtuse rostrum; the lateral line somewhat arched, conspicuous.

Called

*B. v. D.  $\frac{11}{40}$ . P. 17. V.  $\frac{1}{6}$ . A.  $\frac{2}{10}$ . C. 15.*



## No. CXII.

SPARUS *cauda lunulata*; *capite ovato, acutiusculo*; *spinis analibus tribus*.

The SPARUS with a lunulate tail; an ovate, rather sharpish head; and three anal spines.

Called

*B.* . *D.*  $\frac{11}{22}$ , *P.* 15. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{18}$ . *C.* 17.

## REMARKS.

The descriptions of No. CXI. and CXII. having, by some accident been lost, it was not in my power to give more than merely the specific characters.

## No. CXIII.

SPARUS? *capite sub-anguloso*; *rostro elongato, obtuso*; *cauda emarginata*; *pinnis dorsalibus duabus*.

The SPARUS with a head somewhat angular; an elongated, obtuse rostrum; the tail emarginate; two dorsal fins.

Called by the Natives SORING.

*B.* vi. *D.*  $\frac{11}{11}$ . 23. *P.* 15. *V.* 6. *A.* 23. *C.* 18.

THE *body* lanceolate, somewhat roundish, pellucid; scales large, close, ciliate, rough to the finger when stroked upwards.

The *head* oblong-ovate, smaller than the body, somewhat angular; naked, smooth, except the front of the rostrum, which is squamous, and has a long groove on each side. The mouth small, roundish; hardly any lips. Jaws extractile, short, the inferior much shorter than the upper. Teeth very small, setaceous, and, except in old subjects, the jaws seem only rough like a file. No tongue visible. Palate narrow, the forepart rough like the jaws, the rest smooth. The eyes high, remote from the point of the rostrum, large, round, iris yellow. Nostrils in the groove near the orbit, double, the posterior largest. The three laminae of the opercula, squamous, the anterior a little serrate, the middle scabrous, the posterior moveable.

The branchial membrane thin, half covered; aperture arched, lateral.

The *trunk*. The back straight, but a little convex, the hinder part carinate; the belly and throat rather prominent; sides and tail compressed. Lateral line high, curves gently to the middle of the tail, then straight, middle. Anus nearly central.

The *fins*. Two dorsal, the first scapular, consists of eleven soft spines, the first ray one inch and two thirds in length, the last one third of an inch; the posterior fin declines also, and reaches nearly to the tail; the pectoral low, short, acuminate at top; the ventral, the length of the pectoral, but broader, has no spinous ray. The anal fin of the same form with the second dorsal, but broader; the caudal distant, sub-bifid.

The *colour*. The crown and rostrum a faint reddish purple, the rest of the face a pale orange; the trunk a

still paler, with a faint greenish cast on the back; the sides, in younger subjects, powdered with very small black dots. The belly a dull pearl. The first dorsal fin light colour, the second of the colour of the body: both have regular rows of black spots on the anterior edges of the spines. The pectoral, ventral, anal, and caudal fins have a very slight yellowish cast.

The *colour* in older subjects is lighter; the body becomes less transparent, and the spots on the fins are often absent.

The *length*, fourteen inches.

#### REMARKS.

This, known to the English under the name of Whiting, is rather a more delicate fish, and certainly a different genus. It is placed doubtfully under the present genus; and, as well as some of the following subjects, may perhaps belong more properly to the genus *Sciæna*.

They are caught chiefly near the mouth of the river. The most common size is under that of the fish described: but they are sometimes brought of twenty inches.

In figure it has some resemblance to the *Perca Zingel*. \*

#### No. CXIV.

SPARUS? *cauda lunata; spinis quinque dorsalibus; corpore sub-dolabriforme, pinnis squamosis.*

The SPARUS with a lunate tail; five dorsal spines; the body somewhat of a hatchet form; the fins squamous.

Called by the Natives MANGULA KUTTI.

*B.* vii. *D.*  $\frac{5}{15}$ . *P.* 18. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{42}$ . *C.* 19.

*THE body.* The scales rising so high on the dorsal and anal fins, contribute to give the fish an unusual form. The scales long, close, imbricate, above the line ciliate.

The *head* short, compressed, rostrum obtuse. Mouth large, oblique, without lips. Jaws extractile, equal, the upper emarginate. Teeth very small, numerous, linear, sharp. Tongue awl-shape. Palate wide, smooth. Eyes enormously large, orbicular. Nostrils double, small, middle between the orbit and rostrum.

The first lamina of the opercula squamous, the second striate and acuminate; the branchial membrane half exposed when the mouth is shut; the aperture large, lateral, and gular.

The *trunk.* The back at first slightly arched, afterwards straight; the breast and belly carinate, but prominent; the sides gradually compressed, the posterior part of the trunk spreads in a singular manner, forming an irregular angle, the lower side carinate. The branchiæ consist of four leaves, the exterior pectinate, the other tuberculate. The lateral line supreme, conspicuous, rises in a low arch, from the edge of the opercula, then runs straight from the pectoral fin, parallel to the back. Anus nearer the head than the tail.

The *fins.* The dorsal on the middle of the back, small, assurgent in front, behind somewhat crescent-form; the pectoral nearly middle, acuminate at top; the ventral of the same form, but very small; anal long, rising a little behind the anus, occupies the whole inferior side of the tail, assurgent (like the dorsal) in front, then declining, but not falcate; the caudal lunulate fin remains extended after death.

\* Bloch, Tab. 106.

The *colour* generally reddish, with an obscure mixture of gold. The fins of a yellowish red.  
The *length* six inches and a half.

## REMARKS.

In White's Journal,\* there is the figure of a fish reckoned a Sparus, that bears a strong resemblance to the present subject.

The situation of the dorsal fin is a remarkable character, and suggested an idea of the new genus Kurtus,† from which however, besides being a thoracic, not a jugular fish, it differs in other essential characters.

## LABRUS.

## GENERIC CHARACTER.

*Caput: dentes acuti. Labia simplicia. Membrana branchiostega radiis sex. Opercula squamosa.*

*Corpus: pinnae dorsalis radii postice ramento filiformi aucti; pectorales acuminatae. Linea lateralis recta.*

The head: the teeth sharp; lips simple; six rays in the branchial membrane; the opercula squamous.

The body: the rays of the dorsal fin furnished on the posterior edge, with membranous filaments. Pectoral fins acuminate; lateral line straight.

## No. CXV.

LABRUS *cauda pentagona; corpore ovato-lanceolato, cinereo-obscuro; pinna dorsali interrupta.*

The LABRUS with a pentagonal tail; an ovate-lanceolate body, of a dark cineritious colour; and the dorsal fin interrupted.

Called by the Natives NALLA KATCHELEE.

*B.* vii. *D.*  $\frac{11}{35}$ . *P.* 18. *V.* 6. *A.*  $\frac{2}{9}$ . *C.* 18.

The *body* ovate-lanceolate, compressed; scales large, roundish, edge membranous, base striate, imbricate, tenacious; smaller above the line than on other parts.

The *head* small, ovate, compressed, declivous, squamous, cheeks bare. The mouth large, a little oblique; lips thick, covering the teeth. Jaws extractile, the upper somewhat longer than the under. Teeth in a regular row, distant, recurve, short. The tongue large, oblong, subtriangular, obtuse, sheathed, smooth, free. The

\* Journal of a Voyage to New South Wales, Lond. 1790.

† Bloch, Part V. p. 98.

palate a little tuberculate. The eyes middle, forward, oval, prominent. Nostrils near the orbit, and near each other, round, equal. The posterior lamina of the opercula squamous, acuminate. Branchial membrane half covered; the aperture wide.

The *trunk*. The back carinate, arched; the sides convex, compressed; the belly convex. The tail thin, roundish. The lateral line conspicuous, at first high, arched, then straight to the middle of the caudal fin. The anus remote.

The *fins*. The dorsal solitary, composite, interrupted, consisting of one short, and ten long, soft, declining spines, with twenty four soft assurgent rays: the whole ramentacious. The pectoral long, falcate: the ventral shorter than the pectoral, without a spine; the anal has two spines, and its seven rays exceed in length those of the dorsal; the caudal broad, angular, and pointed.

The *colour*. The prevalent colour a dusky gray; the head and back have a cast of dark blue; the sides near the belly, the belly and throat, cinerious. The fins are darker than the back, but in some places have an obscure cast of yellow. There are sometimes in smaller subjects, a few black spots on the dorsal fin.

The *length*, two feet six inches.

#### REMARKS.

This fish is esteemed, and, in like manner as the red Sparus, is caught by hook and line in deep water. It begins to appear after the middle of February.

#### No. CXVI.

*LABRUS cauda pentagona; corpore ovato-lanceolato, maculato.*

The LABRUS with a pentagonal tail; and an ovate-lanceolate, speckled body.

Called by the Natives KATGHELEE.

*B.* vii. *D.*  $\frac{11}{35}$ . *P.* 18. *V.* 6. *A.*  $\frac{2}{9}$ . *G.* 18.

THIS does not differ in any material respect from the fish last described. It is universally of a darker colour, the back and shoulders are spotted, with numerous black, oval spots; and the pectoral, ventral, and anal fins are nearly quite black. The dorsal and caudal fins are constantly spotted, which is not the case in the last fish, though of equal size.

The fishermen conceive it to be the female, and give it the same name.

## No. CXVII.

LABRUS *cauda pentagona; corpore oblongo-ovato, dorso versicolore; spina anali secunda robustiore.*

The LABRUS with a pentagonal tail; an oblong ovate body, of changeable colour on the back; and the second anal spine long and thick.

Called by the Natives TELLA KATCHELEE.

*B.* VII. *D.*  $\frac{11}{41}$ . *P.* 16. *V.* 6. *A.*  $\frac{2}{10}$ . *C.* 18.

THIS species agrees with the description of the black Katchelee, No. CXV. differing only in a few circumstances besides the colour. The body is broader at the shoulders, and the tail less slender; the dorsal fin is less ramentacious, and the soft rays more numerous; the pectoral shorter, broader, and less falcate; the second spine of the anal fin much longer and grosser.

The *colour* of the head (which is less squamous than in the other) and of the back, darkish, but changeable like a pigeon's neck; below the line the colour grows lighter and glossy, and the belly is of a rich pearl; the dorsal fin darkish; the others and lower part of the caudal fin yellowish.

The *length*, one foot eight inches.

## No. CXVIII.

LABRUS *cauda pentagona corpore oblongo; capite toto squamoso, rostro obtuso; cirro unico ad maxillam inferiorem.*

The LABRUS with a pentagonal tail; an oblong body; the head entirely squamous, the rostrum obtuse, and a solitary cirrus pendent from the lower jaw.

Called by the Natives QUALAR KATCHELEE.

*B.* vii. *D.*  $\frac{12}{39}$ . *P.* 15. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{10}$ . *C.* 18.

THIS fish under the name of Katchelee, differs more remarkably from the one first described.

The *body* is oblong; the scales smaller.

The *head* shorter, squamous; rostrum shorter, more obtuse. The mouth small, round; teeth very slender; the eyes supreme, oval, large; nostrils double, small, close to the orbit; the posterior oval. A solitary cirrus at the lower jaw.

In other respects it agrees; as likewise in the shape of the lateral line, position of the anus, and shape of the fins.

The *colour* has been omitted in my original description.

The *length*, ten inches.

It is rather a rare fish.

## No. CXIX.

LABRUS *pinna caudali medio sub-truncata; maxillis apice bipartatis; linea lateralis ramosa, interrupta; pinnis vittis cæruleis.*

The LABRUS with the tail somewhat truncate in the middle; the maxillæ divided at the point; the lateral line ramous, and interrupted; pale blue fillets on the dorsal, anal, and caudal fins.

Called by the Natives SAHNEE MOIA.

*B. v. D.  $\frac{10}{21}$ . P. 15. V. 6. A.  $\frac{2}{11}$ . C. 16.*

THE *body* oblong, compressed, most beautifully coloured; scales remarkably large, somewhat triangular, tenacious, the posterior edge rounded and striate.

The *head* large, rounded, compressed, and mostly naked; the front convex, smooth. The mouth middle, not large, transverse; lips thickish, blue. Jaws not extractile, equal, divided in the middle, as in the Tetraodon, rough in the inside, the margin somewhat serrate, and the outside tuberculate. Tongue ovate, fleshy, immovable. Palate smooth. Eyes high, backward, small, orbicular, beautifully coloured, not prominent. Nostrils nearer the orbit than the rostrum, very small, oval.

Opercula squamous, the posterior bluntly pointed, ciliate. Branchial membrane concealed; aperture large, arched, lateral, and gular.

The *trunk*. The back and belly convex; the sides and tail compressed. Lateral line, at its origin from the upper part of the opercula, a very little arched, afterwards descends obliquely to near its termination at the middle of the caudal fin. Anus nearly middle, somewhat prominent.

The *fins*. The dorsal long, not broad, occupies the whole of the back from the shoulder to within an inch of the caudal fin. It consists of 19 or 21 rays, of which nine resemble spines, but are soft and club-pointed; the others ramous: all are assurgent. The pectoral fins low, short, broad, acuminate at top. The ventral shorter, without any distinct spine; the anal assurgent, like the dorsal, with two or three similar club-pointed spines; the caudal is of an uncommon form, being a little convex in the middle, with a short inverted horn at each end.

The *colour*. The beautiful colours of this fish, though more permanent than those of the dolphin, yet fade too quickly for the painter to sketch accurately, and it is next to impossible to describe them in words.

The face greenish, the edges of the lips light blue, the throat and opercula have a faint reddish tint, the eye changeable blue, red, and white. The scales are greenish with yellow margins, but the back and posterior part of the tail are darkened by a purplish tint, while the sides towards the belly brighten and slide insensibly into a pale red; the breast is of a pale green. The lateral line is smooth and singularly ramous, consisting of a series of small obverted fusi-form roots, from which issue minute uniform branches. The edge and root of the dorsal fin are of a light blue, the membrane faint green and yellow; the pectoral fin a dark reddish; the ventral a yellowish red: the first ray in both blue; the anal faintly reddish, striped the whole length by three blue fillets; the sides of the caudal fin blue, the horns yellow, the membrane yellowish red, with cross, waving, blue, fillets.

The *length*, including the caudal fin, one foot eight inches.

## REMARKS.

The fishermen asserted that this fish very rarely appeared, which I was inclined to believe, from its having been brought to me once only.

## No. CXX.

LABRUS *cauda-sub-rotundata*; corpore ovali, picto, linea laterali infracta; dente curvo ex angulo oris exerto, utrinque.

The LABRUS with a roundish tail; an oval, highly coloured body; the lateral line broken.

A small curve tooth protruding from the corner of the mouth, on each side.

Called also by the Natives SAHNEE MOIA.

B. v. D.  $\frac{11}{21}$ . P. 14. V. 6. A. 13. C. 14.

THE *body* long-oval, compressed, squamous. Scales large, smooth, ciliate, imbricate.

The *head* small, sharp, compressed, without scales; the front depressed, the neck roughish. Mouth middle, small, straight. Jaws a little extractile, equal, set with teeth. Lips large, covering the teeth. Teeth large, a little curve, close in the upper jaw, but more distant from each other in the lower: in the upper, there is a remarkable crooked tooth, projecting in the manner of tusks from the corner of the mouth on each side. Tongue short, obtuse, smooth. Palate smooth, the throat rough; the eyes high, small, orbicular; the iris orange. Nostrils double, before the superior edge of the orbit.

The branchial opercula consist of two acuminate laminae, without scales; the aperture lateral; the membrane covered.

The *trunk*. The back convex; sides compressed; belly rather plane. Branchiae consist of three simple leaves. The lateral line bends gently from the edge of the opercula to the end of the dorsal fin, then declines rapidly, and is continued straight along the middle of the tail. The anus middle, depressed.

The *fins*. The dorsal solitary, lower in the middle than at either extremity, with a remarkable spot on the anterior part; the pectoral acuminate at top; the first ray of the ventral long and setaceous; the anal of the form of the hinder part of the dorsal; the caudal fin rounded at the edge.

The *colour*. The face sea-green with a few streaks of purple and dusky yellow. The back dark-green, the sides variegated with a few purple and orange fillets. The green of the trunk shades off to a dull white on the belly. The dorsal fin spotted green and purple, and there is a remarkable black spot with an orange dot, on the membrane between the fifth and seventh ray; the root of the pectoral red, the rest light; the ventral and anal fins with spots of a lighter green than the dorsal; the rays of the anal purplish, with some streaks of orange towards the tail; the caudal fin strewed with green spots with purple borders, the margin yellowish green.

*Length*, five inches.

## PERCA.

## GENERIC CHARACTER.

*Caput: opercula squamosa, serrata.*

*Membrana branchiostega radiis septem.*

*Corpus: linea lateralis cum dorso arcuata; pinnae spinosae.*

The head: the opercula squamous, serrated. The branchial membrane has seven ossicles.

The body: the lateral line arched like the back; the fins spinous.

## No. CXXI.

*PERCA cauda bifida; corpore vittis flavis fuscisque; spina secunda anali permagna.*

The PERCH with a forked tail; the body striped with yellow and brown fillets; and the second anal spine very large.

Called by the Natives PAIKEELI.

*B.* vii. *D.*  $\frac{12}{27}$ . *P.* 16. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{13}$ . *C.* 18.

The *body* oblong, compressed, squamous; the scales somewhat square, rounded behind, imbricate, tenacious.

The *head* ovate, small, compressed, declivous, mostly squamous; rostrum naked. The mouth low, small, horizontal; lips thickish. Jaws short, extractile, the upper longest. Teeth numerous in both jaws. Tongue somewhat round, smooth, not tied; palate tuberculate in the fore part. Eyes high, large, orbicular, iris of a yellowish white. Nostrils large, oval, near the orbit.

The opercula squamous, the first lamina serrated. The branchial aperture large, arched, the membrane exposed.

The *trunk*. The back rises in an arch, carinate; the sides compressed; the breast convex, but the belly nearly straight; the tail broad and long. The lateral line less arched than the back, becomes straight where the dorsal fin ends. The anus much nearer the head than the tail.

The *fins*. The dorsal spines, the first two excepted, long, and form a high arch; the ramous rays declining are much shorter; the pectoral long, slightly falcate; the end of the first ventral ray setaceous; the second anal spine remarkably large; the caudal not deeply bifid.

The *colour*. There are five or six longitudinal fillets, yellow, and dusky brown, on the sides; the breast and abdomen white; the pectoral and dorsal fins near the roots dotted with black.

The *length*, ten inches.



## No. CXXII.

*PERCA cauda sub-integra; spinis dorsalibus decem; pinnis pectoralibus caudalique rubescentibus.*  
The PERCH with a tail nearly entire; ten dorsal spines; the pectoral and caudal fins of a pale red colour.

Called by the Natives DOONDAWAH.

*B.* vii. *D.*  $\frac{10}{24}$ . *P.* 17. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{12}$ . *C.* 17.

THE head in this species is longer and sharper than in the last; the body less arched; the breast and belly flatter; the lateral line rises in a higher arch; and the scales on the trunk, besides being larger, are striate on the shoulder. In other characters they in general agree.

The *fins*. The dorsal spines are shorter than in the last, and the ramous rays are assurgent, forming a rounded point; the pectoral lanceolate and somewhat falcate; the spine of the ventral fin unusually large; the ramous rays of the ventral form a rounded point like the dorsal; the caudal emarginate, or a little shorter at the middle.

The *colour*. The upper part of the head a dark red, brightening on the checks and opercula to pink; the lips red. The back darker than the head, but gradually fades into a reddish white, which is the colour of the breast and abdomen. The dorsal fin a very light gray, with a purple margin, the white points of the spinous rays appearing above the margin. The pectoral are pink; the ventral and anal like the dorsal, but with a broader border of lighter purple; part of the tail pink, the lower lobe purple.

The *length* of the subject described, one foot four inches.

## No. CXXIII.

*PERCA cauda oblonga, acuminata; spinis dorsalibus undecem; maculâ magna in pinna dorsali; corpore fasciis nigris, obliquis et transversis.*

The PERCH with an oblong tail, a little pointed; eleven dorsal spines; a large spot on the dorsal fin, and several oblique and cross black fillets on the body.

Called by the Natives SARI KULLA.

*B.* vii. *D.*  $\frac{11}{34}$ . *P.* 16. *V.*  $\frac{1}{6}$ . *A.*  $\frac{2}{9}$ . *C.* 17.

THE *body* ovate, compressed, covered with very small, firm, sub-orbicular scales. The head completely squamous, declivous, the rostrum short, obtuse, projecting a little over the mouth. Mouth low, horizontal, large; hardly any lips. Jaws extractile, the under shortest, both full of teeth. Teeth above distinct, regular, a little curve; below more crowded, in front tuberculous, and behind acerose. Tongue short, roundish, smooth, free. Palate without teeth. Eyes nearer the rostrum than the crown, large, orbicular. Nostrils double, in a groove near the orbit; the posterior (as usual) largest.

The opercula, branchial membrane, and aperture, as usual in this genus.

The *trunk*. The back carinate, the abdomen rather flat. The lateral line from the upper edge of the

opercula to the middle of the last portion of the dorsal fin, arched, then straight. The branchiæ and anus as usual.

The *fins*. The long dorsal fin interrupted, the anterior half arched, the posterior equal; the pectoral rather low, long, acuminate above; the ventral short, the second ray with a setaceous tail; the anal small, acuminate in the middle, and has only two spinous rays; the caudal oblong, entire, with a point.

*Colour*. The crown and back changeable pearl, the rest a silvery white; a large irregular black spot on the shoulder, a second much longer passes obliquely from the beginning of the dorsal fin to the lateral line, and then bends towards the abdomen, a third, narrower and shorter, crosses the line also; behind which are three more diminishing in size, the last on the upper part of the tail. On the dorsal fin, a broad, oblong, black macula extends from the second to the sixth spinous ray, the rest of the membrane stone-gray, with a narrow, black margin; the other fins are of a faint yellowish white.

*Length*, five inches.

#### No. CXXIV.

PERCA *cauda bifida; spinis dorsalibus duodecem macula parva in pinna dorsali, et maculis oblongis fuscis ad latera.*

The PERCH with a bifid tail, eleven dorsal spines; a small mark on the dorsal fin, and several oblong brown marks on the body.

Called by the Natives CARIFE.

*B.* vii. *D.*  $\frac{12}{25}$ . *P.* 16. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{10}$ . *C.* 18.

THIS in the material characters comes near the fish last described. It is rather thicker at the shoulders, the head less pointed, the crown broader, and the rostrum shorter. The eyes are higher, and the nostrils closer to each other and to the orbit. The teeth are smaller, setaceous; the lateral line less arched, and commences at the eye.

The ramous portion of the dorsal fin is shorter and more arched; the anal has three spinous rays; the caudal bifid.

It nearly resembles the former fish in colour. It has a fainter spot on the shoulder, but three only on the lateral line, in colour less dark; the black spot on the dorsal fin is small and square. The pectoral and ventral fins are of a faint yellow; the colour of the others as in the former fish.

The *length*, four inches and a half.

## No. CXXV.

*PERCA cauda sub-lunata ; spinis dorsalibus undecem ; corpore oblongo-ovale, vittis luteis, obliquis et longitudinalibus.*

The PERCH with a tail slightly lunate ; an oblong-oval body, with oblique and longitudinal yellow fillets.

Called by the Natives KAROOI.

*B.* viii. *D.*  $\frac{11}{23}$ . *P.* 16. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{12}$ . *C.* 19.

THE *body* oblong-oval : the scales larger than in the last.

The *head* less declivous and squamous. In the mouth, lips, jaws, tongue, and nostrils, no material difference is found ; but the teeth are larger, more regular, and there are teeth in the palate ; the eyes are much larger.

The opercula serrate ; the lateral line, and position of the anus, nearly alike in both.

The *fins* resemble those of the last fish, in their situation and shape, only that the caudal, instead of bifid, is somewhat lunate.

The *colour*. The crown darkish red, the lips and opercula faint pink, the back dark, with an obscure mixture of yellow. Between the ridge of the back and lateral line, there are oblique bands of dark yellow, then two fillets of brighter yellow, and still lower are four or five fillets of more obscure yellow. The belly white. Dorsal, anal, and caudal fins yellow ; ventral yellow, intermixed with white. Pectoral fin faint pink.

*Length* of the subject, seven inches.

## No. CXXVI.

*PERCA cauda sub-lunata ; corpore oblongo-ovale, vittis tribus fulvis ad latera ; macula nigra semicirculari in pinna dorsali ; aculeis tribus ad operculum, et lamina serrata prope pinnam pectoralem.*

The PERCH with a sub-lunate tail ; an oblong-oval body, with three yellow fillets on the sides ; a semicircular black spot on the dorsal fin ; three small spiculi on the edge of the operculum, and a serrated lamina near the pectoral fin.

Called by the Natives KEELPUTA.

*B.* vi. *D.*  $\frac{11}{21}$ . *P.* 13. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{11}$ . *C.* 18.

THE *body* oblong-oval, compressed, squamous, scales small, somewhat square, but rounded at the posterior side, imbricate, tenacious.

The *head* proportional, ovate, compressed, squamous ; front slightly declivous, naked, depressed. The mouth wide, horizontal ; lips thickish. Jaws extractile, short, nearly equal. The teeth numerous in each jaw, but most in the upper ; in the under more sparse, but in front a few are longer and crooked. Tongue roundish, smooth, free. Palate tuberculate, in the fore part. Eyes high, large, somewhat oval ; iris yellowish-white. Nostrils double, in a shallow groove, one near the orbit, the other smaller, near the point of the rostrum. The

branchiæ four-leaved; the exterior pectinate, the others tuberculate. The opercula squamous; the anterior lamina serrated, and armed with three short straight spines; the posterior terminates in a spinous point; between which and the pectoral fin there is a semicircular squama, or ossicle, serrated on the edge. The branchial membrane exposed; the aperture large, arched.

The *trunk*. The back gently arched, carinate, sides compressed, a little convex; the abdomen and throat gently rounded, the former a little flattened. The lateral line forms a low arch above the pectoral fin, then slopes gently to the middle of the tail. Anus nearer the tail than the head.

The *fins*. The dorsal solitary, composite; the two first spinous rays very short; from the third to the tenth they gradually shorten, but the tenth and eleventh, lying on the ramous portion, again lengthen: the ramous rays decline gently; the pectoral low, short, acuminate at top; the ventral longer than the pectoral, the second ray longest; the anal has three stout, spinous, assurgent rays; the ramous rays are likewise assurgent, and decline very little from the fifth. The caudal fin bifid.

The *colour*. The upper part of the head a darkish green, the rest white; the back also green, but changeable; the rest of the trunk a very light gray, terminating in white on the belly. On the sides are three fillets of a dusky yellowish-green, the lowest from the eye continued along the tail: still lower is a yellowish fillet ending with the anal fin.

The first part of the dorsal fin whitish, with a large semicircular black spot, the posterior part of the fin yellowish, with two fillets like continuations of those on the body. The pectoral, ventral, and anal fins yellowish-white; the caudal yellowish, with two oblique streaks, besides the fillet.

The *length* of the subject described, eight inches. It was caught at a little distance from the shore, but beyond the surf; they are sometimes caught of eleven or twelve inches. Their usual length in the river, where they swarm, is rarely more than five or six inches.

### No. CXXVII.

*PERCA cauda rotundata; spinis dorsalibus undecem; corpore oblongo, maculis fuscis; aculeis tribus planis in operculo posteriore.*

The PERCH with a round tail; and eleven spines in the dorsal fin; an oblong body spotted with yellowish spots; three flat spines in the hinder operculum.

Called by the Natives BONTOO.

*B.* vii. *D.*  $\frac{11}{28}$ . *P.* 18. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{12}$ . *C.* 17.

THE *body* oblong, compressed, but thick and roundish. Scales small, close, tenacious.

The *head* large, thick, compressed, nearly as broad as the trunk, the vertex a little depressed, the rostrum short, declivous. The mouth horizontal, wide; the lips thickish. Jaws extractile, the lower a little longer than the upper. Teeth numerous, in several rows, the exterior larger than the interior, reflex: two longer teeth in front of each jaw. Tongue narrow, rounded, smooth, free. Palate wide, denticulate. Eyes, supreme, round, near the rostrum. Nostrils double, round, near the orbit.

The anterior lamina of the opercula serrate, the posterior acuminate, and armed with three stout, flat, straight, spines. The branchial membrane half exposed when the mouth is shut. The aperture large.

The *trunk*. The back and belly slightly convex; the sides and tail compressed, but roundish. The lateral line very small, high, descends from the point of the opercula, bending a very little over the pectoral fin, and terminates at the middle of the caudal fin. Anus nearly middle.

The *fins*. The dorsal single, composite, the spines (the two first excepted) nearly of equal length; the ramous rays to the ninth assurgent, when the remaining four declining give a rounded form to the fin. The pectoral and caudal fins orbicular; the ventral long, ramous, with one stout spine; the anal, in shape exactly like the opposite dorsal, with three spines.

The *colour* cineritious, spotted with dusky yellow, or brown, round spots; the colour on the belly is lighter; the spots on the fins smaller and darker.

The *length* one foot eight inches.

## REMARKS.

This fish is often brought to table in the winter, and when from one foot to one and a half in length, is reckoned delicate; but when larger, it becomes coarse. It grows to an enormous size. In the beginning of January 1786, one was brought to the Chief's house, measuring from the nose to the point of the caudal fin, seven feet, and in circumference, near the gills, five feet. It weighed three hundred and odd pounds.

About an inch of the anterior part of each jaw was without teeth; the rest full of short, strong, teeth.

The colour, so far as I could judge by candle light, was browner and the spots more obscure, than in the small fish; and the teeth of the serrated opercula were hardly discernible. The three spines very stout and large.

The Dutch name Jacob Evertsen has certainly been applied to several spotted Indian fishes. Ruysch gives no less than eleven figures, none of which agree with the present subject.

In Seba,\* a figure under that name is found; and another in Bloch,† under the name *Bodianus Guttatus*. In both the spines on the opercula are clearly depicted, as well as the rounded tail; and Gronovius in his description concurs with them, though in other respects‡ differing from both.

In the *Perca Guttata* of Linneus reference is made to Marcgrave,§ Sloan,|| and Catesby;¶ but in the figures given by these authors there are no spines in the opercula, and in all the caudal fin is entire, or square. The same remark is applicable to the several figures found in Valentine\*\* and Renard.††

The present fish therefore is not the *Perca Guttata* of Linneus, the *Gugupuguacu* of the Brasils, the Jacob Evertsen of the Dutch and of Willoughby, nor does it agree to any of the figures in Valentine or Renard, though so common in India.

The *Perca Tauvina* of Forskal‡‡ approaches very near to the present fish and the one that follows.

Marcgrave's description of the *Gugupuguacu*, the shape of the tail excepted, agreed so nearly to that of the present *Bontu*, that on meeting with a subject of the enormous size mentioned above, I was inclined to think it the *Gugupuguacu*.

The *Bodianus Guttatus* depicted by Bloch was received from Tranquebar under the native name *Ganimin*, and on showing my drawing to the fishermen at Madras, the name they gave it, sounded to my ear *Panamin*; so that I have no doubt of their being the same fish: but the name received from the Missionary at Tranquebar, who understood the language, is more likely to be correct than what I wrote down by ear only, at Madras.

\* Tab. 27.

† Pl. 224.

‡ S. N. p. 485.

§ Brasil. p. 169.

|| Sloan, Jamaic. T. 2. tab. 247.

¶ Carolin. tab. 14.

\*\* No. 37. 41.

†† No. 17. 111. 207. Tom. ii. No. 36. 300.

‡‡ No. 38.

## No. CXXVIII.

*PERCA cauda rotundata; spinis dorsalibus undecem; corpore oblongo, maculis sub-nigris, spinæ planæ tres in operculo posteriore.*

The PERCH with a round tail; eleven dorsal spines; an oblong body, spotted with blackish round spots; three flat spines in the posterior operculum.

Called by the Natives MADINAWA BONTOO.

*B.* vii. *D.*  $\frac{11}{27}$ . *P.* 18. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{12}$ . *C.* 17.

THIS fish differing very little except in colour, from the one last described, may perhaps be merely a variety. It is much rarer than the other, and the fishermen asserted that it was never met with of a large size.

The *colour* is much darker; the spots more unequal in size, more irregularly scattered, and either nearly black or of a very dark brown. The iris is of an emerald colour.

The *length*, thirteen inches.

## No. CXXIX.

*PERCA cauda rotundata; spinis dorsalibus novem; corpore oblongo, vittato; aculeis tribus ad marginem operculi posterioris.*

The PERCH with a rounded tail, and nine dorsal spines; an oblong body with longitudinal, coloured, stripes; three spines on the margin of the hinder operculum.

Called by the Natives RAHTEE BONTOO.

*B.* vii. *D.*  $\frac{9}{26}$ . *P.* 16. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{12}$ . *C.* 18.

THIS fish is more of the Perch form than the two preceding; the back is more convex, and the body shorter, and not assurgent towards the tail.

The first lamina of the operculum is not serrate; the spines on the second are on its edge, not on the middle, and much shorter than in the last; the fins are rather more orbicular; the dorsal spines nine only.

The *colour* extremely brilliant when fresh caught, but soon fades after death; and the fish, though put immediately into a pail of sea-water, survived but a very short time. The nose of a pale blue; the lips and throat spotted with a deeper blue, and fillets of the same colour diverging from the orbit, cross the yellow opercula and branchial membranes. The back and sides are variegated with azure, and dark yellow, fillets, alternately. The membrane of the dorsal spines pale blue edged yellow: all the other fins azure, striped with dusky yellow.

The *length*, including the caudal fin, nine inches.

## No. CXXX.

PERCA cauda rotundata; spinis dorsalibus undecem; corpore oblongo-ovale, fasciis latis flavis; aculeis duobus in medio operculi posterioris.

The PERCH with a rounded tail; eleven dorsal spines; an oblong-oval body, with broad yellow bands; two spines in the middle of the hinder operculum.

Called by the Natives SUGGALAHTOO BONTOO.

*B.* vii. *D.*  $\frac{11}{25}$ . *P.* 17. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{11}$ . *C.* 18.

This fish agreeing in some respects with the three last described, differs in several others, besides shape and colour.

The *body* is oblong-oval, more slender and compressed; the head narrower towards the rostrum; the first lamina of the opercula distinctly pectinate; the second has two spines, not on the margin, but on the middle, as in No. CXXVII.; the lateral line higher, and more the shape of the back; the dorsal and anal fins less rounded.

The *colour*. The head and trunk very dark, nearly black; the lips spotted black and yellow; some yellow spots on the face; the anterior lamina of the operculum yellow. A dusky yellow, oblong spot on the shoulder, and a broad, irregular, band of lighter yellow, crosses the middle of the trunk; between which and the caudal fin are two more yellow bands. Part of the dorsal and anal fins dusky, the rest yellow, with unequal, round, black spots.

The *length*, eleven inches.

## No. CXXXI.

PERCA cauda rotundata; dorso dipterygio; rostro acuto sursum flexo; operculis aculeatis.

The PERCH with a rounded tail; two dorsal fins; a sharp, turned up rostrum; and spines in the opercula.

Called by the Natives PANDOOMENOO.

*B.* vii. *D.*  $\frac{7}{7}-\frac{1}{14}$ . *P.* 15. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{12}$ . *C.* 18.

The *body* oblong, roundish, compressed; scales large, somewhat square, with a round, ciliate margin, loose.

The *head* small, compressed, pointed, squamous; rostrum short, turning upward. The mouth very oblique, large, wide; lips thickish. Jaws nearly of equal length, without long teeth, but both rough like a file. The tongue thin, hard, obtuse, free. The palate rough, like the jaws. Eyes supreme, near the rostrum, oval, moderate size. Nostrils double, nearer the orbit than the point of the rostrum, oval, the posterior, (as usual) largest.

The opercula squamous, the anterior lamina serrate, and the lower angle armed with three spines; the posterior acuminate, and has a shorter spine than the upper part. Besides these arms, there is a remarkable curve, serrated line, between the orbit and angle of the mouth, a small serrated lamina at the beginning of the lateral line, and another larger above the pectoral fin.

The branchial membrane is half exposed; the aperture large.

The *trunk*, till near the end of the dorsal fin, diminishes little in breadth, the back and belly convex, the sides compressed, convex; tail broad. The lateral line, from the upper edge of the opercula, descends obliquely to within two inches and a half of the caudal fin, where it becomes straight and middle. Anus remote, small.

The *fins*. Two distinct dorsal: in the first, two short and five stout declining spines; in the second, one spinous and thirteen soft assurgent rays; the pectoral low, short, acuminate at top, remarkably thin; ventral longer, thicker, with one strong spine; the anal rounded like the second dorsal, has three spines; the caudal fin orbicular.

The *colour* of the head and back a darkish gray, growing lighter towards the belly, which with the breast and part of the face are pearl. The pectoral fin is of a faint, the ventral of a deep, yellow; the other fins are darker than the back.

The *length*, one foot and a half.

#### REMARKS.

This fish grows to three feet and a half in length, but is best when of the size described, or about two feet long. It is reckoned one of the best fish brought to table, more especially at Calcutta, where it is known under the name of Cockup; but is rather rare at Vizagapatam, and held inferior to other fish more common on the coast.

#### No. CXXXII.

*PERCA cauda sub-integra; spinis dorsalibus duodecem; capite acuto, toto squamoso; corpore cinerco, squamis ciliatis; spina anali secunda permagna.*

The PERCH with a tail hardly divided; twelve dorsal spines; the head sharp, entirely squamous; a cineritious body with ciliated scales; the second anal spine very big.

Called by the Natives GUORAKA.

*B.* vii. *D.*  $\frac{12}{26}$ . *P.* 17. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{11}$ . *C.* 17.

The *body* nearly of the form of the common Perch; the scales large and ciliate, and rise unusually high on the anal fin.

The *head* sharp, declivous, squamous; the mouth low, the teeth, tongue, palate, &c. as usual.

The *eyes* supreme, large; iris silvery. Nostrils high, close to each other, unequal, the posterior oval.

The lateral line arched to the end of the dorsal fin, then straight, and exactly middle.

The *fins*. The spinous portion of the dorsal fin, arched, the ramous short, slightly rounded; the pectoral long, acuminate at top; the second ray of the ventral setaceous. The ramous rays of the anal declining; the second spinous ray remarkably stout; the caudal broad, emarginate.

The *colour*. The head light, resplendent, reflecting various colours. The back light gray, growing paler towards the line, below which it is of a yellowish white. The dorsal fin a little dusky, with some small black spots on the membrane. The other fins have a cast of yellow.

The *length* of the subject described, two feet; but that of the specimen drawn only eight inches.



## No. CXXXIII.

*GASTEROSTEUS spinis dorsalibus tredecem; cauda oblonga cuspidata, utrinque aculeata; pinnis pectoralibus perlongis.*

The *GASTEROSTEUS* with thirteen dorsal spines; an oblong sword-pointed tail, with prickles on both edges; the pectoral fins extremely long.

*Gasterosteus volitans* Linn. *S. N.* p. 491.

Called by the Natives *KODIPUNGI*.

*B.* vii. *D.*  $\frac{13}{25}$ . *P.* 13 *V.*  $\frac{2}{6}$ . *A.*  $\frac{3}{11}$ . *C.* 13.

The *body* oblong-ovate, compressed, broad at the shoulders, covered with very minute sub-orbicular scales, carinate, tenacious.

The *head* large, compressed, rugged, and armed with numerous prickles; the front declivous, depressed, or furrowed; several prickles near the point of the rostrum. Six small cirri only were found; one, on each side, from the upper jaw, and two from the edge of the opercula.

Mouth oblique, large, wide; lips simple. Jaws extractile, the upper emarginate, and longer than the under. Teeth numerous, small, acerose, close. Tongue short, oval-form, smooth, free. Palate wide, rough in the fore part. Eyes close to the vertex, middle size, remote from the rostrum, orbicular. The upper margin of the orbit prickly. Nostrils double, gaping, distant from each other, the anterior guarded with prickles.

The branchial opercula somewhat three-laminated, bony, scabrous, and the two anterior armed with many spines; the posterior lamina ends in a soft point, behind which are two black spots. The membrane covered, but visible; the aperture large.

The *trunk*. The back a little arched and somewhat carinate, the breast and belly convex, plane; sides and tail compressed. Lateral line supreme, a little carinate, at first arched, then descends obliquely, and terminates at the base of the caudal fin. Anus nearer the tail than the head.

The *fins*. The dorsal single, occupying the whole back, from the neck to within half an inch of the tail. The thirteen spinal rays very long, the longest ray two inches four lines; the first, one inch in length; the last, eight lines; all are connected by a tender membrane, which reaches little more than half an inch from the root, and is continued upon the spines, but breaks off upon handling: the posterior part of the fin is assurgent to a point. The pectoral low, very broad, acuminate at top, and extends to near the caudal fin; the ventral long, lanceolate; the anal remote, assurgent, and pointed, like the second dorsal; the caudal fin oblong, a little rounded, but acuminate at the point: above and beneath, on the edges, are three distinct prickles.

The *colour*. The general colour is red, the throat, breast, and branchial membrane excepted, which are pure white. The head pink, with streaks of deeper red. The trunk with transverse fillets, some pink, others of yellowish-red, edged with pale-blue. The fins red; the pectoral and ventral (sometimes the dorsal) with small black dots, on the rays and membrane, and white dots, resembling pearls, on the under side; the margin of the ventral fins black; the anal and caudal red, without spots.

The *length*, nine inches.

## REMARKS.

The cirri, except when the fish is fresh from the water, may easily escape notice.

It is not frequently met with at Vizagapatam.

This fish has been classed under the different genera *Perca*, *Cottus*, and *Scorpæna*, and stands under the latter in Gmelin's edition of Linnæus, p. 1217.

## SCOMBER.

## GENERIC CHARACTER.

*Caput compressum, læve. Membrana branchialis radiis septem. Corpus læve, linea laterali postice carinata. Pinnae spuriae sæpius versus caudam.*

The head compressed, smooth. The branchial membrane has seven ossicles. The body smooth, the hinder part of the lateral line carinated. There are often spurious fins towards the tail.

## No. CXXXIV.

SCOMBER *pinnulis octo, sen novem; cauda falcata; corpore lanceolato, alepidoto, maculis ovalibus; eminentia membranacea, longitudinalis, ad finem lineæ lateralis.*

The SCOMBER with eight, or nine, pinnulæ; the body lanceolate, without scales, and with oval spots; a longitudinal membranous protuberance at the end of the lateral line.

Called by the Natives WINGERAM.

By the English SEER-FISH.

*B.* vii. *D.*  $\frac{16}{16}$ . 20. *P.* 20. *V.* 6. *A.* 20. *C.* 30.

THE *body* lanceolate, compressed, without scales, smooth.

The *head* small, ovate, sharp, smooth; the front very gently declivous, somewhat flattened. Mouth large, oblique, with hardly any lips. The jaws extractile, of equal length; teeth numerous, close, regular, conical, somewhat larger in the under than in the upper jaw. The tongue small, ovate, a little rough in the middle, scarcely moveable. The palate and fauces rough. The eyes middle, near the rostrum, large, orbicular; iris silvery and yellow. Nostrils double, distant from each other, the posterior close to the orbit. Branchial opercula large, rounded, smooth, hardly more than one lamina. The membrane of seven rays, covered; aperture arched.

The *trunk*. The back, breast, and abdomen, somewhat convex, but carinate also; the sides convex, compressed. Branchiæ four-leaved, pectinate. The lateral line supreme, gently arched to the beginning of the pinnulæ, then straight to the middle of the caudal fin, carinate to near the end, where it has a fin-like edge. The anus middle.

The *fins*. There are two dorsal fins besides the pinnulæ: the first spinous, consisting of fifteen or sixteen soft spines, of which the last six, (connected by a very tender membrane and lying in a groove) may easily escape notice if not raised; the second has eighteen or twenty ramous, declining rays, the last three with somewhat the appearance of pinnulæ: the pinnæ spuria vary from eight to nine. The pectoral fins middle, broad, acuminate above; the ventral of the same shape but not half so long; the anal of the same form with the second dorsal; the pinnulæ vary from seven to eight; the caudal completely falcate, and all the fins are somewhat of a falcate form.

The *colour*. The upper part of the head a changeable dark green and blue, the ridge of the back of the same colour, but changes to a polished leaden, which, from the lateral line growing gradually lighter, terminates on the belly in a bluish white. Above, but parallel to the line, a row of small, round spots, nearly black; and on the sides are several similar spots. The fins are darkish, the ventral and anal excepted, which are of the same colour with the belly.

*Length* of the subject described, one foot five inches,

## REMARKS.

This is one of the fishes esteemed by the Europeans. It is reckoned best when about the size of two feet. Under fourteen inches, is drier than an indifferent English Mackarel, but when it exceeds two feet and a half, is coarse and insipid.

The figure now presented, differs considerably from the figure of the same fish given by Bloch, particularly in the shape of the first dorsal fin and the tail. In the Appendix to Willoughby, (to which Bloch makes reference) the figure is without the first dorsal fin: owing probably to the drawing being made from a dried subject.

## No. CXXXV.

SCOMBER *pinnulis dorsalibus decem, analibus duodecem; cauda falcata; corpore lanceolato, alepidoto, maculis oblongis; linea lateralis infracta, ad finem carinata, cum appendice membranacea.*

The SCOMBER with ten dorsal, and twelve anal pinnulæ: the tail falcate. The body lanceolate, naked, with oblong spots. The lateral line infracted, and carinate towards the end, with a membranous appendix.

Called by the Natives KONAM.

*B.* vii. *D.*  $\frac{16}{16}$ . 16. *P.* 22. *V.* 6. *A.* 14. *C.* 24.

THIS fish in the shape of the body and head, as likewise of the mouth, tongue, palate, and eyes, agrees nearly with the Seer-fish. The teeth here are not so close, and incline forward; the lateral line less conspicuous, more straight above the pectoral fin, and slopes more abruptly opposite to the dorsal; has no carina till near the end, where there is a membranous protuberance.

The *fins*. The first dorsal interrupted, being lowest in the middle, but the connecting membrane is much stronger, and at both extremities quite black; four of the dorsal pinnulæ and six of the anal are united by small threads with the respective fins, while the posterior pinnulæ are entirely distinct, as in the Seer-fish.

The *colour* much the same with the former, but the trunk more spotted, especially above the lateral line; the spots are oblong, transverse, and less dusky. The first dorsal is glossy in the middle, the rest black; the other fins a little lighter than the back.

*Length*, two feet eight inches.

#### REMARKS.

The Konam is a much rarer fish than the Wingeram, and inferior in quality, at least when of the above size. Though strongly resembling the Seer-fish, it is clearly a distinct species.

#### No. CXXXVI.

SCOMBER *pinnulis quinque, supra infraque; cauda bifurca; corpore oblongo-ovato, squamoso.*  
The SCOMBER with five pinnulæ on the tail, above and below; a forked tail; the body oblong-ovate, and squamous.

Called by the Natives KANAGURTA.

*B.* vii. *D.*  $\frac{9}{9}$ . 12. *P.* 18. *V.*  $\frac{1}{6}$ . *A.* 19. *C.* 22.

The *body* oblong-ovate, compressed, squamous. Scales very small, somewhat angular, imbricate, deciduous.

The *head* rather large, ovate, compressed, without scales; the front sloping, depressed, smooth. Mouth large, oblique; the teeth very small, straight, numerous; tongue small, roundish, smooth, free; palate smooth. Eyes supreme, large, orbicular. Nostrils double, distant. Branchial opercula smooth, the posterior lamina ciliate.

The *trunk*. The back and breast convex, carinate; the abdomen rather flat; the sides compressed; the end of the tail small and roundish. Branchiæ dissimilar, the exterior tuberculate. Lateral line high, bending very little. The anus nearer the tail than the head.

The *fins*. The first dorsal in a groove, with nine spinous declining rays; the second with twelve ramous rays; the pinnulæ distinct; the pectoral fins high, short, lanceolate; the ventral nearly of the same length as the pectoral, acuminate above; the anal exactly like the second dorsal; the caudal bifid.

The *colour*. The front a dark green; the face and opercula silvery; the back changeable green, blue, and golden, the sides and belly glossy, pearl-white; the dorsal and caudal fins have a yellowish cast, the others are light, glassy.

The *length*, ten inches.

## No. CXXXVII.

SCOMBER *pinnulis caudæ unitis, utrinque quindecim; cauda bifurca; corpore squamoso; maculis sex supra lineam lateralem, rectam, muticam; pinna biradiata ante pinnam ani.*

The SCOMBER with fifteen united pinnulæ on each edge of the tail; a forked tail; a squamous body, with six spots above the lateral line which is not carinated, and nearly straight; a small fin of two spines before the anal fin.

Called by the Natives TOLOO PARAH.

*B.* vii. *D.*  $\frac{6}{6}$ . 21. *P.* 18. *V.* 5. *A.*  $\frac{2}{2}$ . 20. *C.* 19.

The *body* of this species is also squamous, and nearly of the same shape with the last, with which it agrees in several of the other characters. The nostrils are closer together, the teeth larger, the lateral line lower, and more straight, and the anus more distant from the tail.

The *fins*. The first dorsal fin is very different, consisting of six short, stout spines, in a groove, the second dorsal more falcate, than in the last, and the pinnulæ are united with the longer ramous rays; the anal fin is opposite, of the same form, and the pinnulæ in like manner united: but between the anus and that fin, there is a small one of two spinous rays. The other fins as in the last, only that the pectoral are situated much lower.

The *colour*. The upper part of the head dark blue, face and opercula white; iris pearl. The back a shade lighter than the head, and growing gradually more pale, terminates on the belly in a yellowish white.

Above the lateral line, are six small dusky spots in a row.

The dorsal, anal, and caudal fins are darkish, the pectoral and ventral glassy.

*Length* of the subject described, eighteen inches.

## No. CXXXVIII.

SCOMBER *pinnulis dorsalibus unitis decem; cauda profunde bifida; corpore alepidoto, maculis decem; spina horizontalis antrorsum versa, ante spinas dorsales; pinna biradiata ante pinnam ani.*

The SCOMBER with ten united dorsal pinnulæ; a forked tail; a naked body, with ten spots; a horizontal spine pointing forward, in front of the dorsal spines; a fin consisting of two spines before the anal fin.

Called by the Natives TOL PARAH.

*B.* vii. *D.*  $\frac{7}{7}$ . 21. *P.* 17. *V.* 6. *A.*  $\frac{2}{2}$ . 19. *C.* 20.

This species is more of a lanceolate shape than the last, and without scales. The mouth, teeth, and tongue, agree with the last; but the opercula are rounder, and the row of spots above the lateral line, more numerous.

Before the first dorsal fin there is a small, recumbent, flattish, spine, pointing forward, and unconnected with the others, which have an opposite direction. The position and shape of the other fins are the same in both

fishes, but a small spine lying close on the first ray of the ramous, dorsal, and anal fins, is oftener in this found with the point separated, than in the former. The two-rayed anal fin, in both, is in a groove, like the first dorsal. The pinnulæ are connected, as in the former.

The *colour*. The upper part of the head green, the rest white, the back a deep blue, fading into white; the spots dusky, with an obscure bluish cast. The fins glassy, the pectoral and ventral a little yellow.

*Length*, seven inches.

### No. CXXXIX.

SCOMBER *pinnula solitaria prope pinnam caudalem, utrinque; cauda bifida; corpore squamoso, dorso dipterygio; linea laterali postice loricata.*

The SCOMBER with a single pinnula on each edge of the bifid tail; the body squamous; two dorsal fins; the hinder portion of the lateral line loricated.

Called by the Natives KURRA WODAGAWAH.

*B.* vi. *D.*  $\frac{8}{8}$ . 31. *P.* 20. *V.* 6. *A.*  $\frac{2}{2}$ . 24. *C.* 20.

THE *body*, as in the last, lanceolate, but covered with very minute, smooth scales.

The *head* naked, and the mouth, jaws, eyes, and nostrils, as in the genus. The teeth acerose; the tongue ovate, smooth, free; the palate tuberculate; the throat rough; the opercula less orbicular than in the last species, or than usual in the genus. The branchial membrane has six rays only.

The *trunk*. The lateral line chiefly remarkable by being highly carinate, and the posterior part broad, bony, and prickly. The anus behind the middle.

The *fins*. The dorsal and anal fins differ from the preceding species. The first dorsal consists of eight slender, long, spinous rays; the second of thirty-one soft, simple rays, without any appearance of pinnulæ; the second anal has twenty-four similar rays; the other fins are ramous as usual, but the pectoral is longer and more pointed. On each edge of the tail, near the caudal fin, is a small distinct pinnula.

The general *colour* of the head and back a bright lead, softening downwards into white. The fins glassy, the caudal slightly yellow.

The *length*, between six and seven inches.

### No. CXL.

SCOMBER *pinnulis dorsalibus unitis sexdecem; cauda profunde bifida, sub-falcata; corpore alepidoto, supra lineam lateralem aspero, infra lævi; linea laterali infracta.*

The SCOMBER with sixteen united pinnulæ; a tail deeply divided and slightly falcate; a body without scales, rough above the line, smooth under it; the lateral line infracted.

Called by the Natives TALA PARAH.

*B.* vii. *D.*  $\frac{7}{7}$ . 21. *P.* 18. *V.* 6. *A.*  $\frac{2}{2}$ . 20. *C.* 20.

THE *body* oblong-ovate, compressed, without scales, the skin tenacious, and above the lateral line roughish, being covered with minute, raised, short fibres; below the line, it is smooth.

The *head* rather obtuse, the mouth and eyes as usual; teeth linear, numerous, equal. Tongue, short, ovate, long, free, rough; palate and throat rough. Opercula rounded.

The *trunk*. The back gently arched, carinate; the sides compressed, but convex; the breast carinate, the abdomen flattish. The lateral line beginning at the upper edge of the opercula, rises for about an inch, then sloping to the middle of the trunk, forms a small angle above the pectoral fin, after which, it is middle and straight to the end. The anus nearer to the head than the caudal fin.

The *fins*. The first dorsal, in a groove, consists of seven spines, which when raised point alternately to opposite sides; the second, of five ramous rays with sixteen pinnulæ, the first six connected by the common membrane, the others by a very slender one; but it is remarkable of these pinnulæ, that each at its root seems to spring from a pyramidal protuberance not found where the pinnulæ are quite distinct. The same remark belongs to the second anal fin, which consists of six rays and fourteen united pinnulæ; the pectoral and ventral fins very short; the caudal deeply divided, and slightly falcate.

The *colour*. The upper part of the head dark blue, the rest glossy white, but the edge of the opercula yellow. The upper part of the back still darker, but brightens towards the lateral line, above which is a row of five or six darkish spots; under the line, the colour completely yellow. The dorsal and caudal fins are a little lighter than the back; the edge of the latter is of a pale yellow; the pectoral yellow above, at the root black.

The *length*, two feet four inches.

### No. CXLI.

SCOMBER *pinnulis dorsi tredecem unitis; cauda falcata; corpore alepidoto, toto sub-aspero; maculis sex rotundis ad lineam lateralem.*

The SCOMBER with thirteen united dorsal pinnulæ; the tail falcate; the body without scales, but all over somewhat roughish; six round spots on each side above the lateral line.

Called by the Natives AKEN PARAH.

*B.* vii. *D.*  $\frac{7}{7}$ .  $\frac{1}{21}$ . *P.* 18. *V.* 6. *A.*  $\frac{2}{2}$ .  $\frac{1}{19}$ . *C.* 24.

THIS species differs chiefly in the following circumstances from the one last described. The head sharper; the roughish skin extends over the whole trunk, below as well as above the lateral line; the lateral line carinate, and the tail more falcate.

The *colour*. The upper part of the head greenish, opercula pearl; the ridge of the back dark blue, fading into a yellowish white below the lateral line: six round spots above the line, less dusky than in the last fish. The dorsal and caudal fins darker blue than the back; the pectoral yellow; the ventral and anal fins whitish.

*Length*. The subject described measured sixteen inches, but they are sometimes brought double that size.

### REMARKS.

Though the second dorsal and anal fins are marked with a spinous ray, it should be observed that the spine, lying close on the second ray, seldom pierces the skin, and in such case is often omitted by the painter. In the present instance I follow my original memoranda, which mark spines, though perhaps improperly.

## No. CXLII.

SCOMBER *pinnulis unitis sexdecem, supra infraque; cauda profunde bifida, falcata; corpore squamis orbiculatis; radiis aliquot pinnæ dorsalis analisque longioribus, falcatis; spina antrosum spectans ante pinnam dorsalem.*

The SCOMBER with sixteen pinnulæ, above and below; a deeply divided, falcate tail; the body covered with orbicular scales, some longer falcate rays in the dorsal and anal fin; a spine pointing forward in front of the dorsal fin.

Called by the Natives BOTLA PARAH.

*B.* viii. *D.*  $\frac{6}{6}$ .  $\frac{1}{23}$ . *P.* 18. *V.* 6. *A.*  $\frac{2}{2}$ .  $\frac{1}{22}$ . *C.* 24.

THE *body* oblong-ovate, compressed, covered with small orbicular scales, imbricate, tenacious.

The *head* small, obtuse, compressed, without scales; the front declivous, carinate; the rostrum very obtuse; the mouth low, small, a little oblique; the lips simple. The lower jaw much shorter than the upper; in the fore part of each is a cluster of small teeth, which to the finger feels like a file, the rest of the teeth very minute, irregular. The tongue roundish, smooth; the palate tuberculate.

The eyes middle, large, orbicular; nostrils double, close, oval, the posterior by much the largest. The opercula rounded without scales. The branchial membrane with eight rays.

The *trunk*. The back and breast carinate; the lateral line nearly middle at its beginning, bends at first gently over the pectoral fin, and then runs straight to its termination. The anus middle.

The *fins*. Before the dorsal there is a recumbent spine pointing forward as in No. CXXXVIII. The first dorsal consists of six spines in a groove, diverging when raised; the second dorsal like the second anal, is distinguished by the extreme length of the first three ramous rays, forming a long falcate tail; the pinnulæ in both alike; a two-spine fin before the anal; the caudal more falcate than in the last, and the upper lobe longest.

The *colour*. The upper part of the head a dull leaden, the rest white. The back at first like the head, shades off to a light colour, with a tinge of yellow. The abdomen a yellowish white. Four large, dark leaden, oval spots, above the lateral line. The dorsal, anal, and caudal fins yellowish, but the interior falcate edges blackish. The pectoral yellow; the ventral light coloured.

*Length*, one foot seven inches.



## No. CXLIII.

SCOMBER *pinnulis dorsalibus tredecem, sex unitis, septem distinctis; cauda bifurca; corpore lanceolato, squamoso; linea laterali spinosa.*

The SCOMBER with thirteen dorsal pinnulæ, six united, and seven distinct; a lanceolate, squamous, body; and a prickly lateral line.

Called by the Natives WORAGOO.

*B.* vi. *D.*  $\frac{7}{7}$ . 14. *P.* 18. *V.* 6. *A.*  $\frac{2}{2}$ . 12. *C.* 20.

THE *body* lanceolate, the scales very small. The head, mouth, tongue, and teeth, as described in the first species of this genus. The nostrils divided by a valve. The branchial membrane has six rays only. The back and breast, as usual, carinate; the abdomen rather flat; the tail near the fin remarkably small and round. The lateral line differs from all the preceding species: after forming a short smooth arch at its rise, it becomes straight and carinate, with uncommon prickly, oblique branches going off on each side. The anus middle.

The *fins*. The first dorsal consists of seven slender spinous rays, the first spine half the length of the second, the other five declining; the second fin has nine ramous rays united with six pinnulæ; behind which are six or seven distinct pinnulæ. The pectoral fin very long and falcate; the second anal, in shape like the dorsal, has six ramous rays, united with six pinnulæ; behind which are five distinct pinnulæ. The caudal fin bifid.

The *colour*. The upper part of the head and back, a dark green; a large spot of light yellow behind the orbit; a smaller of a beautiful changeable colour, on the upper edge of the last operculum; the rest of the fish pearl-white. The dorsal fins the colour of the back; the pinnulæ yellowish; the pectoral yellow; the ventral and anal light, glassy; the caudal yellowish, with a dusky margin.

*Length*, eleven inches.

## No. CXLIV.

SCOMBER *pinnulis dorsalibus unitis undecem, seu duodecem; cauda profunde bifida, lobis lanceolatis; corpore lato-ovato, squamoso; spina recumbens horizontalis ante pinnam primam dorsi.*

The SCOMBER with eleven, or twelve, dorsal, united pinnulæ; a tail deeply bifid; the lobes lanceolate; the body broad-ovate, squamous; an horizontal couched spine before the first dorsal fin.

Called by the Natives GUNDI PARAH.

*B.* vii. *D.*  $\frac{8}{8}$ . 21. *P.* 18. *V.* 6. *A.*  $\frac{2}{2}$ . 18. *C.* 22.

THE *body* broad-ovate, compressed, covered with small, orbicular scales, close, tenacious.

The *head* large, more declivous and less sharp than in any of the foregoing species; without scales, the first lamina of the opercula excepted; the front carinate, the rostrum obtuse. The mouth situated low, hardly oblique, large; lips thin; jaws extractile, nearly equal. The teeth in the under jaw and forepart of the upper, larger than usual in this genus, conical, a little curve: the rest small, but not acerose. The tongue ovate, scabrous, loose; the palate wide, roughish. The eyes middle, near the rostrum, large, round, not protuberant.

Nostrils near the orbit, the anterior largest, oval, the posterior rounded. The opercula rounded, the first laminæ squamous, the intermediate and last without scales. The branchial membrane seven-rayed, easily discovered; the aperture large, semicircular.

The *trunk*. The back more arched than the breast and abdomen; the sides compressed, the extremity of the tail roundish. The two exterior leaves of the branchiæ pectinate. The first half of the lateral line arched and carinate, the other broad, straight, loricated. The anus middle.

The *fins*. In front of the dorsal there is a recumbent spine, and two or three others seem to lie under the skin. The first dorsal fin consists of seven long, slender, spinous rays, in a groove; the second of eight or nine long, ramous rays, and eleven or twelve united pinnulæ: the second anal, which is of the same falcate shape, has six ramous rays and twelve pinnulæ. The pectoral fins very long, falcate; the ventral much shorter, acuminate above; the caudal deeply bifid, but not falcate.

The *colour*. The crown and face smooth, polished, green; throat and breast bright pearl. The upper part of the back darker green than the head, but changeable, and shading away to a very pale yellow; the belly white with a yellowish cast. The dorsal and upper lobe of the tail darkish; the pectoral, ventral, anal, and lower lobe of the caudal fin, yellow.

*Length*, one foot.

It is a dry, insipid fish.

#### No. CXLV.

SCOMBER *pinnulis dorsalibus unitis quindecim; cauda bifida; corpore squamoso; linea laterali carinata, postice loricata; pinnis pectoralibus perlongis, falcatis.*

The SCOMBER with fifteen united, dorsal pinnulæ; a bifid tail; a squamous body; a carinated lateral line, loricated on the part towards the end of the tail; the pectoral fins very long and falcate.

Called by the Natives KURUGOO PARAH.

*B.* vii. *D.*  $\frac{8}{3}$ . 22. *P.* 19. *V.* 6. *A.*  $\frac{1}{2}$ . 19. *C.* 24.

This species agrees in colour, as well as in most other characters, with the fish last described: it varies sufficiently in others to make it a distinct species.

The *body* broad, oblong, much arched above, almost straight below, the sides compressed, and the sides of the tail, from where the lateral line grows straight, form an angle; the head is larger, more declivous; the front a little depressed and divided by a ridge; the last lamina of the opercula acuminate with a soft point, and all are without scales.

The *fins* agree exactly in shape with the last; the spine before the dorsal fin is also found here, and sometimes spines concealed under the skin. The first dorsal has eight slender spines, besides one recumbent, which is unconnected; the pectoral remarkably long; the second dorsal and anal fins falcate, composed of ramous rays and united pinnulæ; the caudal bifid, with lanceolate lobes.

The *colour*. The crown green, the face lighter green; the throat and breast, pearl. The trunk and fins as described in the Gundi Parah.

*Length*, thirteen inches.

## No. CXLVI.

SCOMBER *pinnulis dorsalibus unitis quatuordecem; cauda sub-falcata; operculo primo squamoso; aculeis sub cute ante pinnam primam dorsalem.*

The SCOMBER with fourteen united, dorsal pinnulæ; a tail somewhat falcate; the first operculum squamous; some spiculi covered by the skin in front of the first dorsal fin.

Called by the Natives ECALAH PARAH.

*B.* vii. *D.*  $\frac{7}{7}$ . 20. *P.* 20. *V.* 6. *A.*  $\frac{2}{2}$ . 17. *G.* 25.

THE shape of the body is exactly that of the last, from which it differs in the falcate form of the tail; and instead of the recumbent spine before the dorsal fin, there is an appearance of some latent spines under the skin. In the mouth, tongue, teeth, and eyes, there is no peculiarity.

The *colour*. The crown green, the face, opercula, and breast, pearl. The back changeable, green, blue, and purple, on a gold ground; sides, pearl; belly, yellowish-white; dorsal, and upper lobe of the caudal fin, an obscure green; pectoral, light, glassy; ventral, anal, and lower lobe of the caudal fin, yellow.

*Length* of the subject described, one foot; but they are brought much larger.

## No. CXLVII.

SCOMBER *pinnulis unitis duodecem; cauda profunde bifida; corpore squamoso; linea laterali antice arcuata, undulata, postice loricata; pinnis flavescensibus.*

The SCOMBER with twelve united pinnulæ; a deeply bifid tail; a squamous body; the anterior part of the lateral line arched, undulate, the hinder part loricated; the fins yellowish.

Called by the Natives YARRADANREE PARAH.

*B.* vi. *D.*  $\frac{7}{7}$ . 20. *P.* 18. *V.* 6. *A.*  $\frac{2}{2}$ . 17. *G.* 22.

THIS in its angular form behind, and straight abdomen, agrees with the two species immediately preceding. The branchial membrane has only six rays; the first part of the lateral line undulates; and there is no recumbent spine, nor vestige of latent spines on the back; the second dorsal and anal fins are composed of ramous rays and united pinnulæ; the caudal deeply bifid.

The *colour* silvery-brown, the back changeable green, and blue; all the fins yellowish; the tip of the upper lobe of the caudal, black.

The *length* usually ten inches; the breadth, where broadest, three and a quarter.

## No. CXLVIII.

SCOMBER *pinnulis dorsalibus unitis quatuordecem; cauda falcata; spina distincta in pinna secunda dorsi, analisque.*

The SCOMBER with fourteen united, dorsal pinnulæ; a falcate tail; a distinct spine in the second dorsal, and second anal fin.

Called by the Natives WOTIM PARAH.

*B.* vii. *D.*  $\frac{7}{7}$ .  $\frac{1}{22}$ . *P.* 20. *V.* 6. *A.*  $\frac{2}{2}$ .  $\frac{1}{18}$ . *C.* 24.

THE *body* oblong, arched above and straight below, like the three last-described species; the head also is large, declivous, and without scales; but the mouth, though low, is more oblique, and the lips, thick. The tongue ovate, large, rough in the middle, the point sheathed. The eyes middle, large; the iris orange. Nostrils small, oval, contiguous. Opercula with membranous margins; a part only of the face, near the orbit, squamous. The first part of the lateral line arched, not undulating; and towards the end, highly loricated.

The *fins*. The spines of the first dorsal remarkably straggling, or distant from each other; the spinous ray of the second dorsal and second anal distinctly separate from the second rays: both fins are composed of ramous rays and united pinnulæ; the caudal falcate.

The *colour*. The upper part of the head and back, to near the pectoral fin, a changeable mixture of dark green, blue and gold; the belly white, skirted with yellow. Dorsal fin and upper lobe of the caudal, darkish. Pectoral and ventral, yellowish-white; the lower lobe of the caudal, brimstone, with a darkish edge.

The *length*, thirteen inches; the breadth, four and a half.

## No. CXLIX.

SCOMBER *pinnulis aualibus unitis duodecem; cauda sub-falcata, loborum apicibus nigris; corpore squamoso, fasciis transversis fuscis.*

The SCOMBER with twelve united pinnulæ; a sub-falcate tail, with black pointed lobes; the body squamous, and cross brown bands on the sides.

Called by the Natives POLOOSOO PARAH.

*B.* vi. *D.*  $\frac{7}{7}$ . 20. *P.* 23. *V.* 6. *A.*  $\frac{2}{2}$ . 17. *C.* 20.

THIS species agreeing in the shape of the head and trunk nearly with those immediately preceding, differs little in other circumstances, except in colour. The breast is a little more rounded; the mouth, though low, somewhat oblique; the teeth are hardly perceivable; the opercula wholly squamous; and the branchial membrane has six ossicles only.

The *fins*. The dorsal spines very slender, and, as well as the first anal, in a groove; the second dorsal and anal narrow fins are slightly falcate, and united with the pinnulæ. The pectoral fins long and falcate; the ventral short, lanceolate; the caudal slightly falcate.

The general *colour*, except the breast and abdomen which are white, is yellow of different shades. From the upper edge of the orbit a curve streak of brown runs obliquely to the ridge of the back, and seven or eight fasciæ of the same colour cross the sides, broad and narrow alternately. All the fins are yellow; the lobes of the caudal tipped with black.

The *length* of the subject seven inches; the breadth, three inches one-third.

## No. CL.

SCOMBER *pinnulis dorsalibus unitis undecem; cauda bifida; corpore lato-ovato, compresso, pectore alepidoto; linea laterali arcuata, carinata, postice recta, loricata.*

The SCOMBER with eleven united, dorsal pinnulæ; a bifid tail. The body broad-ovate, compressed, the breast naked; the lateral line arched and carinate, the hinder part straight and loricated.

Called by the Natives TALLAM PARAH.

*B.* vii. *D.*  $\frac{7}{7}$ . 22. *P.* 18. *V.* 6. *A.*  $\frac{2}{2}$ . 18. *C.* 20.

THE *body* rather oval than ovate, compressed, and, except on the breast, covered with very minute scales.

The *head* declivous, compressed, without scales; the front and vertex carinate. The mouth low, a little oblique; lips simple. Teeth conical, close, regular. Tongue and palate smooth. Eyes supreme, very large, orbicular. The opercula without scales.

The *trunk*. The back and abdomen carinate; the sides thin, very much compressed. The branchiæ, lateral line, and anus, as in the fish last described.

The rays of the first dorsal fin slender, the three last very short; the second dorsal and second anal are composed of long rays and pinnulæ, but more strongly than usual connected, the membrane having a fibrous margin. The protuberance at the roots of the connected pinnulæ, were observed here, in some degree, at the base of the rays also. The first dorsal and first anal fin in grooves; the pectoral fin middle, falcate; the caudal bifid.

The *colour*. The upper part of the head and back have a faint greenish cast, on a silver ground; the rest silvery, faintly reflecting various colours, the throat and abdomen excepted which are simply white. The fins glossy with a yellowish cast.

The *length*, eight inches.

## REMARKS.

This fish never appears at the English tables, but is salted by the natives, with other small fish, for the inland villages.

## No. CLI.

SCOMBER *pinnulis dorsalibus unitis quindecim; cauda profunde bifida; corpore sub-orbiculato, pectore alepidoto; spinæ in dorso anteriore; pinnæ secundæ dorsalis radio primo elongato.*

The SCOMBER with fifteen united pinnulæ; a tail deeply divided; a roundish body, the breast without scales; spines in the fore part of the back; the first ray of the second dorsal fin elongated.

Called by the Natives TCHAWIL PARAH.

*B.* vii. *D.*  $\frac{7}{7}$ . 21. *P.* 18. *V.* 5. *A.*  $\frac{2}{2}$ . 17. *C.* 22.

THIS small species, for it seldom exceeds five inches in length, agrees in the general characters of the genus; but is distinguished by the length of the first ray of the second dorsal fin, which measured nearly two inches; the first dorsal consists of seven soft spines; there is a recumbent spine in front, and the appearance of several others under the skin, as in No. CXLIV. and CXLVI. The dorsal and anal fins in grooves; the second composed of rays and pinnulæ united. The pectoral long, falcate; the caudal bifid, the lobes lanceolate.

The *mouth* nearly middle; the lips and cheeks membranous, white, pellucid; the jaws extractile, but the upper capable of wider extension than the under, raising the rostrum along with it, which returns to its place when the mouth shuts. Teeth linear.

The *colour*. The crown, pale-green; the face and trunk, mother-of-pearl; the rest silvery white. The fins yellowish.

*Length* of the subject, five inches and a half.

## No. CLII.

SCOMBER *pinnulis dorsalibus unitis quatuordecim; cauda bifida; pectore alepidoto, prominente; spinis ante pinnam dorsalem nullis; pinnula prima anali carens.*

The SCOMBER with fourteen united dorsal pinnulæ; a bifid tail; a prominent, naked, breast; no spines in front of the dorsal fin; and no first anal fin.

Called by the Natives MAIS PARAH.

*B.* vi. *D.*  $\frac{5}{5}$ . 24. *P.* 18. *V.* 5. *A.* 21. *C.* 21.

THIS agrees with the species last described in the structure and motion of the upper jaw, the membranous cheeks, the linear teeth, and the form of the dorsal, anal, and caudal fins; but it differs in other respects.

The *body* in the fore part, is broader, and rounder; the hind part, from the beginning of the second dorsal and anal fin, trigonal; the abdomen straight and flat; there is no recumbent dorsal spine; the biradiate anal fin is wanting; the first dorsal has only five spines; and the branchial membrane six rays. The pectoral fin in both is long and falcate; but the ventral are remarkably long and setaceous, with only five rays. In the opercula, smooth tongue, palate, and branchiæ, they agree. The lateral line undulates a little above the pectoral fin.

The *colour*, to the best of my recollection, was much the same as that of the species last described; but the only circumstance noted in my memoranda, is, that the iris was silvery.

## No. CLIII.

SCOMBER *corpore longo-lanceolato, squamis exiguis, non imbricatis; linea laterali undulata; cauda lunulata.*

The SCOMBER with a long-lanceolate body; very small scales, contiguous, not imbricate; the lateral line undulating; a crescent-shape tail.

Called by the Natives PEDDA MOTTAH.

*B.* vii. *D.*  $\frac{7}{7}$ . 37. *P.* 18. *V.* 6. *A.* 26. *C.* 20.

THE *body* long-lanceolate, roundish, covered with very small orbicular scales, close together, not imbricate.

The *head* oblong, depressed, without scales; the front hardly slopes, naked; the rostrum rounded. The mouth long, nearly straight; lips thin; jaws extractile, the under somewhat shorter. Teeth very small, numerous, a little curve. Tongue large, oblong, obtuse, scabrous, free. The palate wide and rough. The eyes high, nearer the rostrum than the opercula, moderate size, round. Nostrils double, contiguous, the anterior largest, oval, the other round. The branchial opercula with two laminæ, semicircular, without scales; margin ciliate; the membrane covered, the aperture large.

The *trunk*. The upper and lower part almost straight, or sloping very gradually; the sides and abdomen convex. The exterior branchiæ pectinate, the others roughish, not tuberculate; the lateral line declines gradually, and undulates in a singular manner.

The *fins*. The first dorsal consists of nine short spines (sometimes seven) in a groove; the second of thirty-seven descending rays; the pectoral nearly middle, shorter than the head, broad, acuminate at top; the ventral short; the anal single, of the shape of the dorsal, but shorter; the caudal fin lunulate.

The *colour* of the head, trunk, and fins, almost black, except the throat, abdomen, and pectoral fins, which are cineritious. The caudal whitish at the points.

*Length*, one foot five inches.

## No. CLIV.

SCOMBER *cauda falcata; rostro truncato; corpore sub-rhombeo, scabriusculo, alepidoto? linea laterali mutica; pinnis secundis dorsi anique falcatis.*

The SCOMBER with a falcate tail; a truncate rostrum; a rhomboid body, roughish, without scales? a smooth lateral line; the second dorsal and anal fin falcate.

Called by the Natives MOOKALEE PARAH.

*B.* vii. *D.*  $\frac{6}{6}$ .  $\frac{1}{19}$ . *P.* 19. *V.* 6. *A.*  $\frac{2}{2}$ .  $\frac{1}{18}$ . *C.* 22.

THE *body* somewhat of a rhomboid form, a little rough, but without apparent scales.

The *head* large, compressed, roundish, naked; front declivous, carinate; rostrum short, truncate. Mouth small, oblique, round, situated rather low; lips thick; jaws extractile, nearly equal, no teeth. Tongue large, ovate, smooth, tied. Palate broad, smooth. Eyes middle, very near the rostrum, moderate size, orbicular. Nostrils double, contiguous, the one next the orbit large, oval, the other small, round. The branchial opercula rounded, without scales, smooth; the membrane half exposed, the aperture wide, arched.

The *trunk*. The back, to the beginning of the second dorsal fin, arched and carinate, it then descends obliquely, the second dorsal occupying the declivity; the sides are a little convex, but compressed; the abdomen slanting, flat. The sides of the branchiæ somewhat rough, the exterior tuberculate. The lateral line (slightly carinate) forms a low arch over the pectoral fin, then runs straight along the middle of the tail. The anus nearest to the head.

The *fins*. The first dorsal consists of six short spines in a groove; the second of one short spine, and six long rays united with fourteen rays like pinnulæ, but without the usual protuberances at the root: the membrane unusually thick. The pectoral fins very short, broad, acuminate above; the ventral half the length of the pectoral; the first anal fin in a groove; the second has one short spine, and in other respects resembles the opposite dorsal, the long rays in both being falcate; the caudal completely falcate. Before the first dorsal fin there is a recumbent spine, as in several of the preceding species.

The *colour* of the head and trunk above the line, a dark leaden; the rest, including all the fins, excepting the dorsal and exterior part of the caudal lobes, yellow.

*Length*, eleven inches.

#### REMARKS.

In a subject of twenty inches, the colour of the head and back was of a bluish-gray, and the parts below the line, were white, instead of yellow. It is a dry insipid fish.

In the form of the dorsal and anal fins, the present fish resembles the *Scomber Glaucus*;\* but in its general form it approaches nearer to the *Chaetodon Rhomboides*.†

#### No. CLV.

SCOMBER *cauda bifida*; *corpore-ovali*, *alepidoto*, *cute striata*; *dorso dipterygio*; *macula magna in pinna prima dorsi*.

The SCOMBER with a bifid tail; an oval body, without scales, covered with a striated skin; two dorsal fins: in the first, a large spot.

Called by the Natives WORI PARAH.

*B.* vii. *D.*  $\frac{7}{7}$ . 24. *P.* 17. *A.*  $\frac{2}{2}$ . 21. *C.* 20.

THE body of this species is oval, thin, without scales; the skin singularly striated. The head small, compressed, sharp. The mouth a little oblique; lips thickish. Teeth very small, perceptible in the upper jaw to the touch only. The eyes, high, round. Nostrils contiguous, remote from the orbit. The opercula, &c. as usual in the Genus.

The *body*. The back, breast, and abdomen, carinate, the sides much compressed; the end of the tail small, roundish. The lateral line of the usual shape, carinate, and towards the end loricated. The anus middle.

The *fins*. The first dorsal declining from the third ray; the second fin declines from the fourth ray; the pectoral low, long, falcate; the ventral short, lanceolate; the first anal biradiate, as usual; the second exactly like the second dorsal; the caudal fin bifid.

The *colour*. The crown and back a deep blue, the rest mother-of-pearl; the belly white. The first dorsal fin pale-yellow at the bottom, the rest black; the other fins glassy, with more or less of a yellow tint.

*Length*, eight inches.

\* Bloch, Pl. 209.

† Id. Pl. 210.



## No. CLVI.

SCOMBER *cauda sub-falcata; corpore ovato, non squamoso, cute striata; dorso monopterygio; linea laterali aspera, inversa curvata.*

The SCOMBER with a tail slightly falcate; an ovate body, without scales, covered with a striated skin; the lateral line bending towards the abdomen.

Called by the Natives MITTA PARAH.

*B.* vi. *D.*  $\frac{7}{28}$ . *P.* 18. *V.* 6. *A.*  $\frac{2}{2}$ . 16. *C.* 22.

THE *body* oblong-ovate, without scales, compressed; the skin has a striate appearance.

The *head* declivous, compressed, front carinate; mouth small; teeth linear. Tongue and palate smooth. Eyes middle, large; nostrils contiguous, in the middle between the orbit and rostrum. Opercula rounded, smooth. The branchial membrane has six rays.

The *trunk*. The back arched, carinate; the belly straight. The exterior branchiæ pectinate. The lateral line nearly middle, very slightly, and unusually, bent downward. The anus middle.

The *fins*. The dorsal single, the spinous and ramous rays being united; the latter, however, retain something of the united pinnular form. The pectoral middle, acuminate above; the ventral lanceolate, point setaceous; the second anal like the hinder part of the dorsal; the caudal when extended somewhat falcate.

The *colour* of the upper part of the head and back darkish, with an olive-green cast, the rest a bright leaden. The fins yellowish-white.

*Length* four inches, but sometimes twelve.

## MULLUS.

## GENERIC CHARACTER.

<i>Caput compressum, declive, squamis tectum.</i>		The head compressed, sloping, squamous.
<i>Membrana branchiostega radiis tribus.</i>		Three rays in the branchial membrane.
<i>Corpus squamis magnis, facile deciduis.</i>		The body covered with large scales, easily falling off.

## No. CLVII.

*MULLUS cirris geminis sub mento; squamis magnis, ciliatis, deciduis; maculis duabus ovalibus supra lineam lateralem.*

The MULLUS with two cirri under the chin; large ciliated scales, adhering loosely; two oval spots above the lateral line.

*Mullus barbatus Linn. S. N. p. 494.*

Called by the Natives RAHTEE GOOLIVINDA.

*B. iii. D.  $\frac{8}{8}$ . 9. P. 15. V. 6. A. 7. C. 18.*

THE *body* oblong, compressed, but somewhat roundish; covered with large, orbicular scales, ciliate at the edge, obliquely notched at the base, deciduous.

The *head* large, declivous, compressed, somewhat angular; rostrum obtuse, without scales, polished. Mouth wide, lips thickish, loose. Jaws unequal; the upper arched, longer and broader, the under more extractile; both set with regular, marginal, almost straight, teeth. Tongue sub-triangular, obtuse, smooth, fixed. Eyes supreme, remote, orbicular, iris red. Nostrils very small, near the point of the rostrum, distant from the orbit. Opercula consist of three unequal plates, the posterior with a membranous margin, and a small spine above the pectoral fin. The branchial membrane covered; the aperture large.

The cirri rise externally from beneath the os hyoides, not from the lower jaw.

The *trunk*. The back gently curve, convex, the sides compressed; the breast and abdomen prominent, but sometimes flat. The branchiæ four-leaved, the exterior tuberculate and pectinate; the others tuberculate. The lateral line supreme, curves gently, almost parallel to the back. The anus small, nearly central.

The  *fins*. First dorsal scapular, triangular, spinous; the second lumbar, gently declining. The pectoral nearly middle, acuminate at top; the ventral distant from each other, as long as the pectoral, lanceolate; the anal fin of the same form as the opposite dorsal, but narrower; the caudal bifid.

The *colours* extremely beautiful when the fish is alive, but quickly fade after death. The upper part of the head of a dark purple, with some lines of light violet; the cheeks pink, variegated with pale yellow, and waving light-blue lines; the lips reddish, with a dark spot at each corner of the mouth. The back a dark changeable purple; two oblong oval spots on the lateral line: the first golden and white, glows as if illuminated, but less permanent; the second nearer the tail, a very dark purple, forms a beautiful contrast. The sides are faintly

purple, with azure lines running above the pectoral fin to the tail; but lower towards the belly, they run on a changeable ground golden and white: the belly white, the throat white also, shaded with very faint pink.

The dorsal fins purple, streaked with light blue; the pectoral pink; the anal white and pink, with a few cross streaks of straw-yellow: the ossicles of the caudal reddish purple, the membrane dark green.

*Length* ten inches, and seldom exceeds fourteen.

## REMARKS.

The red Mullet is rather a rare fish at Vizagapatam, and in quality inferior to the red Mullet of the Mediterranean, or of England.

## No. CLVIII.

*MULLUS cirris duobus sub mento ; corpore squamis magnis sub-deciduis ; lineis luteis longitudinalibus duabus ; pinnæ dorsi caudæque lineis obliquis transversis.*

The MULLUS with two cirri under the chin; the body covered with large loose scales; two yellow fillets on the sides, and oblique, cross lines on the dorsal and caudal fins.

*Mullus surmuletus Linn. S. N. p. 496.*

Called by the Natives BANDI GOOLIVINDA.

*B. iii. D.  $\frac{8}{8}$ . 9. seu  $\frac{7}{7}$ . 8. P. 16. V. 6. A. 7. C. 18.*

THIS fish, except in colour, agrees in most circumstances with the former. The scales are less deciduous; and the nostrils nearer the orbit. The body white; with two yellow fillets from the gills to the tail on each side, the upper crossing the lateral line. The belly and breast a greenish white. The dorsal and caudal fins streaked obliquely with white and dusky yellow fillets; the ventral and anal of a greenish white.

The *length* seldom exceeds six inches.

This fish abounds in the river, but is in no estimation.

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## TRIGLA.

## GENERIC CHARACTER.

*Caput lorica tum lineis scabris. Membrana  
branchiostega radiis vii. Corpus cuneatum :  
digiti liberi ad pinnas pectorales.*

The head loricated with rough lines.  
Seven rays in the branchial membrane.  
The body wedge-form ; free, articulated  
digiti at the pectoral fins. (between the  
pectoral and ventral fins.)

## No. CLIX.

TRIGLA *digito libero solitario utrinque ; corpore cunei-forme alepidoto ; spina recurva ad  
rostrum ; cauda truncata.*

The TRIGLA with a solitary digitus on each side ; a wedge-form body, without scales ;  
a recurve spine on the rostrum, and a truncate tail.

Called by the Natives WORRAH MINOO. A.

*B.* vi. *D.*  $\frac{11}{22}$ . *P.* 11. *V.* 6. *A.* 10. *C.* 10.

THE *body* wedge-form, a little compressed, very small near the caudal fin ; no scales.

The *head* nearly as broad as the body, scabrous, and armed with many spines ; the front declivous, grooved ; a long curved spine on each side of the rostrum, two or three small prickles in front. Mouth large. Jaws extractile, nearly equal, the superior emarginate, and two small cirri pendent from the lower. Teeth small, acerose. Tongue short, smooth, obtuse, loose. Palate wide, tuberculate. The eyes close to the crown in a deep prickly orbit. Nostrils double, unequal in size, close on the point of the rostrum.

Branchial opercula rugged, and armed with small spines pointing backward ; the membrane half exposed, the aperture large.

The *trunk*. The back and throat rather flat, the tail a little compressed. The branchiæ pectinate on the inside. Lateral line supreme, gently arched, and terminates at the upper edge of the tail. The anus remote.

The *fins*. The dorsal single, the eleven spinal rays nearly equal in height, the posterior part of the fin higher and rounded ; the pectoral broad, half as long as the trunk, acuminate at top ; the ventral broad, half the length of the pectoral ; the anal equal, narrower than the opposite dorsal ; the caudal truncate, and, as in all the others, the point of the rays extend beyond the membrane. The *digiti liberi* exactly under the pectoral fins.

The *colour* a dusky purple ; the belly pink. The points of the dorsal spines and the margin of the membrane black, the posterior portion darkish purple. Pectoral and ventral fins reddish with a purple tint. The tail dark-purple, with two light coloured bands.

*Length* of the subject four inches.

## No. CLX.

TRIGLA *digito uno, utrinque; cauda oblonga, acuminata; corpore squamoso, scabro; pinnis pectoralibus angustis, longitudine fere corporis; macula magna in pinna dorsali.*

The TRIGLA with a single digitus on each side; an oblong, pointed tail; the body squamous and rough; the pectoral fins narrow, nearly as long as the body; a large spot on the dorsal fin.

Called also by the Natives WORRAH MINOO. B.

B. vii. D.  $\frac{15}{24}$ . P. 10. V.  $\frac{1}{6}$ . A.  $\frac{3}{10}$ . C. 16.

THE *body* in shape nearly resembles the former, but is covered with carinate, rough scales.

The *head* less scabrous; the crown and front furrowed; spines in front and on the side of the rostrum, as in the former, besides prickles on the orbit and hind head. There are three cirri from the lower jaw. The mouth, jaws, tongue, and eyes, as in the former. The opercula striate, and armed with short spines. The lateral line supreme, nearly straight, terminating at the middle, not the upper edge, of the tail.

The *fins*. The dorsal spines rise higher, and being unequal form an arch, while the posterior portion of that fin is more oblong and rounded. The pectoral fins are much longer, forming narrow wings; the ventral proportionally longer than in the former, and each has one spine. The anal is rounded like the dorsal, and has three spinous rays; the caudal oblong, pointed. The rays of all, as in the former, exceed the membrane.

The *colour* reddish; breast and belly white. The dorsal fin dusky, with an oblong black spot on the middle; the posterior membrane streaked with three dusky-yellow fillets. The pectoral fin purplish, but on the under side green; the anal dusky, like the dorsal, without streaks. The caudal streaked transversely with yellow fillets.

*Length*, five inches.

A variety of this fish was brought of a light-gray colour.

## No. CLXI.

TRIGLA *capite crusta ossea, scabra, rufa; pinnula singulari ad pinnas pectorales.*

The TRIGLA with a head covered with a rough, bony, reddish crust; a singular pinnula (or wing) at the pectoral fins.

*Trigla volitans* Linn. S. N. p. 498.

Called by the Natives MOOREE GODOO.

B. vi. D.  $\frac{5}{5}$ . 8. P. 28. V. 5. A. 6. C. 12.

THE *body* wedge-form, roundish, very small towards the tail, scabrous, covered with small orbicular scales, highly carinate in the middle, forming longitudinal, rough rows on the back: the scales on the belly smooth.

The *head* broader than the body, sub-tetragonal, a little rounded before; the rostrum short, furrowed, obtuse; crown flat, with a thick, rough, bony covering, or plate, divided by engraved lines into compartments

of divers forms, but chiefly lozenge, and extending into two long, acute, triangular processes, which reach the first dorsal fin. The mouth horizontal, under the rostrum, rather large; lips thickish. Jaws extractile, the under shorter than the upper. The teeth small, numerous, granulous. Tongue short, round, obtuse, smooth, bridled. Palate smooth. Eyes supreme, large, orbicular, protuberant, iris yellow; the superior edge of the orbit sharp, and by rising high on each side makes the crown appear deep channeled. Nostrils double, in a groove before the orbit.

The branchial opercula consist of three squamous laminæ, rough, angular: the first oblong-triangular, margin serrated; the margin of the second lengthened into a long, sharp, serrated process; the third small, ending in a pointed, soft flap. The branchial membrane partly exposed, consisting of six rays, the two lower very small, the others distinct, distant, and united by what might be called a seventh ossicle. The aperture lateral, small.

The *trunk*. The back nearly straight, furrowed, sides convex; abdomen and throat bellied, but sometimes plane; the tail a little angular, compressed.

The branchiæ tuberculate on the inner side. Lateral line not visible.

The *fins*. Two dorsal: the first of five, soft, declining spines; the second of eight simple rays, declining a little also. The pectoral fins expand into wings as long as the body, the first and last rays shortest, giving the wing a rounded appearance: the last rays of the wing gradually shorten, as in the figure. The ventral fins are long, narrow, acuminate; the anal, opposite to the second dorsal, has six assurgent, ramous rays; the caudal slightly falcate.

At the division of the bony processes on the back, there is a single soft ray exceeding an inch in length; between which and the dorsal fin is an oval-form prickle pointing backwards, and another similar between the first and second dorsal fin. On each side of the tail, at nearly equal distances, between the second dorsal and caudal fins, are three remarkable semilunate, serrated squamæ.

The *colour*. The head and back of a dark red, with some round spots of dusky-green; the sides of a lighter red; belly white; dorsal, pectoral, and caudal fins, are spotted also with dark green spots; the ventral and anal light coloured.

*Length*, usually eleven inches; but the subject drawn did not exceed seven.

#### REMARK.

This species of flying fish is not common at Vizagapatam.

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## OPHICEPHALUS.

## GENERIC CHARACTER.

*Caput depressum, squamis variis.* BLOCH. || The head depressed, with scales of an unusual and different shape from those on the body.

## No. CLXII.

OPHICEPHALUS *corpore lanceolato, squamoso, lubrico; linea lateralis infracta; pinnis pectoralibus caudæque rotundatis.*

The OPHICEPHALUS with a lanceolate, squamous, lubricous, body; the lateral line infracted; the pectoral and caudal fin rounded.

*Ophicephalus striatus* Bloch. Part x. p. 117. Tab. 359.

Called by the Natives MUTTAH.

B. v. D. 45. P. 15. V. 6. A.  $\frac{1}{26}$ . G. 14.

The *body* lanceolate, roundish, compressed, squamous, lubricous. The scales on the head very different in shape from those on the body.

The *head* broader than the body, depressed, hardly declivous, covered with remarkably large, bony, angular scales, contiguous, not imbricate; the rostrum naked. The mouth wide, horizontal, rounded; lips thin; jaws extractile, the under somewhat longer. The fore teeth above and below, in several rows, close and small: in the under jaw behind are some larger curve teeth. The tongue short, sharp, smooth, free. On each side of the palate a phalanx of small teeth. The eyes supreme, near the rostrum, small, round, the iris orange, the orbit deep. Nostrils double, round; one close to the orbit, the other on the verge of the rostrum: near the latter a small tubulus, hardly visible in the dead subject. The branchial opercula oblong, squamous, the posterior margin ciliate; the membrane exposed; the aperture arched, lateral and gular.

The *trunk*. The back almost straight, declining very gently towards the tail. The abdomen straight, convex; the sides rounded at the shoulders, more compressed towards the tail. The branchiæ tuberculate, and rough. The lateral line conspicuous, not carinate; slopes gently from the upper edge of the opercula till on a line with the eleventh ray of the dorsal fin, then bends abruptly, and runs straight along the middle of the tail. The anus nearer the head than the caudal fin.

The *fins*. The dorsal, consisting of forty-five ramous rays nearly of equal length till near the end, possesses the whole of the back from the shoulders to within less than an inch of the tail; the pectoral round, of moderate size; the ventral very short; the anal little more than half the length of the dorsal, but similar in shape; the caudal oblong, round.

The *colour* of the head and back very dark, or nearly black; approaching the lateral line it grows a few shades lighter, and, extending over it, forms a row of oblong-conical marks pointing downwards, the interstices

between which are nearly of the same colour with the abdomen and under part of the tail, viz. a dull reddish-white. The fins not so black as the back; the ventral alone are light coloured.

The *length* of the subject described, sixteen inches.

## REMARKS.

The Ophicephalus was not known to Linnæus, nor is it found in Gmelin's edition of the Systema Naturæ. From specimens received from Tranquebar, the new genus was formed by Bloch, from whom I have borrowed the Generic Character.

## No. CLXIII.

OPHICEPHALUS *corpore oblongo, squamis magnis, rotundis, punctatis; linea laterali infracta; pinnis pectoralibus caudæque rotundatis cum acumine.*

The OPHICEPHALUS with an oblong body, large, rounded, dotted scales; the lateral line infracted; the pectoral fins, and the caudal round, with a small point.

*Ophicephalus punctatus* Bloch. Part x. p. 117. Tab. 358.

Called by the Natives SOWARAH.

*B. v. D. 45. P. 17. V. 6. A. 26. C. 14.*

THE *body*. This fish in shape differs from the last. It is rather oblong than lanceolate, rounder at the shoulders, more compressed near the tail, and bends from the anus gently upward to the end of the anal fin. The scales are larger, orbicular, and all, except on the abdomen, marked with a cluster of small black dots on the anterior part. The body, as in the former fish, lubricous.

The *head*. There is little difference in the shape of the head; but the scales on the crown are here only larger than those on the trunk, of the same form, and imbricate. The marginal row of teeth more complete. The tubuli on the edge of the rostrum less conspicuous. The mouth, tongue, palate, eyes, nostrils, and branchial membrane; the branchiæ, lateral line, and position of the anus, as already described in the MUTTAH.

The first lamina of the operculum obtusely angular, the second acuminate.

The *fins*. The dorsal and anal are alike in both fish, except the want of a spine in the latter fin; the pectoral and caudal are pointed as well as round; the ventral more obtuse, and proportionally longer.

The *colour* less dusky, with an obscure tinge of green. A regular row of angular marks, of a colour lighter than that of the back, forms a denticulate border to the lateral line, from its infraction to its end. Beneath these the colour is a yellowish white. The dorsal, anal, and caudal fins, with a greenish cast, are less dusky than the back; the pectoral and ventral of a yellowish dusky white.

The *length*, one foot six inches.

## REMARKS.

This fish was brought in the month of July, in a jar of water, from the lake of Ankapilly, and lived several days. They survive many hours even out of water.



## No. CLXIV.

*OPHICEPHALUS corpore lanceolato, purpurascente; pinnis pectoralibus radiis duodecem, striatis.*  
The OPHICEPHALUS with a lanceolate, purplish body; a pectoral fin of twelve rays, striated transversely.

Called by the Natives KORA MOTTA.

*B. v. D. 36. P. 12. V. 5. A. 23. C. 14.*

THIS fish has only twelve rays in the pectoral fin, and five in the ventral. In most of the other characters it agrees better with the Muttah, No. CLXII. than with the one last described.

In colour it differed from both. The back a cast of dusky purple, the breast bluish, the abdomen dark gray. The dorsal and part of the anal fin of the same colour as the body; the hinder portion of the dorsal a dark orange; the pectoral streaked transversely black and yellow; the points of the caudal rays distinctly separate, and tipped yellow.

The *length* of the subject, six inches.

## REMARKS.

None of this genus were ever caught in the sea or in the river. I found them in the lakes of Ankapilly and Casem Cottah, as also in a tank close to Vizagapatam.

It has been already remarked that, like eels, they may be long preserved alive in fresh water.

## PISCES ABDOMINALES.

FISHES WHOSE VENTRAL FINS ARE SITUATED BEHIND THE PECTORAL FINS,  
OR ON THE ABDOMEN.

### SILURUS.

#### GENERIC CHARACTER.

*Caput nudum, magnum, latum, compressum; os cirris aliquot tentaculatum; rictus et faux ampla; labia crassa; mandibulæ dentatæ; lingua crassa, lævis, brevissima. Oculi parvi. Membrana branchiostega radiis iv.—xvi.*

*Corpus elongatum, compressum, squamis nudum, muco tenace obductum; linea lateralis dorso propinqua; pinnarum pectoralium aut dorsalis radius primus spinosus retro dentatus. GMELIN.*

The head naked, big, broad, compressed. Some cirri at the mouth; the mouth and throat wide; lips thick; the jaws denticulate; the tongue thick, very short, smooth. Eyes small. From four to sixteen rays in the branchial membrane.

The body elongated compressed, without scales; covered with a slimy mucus; the lateral line near the back; the first ray of the dorsal or the pectoral fin, spinous, and serrated behind.

#### No. CLXV.

*SILURUS corpore longo, cultrato; pinna dorsali unica, quinque radiata, radio primo serrato; cirris quatuor; cauda falcata, lobis inequalibus.*

The *SILURUS* with a long knife-form body; a single dorsal fin consisting of five rays, the first serrated; four cirri; a falcate tail with unequal lobes.

Called by the Natives WALLAGOO.

*B.* xix. *D.*  $\frac{1}{5}$ . *P.*  $\frac{1}{16}$ . *V.* 10. *A.* 91. *C.* 19.

**T**HE *body* long, compressed, without scales, adipose, slippery.

The *head* depressed, covered with the common skin, through which the sutures are visible; the rostrum short, rounded. The mouth oblique, large, wide, with hardly any lips. Jaws not extractile, nearly equal; both full of numerous, small, crooked teeth, close, disposed in many ranks; those in the inner ranks largest.

Tongue short, blunt, smooth, white, fixed. Palate and throat set with numerous recurve teeth. Eyes distant from each other, remarkably small, round, protuberant. Nostrils double, small, oval, near the orbit; besides which a small round aperture is found between the roots of the long cirri and the point of the rostrum, on each side.

The branchial opercula two-leaved, semicircular, smooth, the posterior lamina ciliate; the membrane half exposed, the aperture large.

There are four cirri; one from each side of the rostrum, and two from the lower jaw: the former five inches and a half long, the other one inch.

The *trunk*. The back almost straight, convex; the sides roundish, compressed; the breast and abdomen full and rounded, but near the anus flattish; the tail taper, compressed. Branchiæ four-leaved, the denticles conical, a little curve. Lateral line conspicuous, high, at first straight, then bending a little upwards. The anus distant from the tail.

The *fins*. The dorsal solitary, scapular, anterior surface of the first ray scabrous; the pectoral low, broad, acuminate above, first ray slightly serrated; ventral small, short; anal very long, nearly equal; the caudal divided into two very unequal falcate lobes.

The *colour* of the head and back a dark leaden, brighter on the sides; the breast and abdomen a dull white. Fins a little lighter than the back.

*Length* one foot three inches, but I have seen them three feet long.

## REMARKS.

None of this genus are brought to European tables, being excessively rank and oily; they are eaten however by the natives of the lower class.

They are chiefly found in lakes or in large tanks. In the neighbourhood of the Ankapilly lake, the weavers employ the dried jaw bones of the present species, as an instrument for carding the finest sort of cotton. A figure is given of the dried bone.

## No. CLXVI.

*SILURUS pinna dorsalis analisque caudali unitæ; cirris octo; cauda cuspidata.*

The *SILURUS* with the dorsal and anal fins united with the caudal, eight cirri; a sharp pointed tail.

*Platystacus Anguillaris* Bloch. Pl. 373.

Called by the Natives JNGEELEE.

*B.* xiv. *D.*  $\frac{1}{5}$ . *D. e.* *A.* 274. *P.*  $\frac{1}{10}$ . *V.* 14.

THE *body* ensiform, compressed, without scales, lubricous.

The *head* large, long, depressed, as broad as the body, smooth. The mouth, under the round, obtuse, projecting rostrum, horizontal, wide; lips adipose, flabby. Jaws large, rounded, the upper longer than the under. Teeth in several rows, in the anterior part of the jaws small, sub-granulous: in the upper jaw very minute. Tongue very short, retracted, smooth. Palate wide, with teeth in a triangular phalanx: teeth also in the fauces. Eyes small, distant, orbicular. Nostrils single, distant from the orbit, large, linear-oval.

Branchial opercula one-leaved, rounded, bridled beneath; membrane broad, mostly hid; aperture arched.

The cirri of equal length, very short, one from each corner of the mouth; one from each nostril, and four from the chin.

The *trunk*. The back declines very gently towards the tail; the sides compressed, a little convex; the tail taper, flattish. The two exterior branchiæ pectinate, the next two tuberculate, and there is a fifth small leaf, both denticulate and pectinate. Lateral line high, straight. The anus distant from the tail.

The *fins*. There are two dorsal, the first scapular, armed with a serrated spine; the second rising about the middle of the back, runs parallel with the opposite anal, and both are blended with the pointed caudal fin. The pectoral low, lanceolate, and, like the dorsal, armed with a serrated spine; the ventral distant from the head, small, lanceolate.

The *colour*. The head and trunk above the line, blackish, the sides a dull copper, the belly and throat bright lead. From the rostrum to the tail, on both sides, are two whitish lines, and a third from the pectoral fin. The fins are nearly as dark as the back, the ventral excepted, which are lighter and glassy.

The *length* of the subject described seven inches; but one caught in the river measured two feet seven.

### No. CLXVII.

SILURUS *pinna dorsali postica adiposa; cirris sex, quorum duo longissimi; cauda biloba falcata, setacea.*

The SILURUS with an adipose dorsal fin; six cirri, two of which very long; a bilobe falcate, setaceous tail.

Called by the Natives CHINTA JELLAH.

*B.* iv. *D.*  $\frac{1}{8}$ . 0. *P.*  $\frac{1}{9}$ . *V.* 6. *A.* 17. *C.* 18.

The *body* sub-lanceolate, round and slender towards the end of the tail. No scales, but the back rough, and behind the vertex looks as if studded with golden pins.

The *head* sharp, ovate, rough; the rostrum projects over the mouth, which, as well as the lips, jaws, teeth, and palate, agree with the last species. The two longer cirri rise from the sides of the rostrum near the point.

The *trunk*. The back acclivous to the first dorsal fin, between which and the spurious fin almost straight, and then declines rather abruptly to the tail. The lateral line after waving gently till opposite to the anal fin, proceeds straight to the middle of the caudal fin: and a second line rising also from the operculum, bends obliquely to its termination at the ventral fin.

The *fins*. The first dorsal armed with a strong spine, a little curve, rough, serrated; the rays slightly falcate: the second stands on the declivity where the tail grows roundish; the pectoral is armed like the dorsal and of a like shape; the ventral fin very small; the caudal falcate and setaceous.

The *colour* on the upper parts a dull leaden: the breast and belly whitish.

The *length* four inches eight lines.

## No. CLXVIII.

SILURUS *pinna dorsali unica, longissima; cirris octo. Cauda rotunda.*

The SILURUS with a single, very long, dorsal fin; eight cirri; and a round tail.

*Silurus Anguillaris, Linn. S. N. p. 502.*

Called by the Natives MARPOO.

*B. ix. D. 69. P.  $\frac{1}{9}$ . V. 6. A. 50. C. 18.*

THE *body* oblong, somewhat roundish, without scales, adipose.

The *head* large, as broad as the body, depressed, grooved, covered with a roughish skin, through which the divisions of the cranium are visible. The rostrum short, rounded at the margin, projecting a little over the mouth. The mouth transverse, large; lips thin. The lower jaw shorter than the upper; both set with several rows of small, curve teeth. Tongue short, retracted, smooth, but the palate rough. Eyes small, nostrils double, distant from each other, and nearer the rostrum than the orbit. Branchial opercula one-leaved; the membrane partly hidden, aperture gular. The cirri eight in number: two larger and shorter than the others, from the upper lip; one from each posterior nostril, and four from the lower jaw.

The *trunk* rounded about the shoulders, grows more and more compressed towards the tail. The branchiæ denticulate. Lateral line high, straight, hardly slanting. The anus distant from the tail.

The *fins*. The solitary dorsal rises near the shoulder, is slightly assurgent, and continued to within half an inch of the caudal fin; the pectoral armed with a strong serrated spine; the ventral near the anus, shorter than the pectoral, acuminate in the middle; the anal shorter than the dorsal, but corresponds in shape; the caudal fin distinct, orbicular.

The *colour*. The upper part of the head and back nearly black, the sides, under the line, from a dusky purplish changes to a dull white, the colour of the abdomen and breast.

*Length* of the subject ten inches.

## REMARKS.

I caught this fish when angling in a tank at Tartoor, and with some surprise recognised an old Aleppo acquaintance. I never met with the species at Vizagapatam.

## No. CLXIX.

SILURUS *pinna dorsali postica adiposa ; cirris sex ; cauda falcata, lobis inequalibus.*

The SILURUS with a hinder adipose, dorsal fin ; six cirri ; a falcate tail, with unequal lobes.

Called by the Natives DEDDI JELLAH.

*B.* iv. *D.*  $\frac{1}{8}$ . 0. *P.*  $\frac{1}{12}$ . *V.* 6. *A.* 16. *C.* 20.

THE *body* oblong, roundish, compressed, lessening and rounding towards the tail ; without scales, adipose, lubricous.

The *head*, large, broad, depressed ; the crown rough ; the rostrum obtuse, projecting over the mouth. The mouth, lips, jaws, teeth, and palate, as before described in No. CLXVI. The tongue fleshy, thick, obtuse, smooth, fixed. The eyes oval, large ; the nostrils also large, and between them is a small mucous aperture. The branchial membrane has four rays. There is a cirrus at the corner of the mouth on each side, and four shorter from the lower jaw. The lateral line at first bends downward, but from above the ventral fin runs straight to the tail : a second line rising under it, (as in No. CLXVII.) forms an inverted arch, which terminates at the anal, not the ventral, fin. The anus nearer the tail than the head.

The *fins*. The first dorsal armed with a strong spine, serrated on both sides ; the ramous rays acuminate above ; the spurious adipose fin distant, opposite to the anal. The pectoral very low, armed also with a strong, serrated spine ; the ventral remote, short ; the rays of the anal declining from its rise ; the caudal fin falcate, the upper lobe considerably longer than the under.

The *colour* a darkish leaden on the upper part of the head and back ; the parts below lighter ; the breast and belly white, not splendent.

				Inches.	Lines.
The <i>length</i> , from the rostrum to the caudal fin	-	-	-	8	8
caudal fin	-	-	-	2	6

## REMARKS.

This species is abundant at Vizagapatam, but eaten only by the lower class. It rarely exceeds one foot in length. The double lateral line in this and in No. CLXVII. is remarkable.

## No. CLXX.

SILURUS *pinna dorsali postica adiposa*; *cirris sex*; *cauda sub-lunata*.

The SILURUS with an adipose hinder dorsal fin; six cirri; and a sub-lunated tail.

Called by the Natives NALLA JELLAH.

*B.* iv. *D.*  $\frac{1}{8}$ . 0. *P.*  $\frac{1}{10}$ . *V.* 6. *A.* 29. *C.* 19.

THE *body* oblong-ovate, roundish, compressed, adipose.

The *head* broad, depressed; the jaws equal, mouth small; teeth, tongue, and palate, as in the last. The eyes smaller; the nostrils contiguous, close to the point of the rostrum, the anterior very small; the opercula so close, that the branchial membrane cannot easily be got at. A cirrus two inches and a half long, from each side of the nose; and four, less than half that length, from the under jaw. The lateral line oblique, not conspicuous; the branchiæ, and anus, as in the last.

The *fins* in their situation and shape as described in the last, only that the caudal is here sub-lunate.

The *colour* of the head and back a bluish leaden, the belly, throat, and hinder part of the tail, a dull white. The whole trunk strewed with small, obscure, dusky dots. The dorsal, ventral, and anal fins have blackish margins; the pectoral and caudal glossy, with a faint yellowish cast.

*Length* of the subject, nine inches.

## No. CLXXI.

SILURUS *cirris carens*; *pinna dorsali postica adiposa*; *cauda trifida*; *pinnis inermibus*; *ventrales longissimæ*.

The SILURUS without cirri; the hinder dorsal fin adipose; a trifid tail; the fins without spines, and the ventral fins very long.

Called by the Natives WANA MOTTA.

*B.* xxiv. *D.* 12. 0. *P.* 10. *V.* 9. *A.* 15. *C.* 17.

THE *body* sub-lanceolate, roundish, compressed, without scales, soft, adipose, white, pellucid.

The *head* small, long, declivous, compressed, obtuse, the front depressed, scabrous. The mouth low, transverse, large, wide, no lips. The jaws long, narrow, the upper emarginate, fixed; the inferior somewhat longer, boat-shape, moves in a wide range: both are full of teeth. The teeth dissimilar, some of the front and the marginal (particularly below) larger, conical, recurve; the others linear, crowded, or in many rows. Tongue very small, short, denticulate, immoveable. The palate narrow, denticulate. Eyes remarkably close to the rostrum, in a deep, long orbit, very small, orbicular. Nostrils double, near each other, the first smallest, round, the posterior oval. The branchial opercula consist of a single soft lamina, open below; the membrane exposed; the aperture wide, lateral, and gular.

The *trunk*. The back from the shoulders to the spurious fin slightly arched, it then rises a little towards the caudal fin, the tail becoming much broader near the fin; the breast and abdomen almost straight, convex; the sides compressed but roundish. The branchiæ have acerose denticles. Lateral line high, nearly straight, slightly raised. The anus remote.

The *fins*. The dorsal consists of twelve soft descending rays, the first two inches long, the last half an inch; the adipose fin, distant, very small; the pectoral remarkably high, sub-falcate, setaceous, the longest ray two inches three lines; the ventral opposite to the dorsal, setaceous, the first ray two inches eight lines long; the anal opposite to the adipose fin, of the same shape as the dorsal, the first ray about one inch in length; the caudal fin is of a singular form, being divided into three lobes, setaceous at the point: each of the lateral lobes consists of seven or eight rays, not including the small accessory rays on the sides; the middle lobe a pyramidal shape ending in a setaceous thread, and pinnated on the sides, but not more than three or four rays can be distinctly counted; it is a little longer than the lateral lobes, and measures one inch and a half.

The *colour* a yellowish-white sprinkled with minute blackish dots, especially behind the anal fin. The fins are of the same colour with the body, but not dotted.

*Length*, nine inches.

#### REMARKS.

This fish is found only in the sea, and not common at Vizagapatam.

It is flabby, oily, and grows rancid remarkably soon.

## SALMO.

#### GENERIC CHARACTER.

*Caput læve. Dentes in maxillis, lingua.*  
*Membrana branchiostega radiis iv.—x.*  
*Pinna dorsalis postica adiposa; pinnae*  
*ventrales multiradiatæ.*

The head smooth; teeth in the jaws and in the tongue. The branchial membrane from iv. to x. rays. The hinder dorsal fin adipose; the ventral fins composed of many rays.

#### No. CLXXII.

*SALMO capite elongato; maxillis inequalibus, dentibus numerosissimis extrà exasperatis; linea laterali loricata.*

The SALMO with an elongated head; jaws of unequal length, armed on the outside with numerous teeth; the lateral line loricated.

Called by the Natives BADI MOTTAN.

*B. xii. D. 12. P. 14. V. 9. A. 11. C. 18.*

The *body* lanceolate, compressed, roundish, squamous. Scales large, rounded, at the base truncate, imbricate, loose.

The *head* small, depressed, sub-compressed on the sides, upper part squamous. The mouth very large, nearly horizontal; without lips. The jaws long, straight, the under a little shorter than the upper; both



furnished externally with innumerable teeth, besides an interior row of small crooked teeth, Tongue short, blunt, awl-shape, denticulate, hardly moveable. The palate narrow, set with many teeth. The eyes supreme, near the rostrum, moderate size, orbicular, prominent. Nostrils double. The branchial opercula rounded, without scales; the membrane half concealed, the aperture wide.

The *trunk*. The back slightly arched, roundish; sides convex. Abdomen a little prominent, flattish; tail small, roundish. The branchiæ denticulate. Lateral line high, straight, loricata. The anus remote.

The *fins*. The dorsal consists of twelve declining rays, and is opposite to the ventral. The pectoral middle, short; the ventral of the same shape with the dorsal, but the rays shorter; the anal fin remote, opposite to the adipose dorsal, and much smaller than the ventral; the caudal bifid.

The *colour* a dusky yellowish; the breast and abdomen a dull white. The ventral and anal fins whitish; the others a little lighter than the trunk.

The *length* of the subject eight inches; I saw none that exceeded ten.

#### REMARKS.

Though the body, like that of the Smelt, is transparent, and in appearance when boiled resembles the Indian Whiting No. CXIII.; it is a very dry and insipid fish.

This was the only species of Salmon I met with in India; but I find another in Bloch, which he received from Tranquebar, and describes under the name Salmo Tumbil. Part X. p. 100. Tab. 430.

## FISTULARIA.

## GENERIC CHARACTER.

*Caput: rostrum cylindricum, apice maxillo-*  
*sum. Membrana branchiostega radiis vii.*

The rostrum cylindrical, with maxillæ at  
the apex; the branchial membrane con-  
sists of seven rays.

## No. CLXXIII.

FISTULARIA *cauda bifida, in setam longam terminante; pinna dorsali remotissima.*

The FISTULARIA with a bifid tail, terminating in a long seta; the dorsal fin very distant from the head.

*Fistularia tabacaria* Linn. *S. N.* p. 515.

Called by the Natives GOORUM.

*B. v. D. 14. P. 15. V. 6. A. 13. G. 16.*

The *head* naked, depressed, and channelled above, a little compressed on the sides, and projecting into a long tubular rostrum, at the extremity of which is placed the mouth. The rostrum two inches and a half long, not quite round, but striated or grooved above and below, and armed on the sides, two-thirds of its length, with a row of small prickles bent forwards. The extremities of this rostrum form the jaws; the under longer than the upper, both tuberculate at the points, and furnished with minute retroflex teeth, not close, but regular. The mouth transverse, narrow, yet by the free motion of the lower jaw it can enlarge itself considerably. The tongue small, fixed, and, as well as the palate, feels rough to the finger. Eyes supreme, large, oval, prominent; the edges of the orbit striate, angular. Nostrils double, nearly of equal size, the posterior on the edge, the anterior within a small furrow, surrounded with minute prickles. The branchial operculum one oblong lamina; the branchial membrane half covered; the aperture gular and long.

The *trunk*. The back depressed, almost straight to the dorsal fin, from which it is carinate; the abdomen and breast flat; the hinder part of the trunk somewhat angular. The branchiæ four-leaved, tuberculate. The lateral line middle, straight, carinate towards the end. The anus remote.

The *fins*. The dorsal single, remarkably remote, low, assurgent; pectoral low, pointed above; the ventral very small, much nearer the head than the tail; the anal opposite to the dorsal, and nearly of the same shape and size; the caudal bifid, with a setaceous tail, three inches long.

The *colour* omitted to be set down when the fish was recent.

	Inches.	Lines.
The <i>length</i> of the subject described, from the point of the rostrum to the division of the caudal fin	9	0
From the point of the rostrum to the eyes	2	7
hind head to the dorsal fin	3	2
pectoral to the anal fin	2	8
dorsal fin to the caudal	1	0

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## ESOX.

## GENERIC CHARACTER.

*Caput supra planiusculum: mandibula superiore plana, brevior: inferiore punctata. Dentes in maxillis, lingua. Membrana branchiostega radiis vii—xii. Corpus elongatum.*

The head flattish above; the upper mandible plane, shorter: the lower dotted. Teeth in the jaws and tongue. The branchial membrane of vii. to xii. rays. The body elongate.

## No. CLXXIV.

*Esox maxilla inferiore longiore, oblique truncata; pinna prima dorsali spinosa, quinque radiata; cauda falcata.*

The Esox with the lower jaw longer than the upper, and obliquely truncate; the first dorsal fin with five spinous rays: the tail falcate.

*Esox sphyraena* Linn. *S. N.* p. 515.

Called by the Natives JELLOW.

*B.* vii. *D.*  $\frac{5}{5}$ . 10. *P.* 14. *V.* 6. *A.* 9. *C.* 20.

THE *body* long, straight, roundish, covered with scales proportionally small.

The *head* long, conical, somewhat angular, with a long projecting rostrum; the crown and front depressed, not smooth like the rest, and the rostrum has a ridge on each side. The mouth very large, a little oblique; the lips thin. The jaws projecting, of unequal length; the upper shorter than the under, which is obliquely truncate; both set with crooked teeth, not crowded, of dissimilar size, and one remarkably large in front of the under jaw. The tongue and palate denticulate. Eyes high, large, oval; nostrils at the root of the rostrum. The opercula large, rounded, both laminae squamous, the posterior terminates in two pointed flaps. The branchial membrane partly exposed; the aperture wide.

The *trunk*. The back and abdomen straight; the sides convex; the tail from the rise of the anal fin, somewhat taper and compressed. The lateral line rising high, descends sloping to the middle of the trunk, then straight and middle. The anus remote.

The *fins*. The first dorsal nearly scapular, has five declining spinous rays, in a groove, the second distant, lumbar, somewhat falcate, has ten ramous rays; the pectoral middle, short, acuminate; the ventral as long as the pectoral, but broader, and not pointed; the anal exactly like the second dorsal; the caudal falcate.

The *colour*. The upper part of the head, and the trunk above the lateral line, a darkish changeable green; the sides light-colour; the lower part of the head, the throat, and abdomen, a dull, not splendid, white. Near the lateral line, the dark colour (but less changeable than on the back) is continued a little across the line, forming a border indented with the light colour of the sides; the dorsal, pectoral, anal, and caudal fins, are of a greenish yellow; the ventral white.

The *length*. The subject described measured two feet two inches; but in the month of September, one was caught of four feet eight.

## REMARK.

It sometimes appears at the English tables, but is not esteemed.

## No. CLXXV.

*Esox maxillis longissimis, sub-equalibus, denticulatis; cauda sublunata.*

The Esox with very long maxillæ, nearly of equal length, and denticulated; a sublunate tail.

*Esox Belone Linn. S. N. p. 517?*

Called by the Natives WAHLAH KUDDERA.

*B. xii. D. 23. P. 15. V. 6. A. 21. C. 20.*

The *body* long, straight, roundish, but somewhat quadrate; covered (on the belly particularly) with very small scales, smooth, angular-form, tenacious.

The *head* small, without scales, depressed above, striate and smooth, compressed on the sides, with a straight projecting rostrum, four inches in length, bony, round, sharp-pointed, constituting the two maxillæ, of which the under is a little longer than the upper; both furnished with a row of straight awl-form teeth, unequal in size, sometimes diverging, distant from each other, the interstices filled up by thickset, minute teeth, in several rows. The mouth opens widely; the tongue oblong-ovate, small, a little round, and not quite fixed. Palate narrow, smooth. The eyes large, oval, near the angle of the mouth; the nostrils in a groove, on a line with the upper edge of the orbit; the posterior oval, the other round; both small. The branchial opercula large, rounded; the first lamina squamous, the second without scales, acuminate. The membrane exposed, the aperture large.

The *trunk*. The back and abdomen almost straight, till where the tail begins to taper at the anal fin; the sides convex, the belly below, rather flat; the tail tapers more than the last. The exterior branchiæ denticulate, the others tuberculate. The lateral line supreme, straight, a little raised towards the end. Another line of very small tubercles runs parallel to it, from below the edge of the pectoral fin to the tail. The anus remote.

The *fins*. The dorsal solitary, very near the tail, consists of twenty-three ramous rays, the first ten declining, sub-falcate, the others short, assurgent. The pectoral fin middle, short, rounded above, assurgent to the eighth ray; the ventral ramous, remote, slightly falcate; the anal in shape exactly like the dorsal, to which it is opposite, but shorter; the caudal bilobed, somewhat lunate, the upper lobe shortest.

The *colour* of the upper part of the head greenish, the cheeks and throat smooth, splendent, silvery. The back changeable, dark green and light blue; the sides light, silvery; the belly white: the dorsal, pectoral, and caudal fins have a greenish tinge, the others a yellowish-white.

	Feet.	Inches.	Lines.
<i>Length</i> of the subject described, from the point of the under jaw to the caudal fin	1	11	6
to the eye	0	4	7
flap of the operculum	0	6	5
ventral fins	1	0	7
of dorsal fin	0	4	7
anal fin	0	4	5
lower lobe of caudal fin	0	2	4

## REMARKS.

This, like the former, is an indifferent fish for the table. The bones are green.

## No. CLXXVI.

*Esox maxillis longissimis, dentatis; corpore alepidoto; cauda rotundata.*

The *Esox* with very long maxillæ set with teeth; the body without scales; the tail rounded.

Called by the Natives KUDDERA. A.

*B.* vii. *D.* 13. *P.* 9. *V.* 6. *A.* 16. *C.* 16.

THIS species in the shape of the body and head, and the structure of the mouth and jaws, agrees with the last described: they differ in the following respects. The cheeks are squamous; the body without scales, transparent; the branchial membrane has only seven rays; and the caudal fin is round, with a small black spot towards the root. The situation of the other fins, the lateral line, and the second line near the belly, are as described in the last; but the dorsal and anal fins are broader and shorter.

The *colour* whitish, clear, transparent. Along the back near the ridge, are three black lines, from the opercula to the dorsal fin. The fins are glassy more or less light colour; the tail yellowish-green, with a black spot, as already mentioned.

<i>Length</i> from the point of the lower jaw to the caudal fin	Inches.	Lines.
	10	6
to the dorsal fin - - - - -	8	3
of dorsal fin - - - - -	1	0
of anal - - - - -	2	8
of caudal - - - - -	1	2

## No. CLXXVII.

*Esox maxilla inferiore tereti, cuspidata, longissima; superiore brevissima; cauda biloba.*

The *Esox* with a very short upper jaw, but the under jaw extremely long, round, sharp pointed; the tail unequally bifid.

*Esox Brasiliensis Linn. S. N. p. 517.*

Called by the Natives KUDDERA. B.

*B.* xii. *D.* 13. *P.* 12. *V.* 6. *A.* 12. *C.* 19.

THE *body* long, roundish, compressed, somewhat quadrate; covered with large, smooth, tenacious scales.

The *head* not so broad as the body, without scales, compressed on the sides, plane above. The mouth roundish, horizontal; no lips. The upper jaw short, under the rostrum: the under is extended into a long bony sword-form process, depressed above, grooved both above and below. The teeth in both jaws small, linear, close, without order. Tongue oblong, obtuse, smooth, loose. The palate smooth also, but the fauces rough. Eyes high, middle size, round, iris silvery. The opercula without scales.

The *trunk*. The lateral line supreme, straight, declining very gently; the other ventral line conspicuous, as in the two former, but bends more downwards, and the belly being more convex, is consequently less parallel to the lateral line. The anus, as in the others, remote.

The *fins*. The dorsal and anal fins as in the last species, but the ventral situated nearer the tail. The pectoral high, straight, acuminate above. The caudal fin differs from the last, being bilobed, or divided unequally: the lower lobe much the longest.

The *colour*. The crown and back changeable; the opercula, sides, and abdomen, silvery; the ventral and anal fins glassy-white; the others bluish, paler than the back.

*Length* of the subject described, from the upper jaw to the caudal fin, nine inches four lines.

### No. CLXXVIII.

*ESOX maxilla superiore brevi; inferiore longissima, subulata; corpore lineare; squamis variis; cauda biloba.*

The *Esox* with a short upper jaw; the under, awl-form and extremely long; the body linear, covered with scales of diverse shapes; the tail unequally bifid.

Called by the Natives KUDDERA. C.

*B.* xiii. *D.* 21. *P.* 9. *V.* 6. *A.* 18. *C.* 18.

THIS species, in the structure of the mouth and lower jaw, agrees with the last, but in the shape of the trunk, approaches nearer No. CLXXVI.; it differs however from all I have hitherto found described.

The *body* linear, compressed, squamous; scales imbricate, loose, but singularly varying in shape; some almost square, others oval or angular.

The *head* depressed, compressed, smooth, without scales, except on the crown; the front deeply grooved in the middle. The mouth as in the last species; the upper jaw short, the denticulate part of the under corresponding; but then it projects into a taper, sharp-pointed, bony, awl-shape process, three inches three lines in length. Teeth numerous, linear. Tongue roundish, small, cartilaginous, smooth, bridled; the palate rough. The eyes supreme, round, larger than in the last. The nostrils double, in a pit near the orbit. The opercula also, as in the last, without scales.

The *trunk*. The back straight, roundish, carinate; the sides compressed, the breast and abdomen attenuate, carinate, and straight to the anal fin, where the tail becomes narrower by the lower part slanting towards the caudal fin, for the upper edge hardly declines. The lateral line high, straight, parallel to the back. The lower line near the belly, found in the three preceding species, is here wanting; but the anus, as in the others, remote.

The *fins*. The dorsal and anal are situated as in No. CLXXVI.; the pectoral middle, remarkably long, acuminate above, point setacious; the ventral remote, extremely small; the caudal bilobate as in the last species, the upper lobe very short.

The *colour*. The upper part of the head and back a dark blue, brightening on the sides to a bright leaden. The colour of the fins was accidentally omitted.

	Inches.	Lines.
<i>Length</i> of the subject described, from the upper jaw to the caudal fin	10	6
to the dorsal fin	7	0
ventral fin	6	3
point of the maxillary process	3	5
of the lower lobe of the tail	1	9

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## ELOPS.

## GENERIC CHARACTER.

*Caput læve. Dentium scabrities in maxillarum margine, palato. Membrana branchiostega radiis xxx.: præterea exterius in medio armata dentibus quinque.*

The head smooth. The margin of the jaws, and the palate rough with small teeth. Thirty rays in the branchial membrane: armed in the middle externally with five teeth.

## No. CLXXIX.

*Elops cauda bilobata; squama lanceolata horizontale ante pinnam caudalem, supra et infra.*

The ELOPS with a tail unequally divided; a lanceolate, horizontal scale on each edge of the caudal fin.

*Elops saurus* Linn. *S. N.* p. 518.

Called by the Natives JINAGOW.

*B.* xxx. *D.*  $\frac{2}{22}$ . *P.* 17. *V.* 14. *A.*  $\frac{2}{14}$ . *C.* 28.

The *head* large, ovate, compressed, without scales, splendent; the front gently declivous, with a broad, smooth furrow, striated on the edges from the crown to the nose. The mouth wide, a little oblique, or arched, hardly any lips. The jaws nearly of equal length, long, extractile; the under carinate; the upper has an oblong, rounded, flat process, reverted towards the opercula: both are scabrous externally. Teeth marginal, small, not close, except in the forepart of the lower jaw. Tongue lanceolate, above convex, rough, free. Two denticulate bones on each side of the palate. Eyes supreme, advanced, large, round, and being covered with the transparent skin of the head, look as if enclosed in glass. The nostrils distant from the orbit, double, unequal, contiguous, small, oval. Branchial opercula large, rounded, without scales, splendent; great part of the membrane displayed; the aperture wide, lateral and gular.

The *trunk*. The back very gently arched, a little rounded; the breast and abdomen almost straight, plane; the sides and tail compressed. The denticles of the anterior branchiæ very long. Lateral line bends gently from the upper edge of the opercula, but soon becomes middle and straight. The anus behind the middle.

The *fins*. The dorsal, nearly in the middle, falcate, consisting of six or seven assurgent rays, and fourteen or fifteen declining. The first two or three are spinous, but lie close on each other. The pectoral very low, acuminate at top; the ventral opposite to the dorsal, rather shorter than the pectoral, consisting of fourteen rays, of which the first is longest; the anal very remote, in shape like the dorsal, but much smaller; the caudal fin bifid, the upper lobe longest. At the origin of the caudal fin, on each side, is a large, bony, lanceolate scale.

The *colour*. The upper part of the head and back a darkish blue; the abdomen pearl-white. The dorsal and caudal fins, somewhat less dark than the back; the pectoral of the same colour, but black at the points; the ventral and anal light, with a faint yellowish tinge.

*Length* of the subject, one foot eight inches.

It sometimes appears at the English tables, but is not esteemed.

REMARKS.

The spinous rays of the dorsal and anal fins lie close on each other, and their points sometimes not piercing the skin (particularly those of the anal fin), may easily pass unnoticed.

MUGIL.

GENERIC CHARACTER.

*Labia membranacea: inferius introrsum carinatum. Dentes nulli. Denticulus inflexus supra sinus oris. Membrana branchiostega radiis vii. curvis; opercula laevia, rotundata. Corpus albicans.*

The lips membranous; the lower lip carinated inwardly; no teeth; a small inflected tooth above the opening of the mouth. The branchial membrane has vii. curve rays. The opercula smooth, rounded. The body inclining to white.

No. CLXXX.

MUGIL *pinna prima dorsali radiis quatuor; cauda lunata.*

The MUGIL with a first dorsal fin of four rays; and a lunated tail.

*Mugil Cephalus Linn. S. N. p. 520.*

Called by the Natives BONTAH.

*B. vi. D.  $\frac{4}{4}$ . 10. P. 17. V.  $\frac{1}{6}$ . A.  $\frac{1}{11}$ . C. 18.*

THE *body* oblong, somewhat compressed, smooth, squamous; scales large, ciliate, imbricate, close.

The *head* roundish, compressed, blunt; the crown and front depressed, squamous, smooth; the rest without scales; the rostrum short, obtuse, smooth, projects over the mouth. The mouth very small, with hardly any lips; without teeth. The jaws short, extractile, the under has a carina internally, which is received into a groove in the upper. The tongue thick, fleshy, smooth, fixed. The palate rough. The eyes high, advanced, large, orbicular, prominent. Nostrils double, not contiguous, and situated above a striated lamina, in front of the orbit. Branchial opercula bony, smooth, without scales; the membrane half concealed; the aperture small.

The *trunk*. The back nearly straight, convex; the sides also convex; the abdomen a little arched, not prominent; the tail continues broad and not much rounded; the branchiæ pectinate; the lateral line scarcely discernible, nearly straight; the anus very remote.



The *fins*. The first dorsal, in the middle of the back, consists of four pretty long, curve, spinous rays; the second, of ten declining ramous rays, is situated an inch and six lines nearer the tail; the pectoral high, broad, acuminate above; the ventral middle between the pectoral and first dorsal, has one spinous ray; the anal opposite, and in shape exactly like the second dorsal, has one spine also; the caudal fin large, broad, lunate.

The *colour* of the crown and back changeable green and blue, the rest a shining white. On each side are five or six dusky filets, running from the opercula to the caudal fin.

*Length*, one foot and a half.

## REMARKS.

This fish, though very common in India, is much esteemed; being in quality greatly superior to the Gray Mullet in England. They are sometimes considerably larger than the subject now described.

## No. CLXXXI.

MUGIL *squama lanceolata ad pinnas pectorales et ventrales; pinna anali aculeis tribus; cauda sub-lunata.*

The MUGIL with a lanceolate scale at the pectoral and ventral fins; three spines in the anal fin; the tail sub-lunate.

Called by the Natives KUNNESEE.

*B. v. D.*  $\frac{4}{4}$ . 9. *P.* 14. *V.*  $\frac{1}{6}$ . *A.*  $\frac{3}{12}$ . *C.* 18.

The *body* oblong, thickish, compressed, squamous, smooth. Scales sub-orbicular, truncate at the base, not tenacious.

The *head* ovate, roundish, compressed; the crown and front depressed; the nose short, soft, obtuse, but does not project so far over the mouth as in the last fish; the crown and cheeks squamous. The mouth small, without teeth; lips simple. Jaws short, extractile; the under somewhat shorter than the upper; the former carinate, and the latter grooved as in the Mullet. Tongue thickish, smooth, fixed. Palate tuberculate. The eyes high, advanced, large, orbicular. Nostrils high, double, the posterior oval. The branchial opercula rounded, bony, without scales, smooth; the membrane covered; aperture arched.

The *trunk*. The back straight to the second dorsal fin, it then declines more sensibly than in the Mullet; the breast and abdomen convex; the exterior branchiæ pectinate; no lateral line visible. Anus remote.

The *fins*. The dorsal fins as in the Mullet, but the posterior more falcate; the pectoral middle, acuminate; the ventral decline from the second ray; the anal longer than the dorsal, exactly opposite, sub-falcate; the caudal sub-lunate.

The *colour* of the head and back, grayish; the face, sides, belly, and throat, white; the dorsal and caudal fins a dark gray; the others whitish.

## REMARKS.

This fish, at first sight, is easily mistaken for a young Mullet; in what it will be found to differ may be comprised in the few following distinctions. The nose is less prominent; the cheeks are squamous; the branchial membrane has five ossicles; the lanceolate squamæ at the pectoral and ventral fins, and the three spines in the anal fin, are wanting in the Mullet.

## No. CLXXXII.

*MUGIL spinis analibus nullis; capite toto squamoso; squamis magnis ciliatis; cauda lunata.*

The MUGIL without spines in the anal fin; the head intirely squamous; scales very large and ciliate; the tail lunate.

Called by the Natives PEDDARAKI SOVERE.

*B. v. D.*  $\frac{4}{4}$ . 9. *P.* 19. *V.*  $\frac{1}{6}$ . *A.* 12. *C.* 18.

THIS fish differs from the Mullet in the shape of the body, as well as from the Kunnesee, while it agrees with both in many of the principal characters. The scales every where sub-ovate, ciliate, remarkably large, tenacious.

The *head* is less of an ovate shape, and, as well as the opercula, covered with scales. The upper lip is thickish, and the tongue roughish; but the mouth, jaws, palate, nostrils, branchial opercula, membrane, and aperture, are exactly as described in the last species. The eyes are of the same form, though placed lower.

The *trunk*. The back is more assurgent and arched, and the abdomen a little more prominent, than in the last; the sides and tail convex, compressed. The denticles of the branchiæ short and soft. The lateral line can scarcely be traced. The anus remote.

The *fins*. The first dorsal, of four spinous rays, is in the middle of the back where it begins to decline towards the tail, and of the same shape as in the last, but not so high; the second dorsal is much more falcate, and the two first rays longer, more setaceous; the pectoral fin middle, and also more falcate; the ventral as in the last, opposite to the dorsal, but the lanceolate squamæ are entirely wanting; the anal, in shape like the second dorsal, has no spinous rays; the caudal large, and lunate.

The *colour* nearly that of the Mullet; and a few darkish fillets are visible also on the sides, though less conspicuous.

*Length* of the subject described, two feet.

## REMARKS.

In this and the preceding species, as well as in the Mullet, the continuation of the membrane of the dorsal fin, gives the idea in the drawing of a fifth ray; nevertheless, all my memoranda concur in the number four spinous rays.

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## POLYNEMUS.

## GENERIC CHARACTER.

*Caput compressum undique squamosum: rostro obtusissimo, prominente. Membrana branchiostega radiis vii. seu v. Corpus digitis liberis ad pinnas pectorales.*

The head compressed, and all over squamous: the rostrum prominent, and very obtuse. Seven or five rays in the branchial membrane; free digiti at the pectoral fins.

## No. CLXXXIII.

POLYNEMUS *digitis quatuor brevioribus; pinna caudali bifida, sub-falcata, squamosa.*

The POLYNEMUS with four shorter digiti; a bifid caudal fin, slightly falcate and covered with scales.

Called by the Natives MAGA JELLEE.

*B.* vii. *D.*  $\frac{8}{8}$ .  $\frac{1}{15}$ . *P.* 17. *V.*  $\frac{1}{6}$ . *A.*  $\frac{1}{17}$ . *C.* 22?

The *body* oblong, thick, compressed, squamous, a little rough to the finger; scales middle size, orbicular, ciliate, not tenacious.

The *head* large, gently declivous, squamous excepting the nose, compressed, the front flattish, rostrum obtuse, projecting. Mouth under the rostrum, transverse, rather wide, no lips. The jaws extractile, the under shortest, both rough like a file externally and internally, but no large teeth. Tongue oblong, point round, smooth, the rest scabrous. The palate smooth in the middle, rough on the sides. Eyes advanced, nearly middle, large, round. Nostrils double, nearer the rostrum than the orbit. The opercula rounded, squamous, margins ciliate; the membrane covered; the aperture lateral and gular.

The *trunk*. The back arched, convex; the breast and abdomen straight, plane; the sides and tail compressed, the latter somewhat carinate. The exterior branchiæ pectinate, the others rough, like the maxillæ. The lateral line, from the edge of the opercula declines very gradually, afterwards middle and straight. The anus nearly middle.

The *fins*. There are two dorsal: the first scapular, of eight spinous rays, the first ray very short, the others extend above the membrane; the second fin in the middle of the back, has one spinous ray, and sixteen ramous in a crescent form; the pectoral extremely low, broad, acuminate above; the ventral contiguous, shorter than the pectoral; the anal exactly like the second dorsal, but rises a little nearer the tail; the caudal very squamous to the edge, rendering it difficult to count the rays, deeply divided, the lobes thick and slightly falcate towards the points. The longest of the four digiti, about two inches two lines; all are of a whitish colour.

The *colour* of the head above, and of the back, a dusky blue; the parts below the eyes and the lateral line, gray; the lips reddish; and there is a yellow, lunate spot behind the orbit. The dorsal and caudal fins dusky, not black; the other fins glossy, light colour.

*Length* of the subject described, one foot eight inches.

## No. CLXXXIV.

POLYNEMUS *cauda longissima, falcata, lobis squamosis, setiferis; opercula serrato; digitis quinque, primo prope anum extenso, ceteris gradatim decrescentibus.*

The POLYNEMUS with a very long, falcate, tail, the lobes squamous, setiferous; a serrated operculum; five digiti, of which the longest reaches nearly to the anus, the others gradually decreasing in length.

Called by the Natives MAGA BOOSHEE.

*B.* vii. *D.*  $\frac{8}{8}$ .  $\frac{1}{15}$ . *P.* 17. *V.*  $\frac{1}{6}$ . *A.*  $\frac{2}{2}$ .  $\frac{1}{14}$ . *C.* 20.

THE *body* of this species differs in shape from the former. It is narrower at the waist or middle; the back rises towards the second dorsal fin, as the abdomen does towards the anal, and both fins are situated nearly opposite, where the body narrows towards the tail, which is more attenuated and rounder than in the last fish. The roots of both fins are covered with scales, and the caudal fin completely squamous.

The *head* is rather longer, narrower, intirely squamous; the rostrum obtuse, but smaller, and more prominent; the mouth, jaws, tongue, palate, eyes, and nostrils, as described in the last. The branchial opercula two-leaved; the first angular, serrated; the posterior oval, smooth: both are squamous; the membrane apparent; the aperture large.

The *trunk*. The abdomen straight but convex, the tail smaller than in the former. The first half of the lateral line more declivous, the after part straight. The anus nearly middle.

The *fins*. The first dorsal consists of one short spine and seven declining spinous rays: the points of which extend above the membrane; the second dorsal is more distant from the first, but of the crescent-form; the pectoral low, acuminate above; the ventral as in the former; between the anus and anal fin, there are two small spines connected by a membrane; the anal commences opposite to the middle of the dorsal, its spinous ray lying close on the ray next it; the caudal deeply divided, falcate, each lobe terminating in a setaceous thread an inch and a half in length; the body of the fin, as already mentioned, intirely covered with small scales. The length of the longest digitus at the pectoral fin, measured above four inches.

The *colour* of the head and back, a dusky blue, or lead; the sides and belly light gray, and as if sprinkled with black sand. The lips and rostrum reddish; the digiti, which in the last species were whitish, are here orange. The dorsal and caudal fins, dark; the lower part of the caudal, as also the pectoral, almost black; the ventral and anal fins, light colour.

*Length* of the subject, one foot four inches.

## REMARKS.

It may be remarked in this as well as in the former species, that the spinous rays of the dorsal and anal fins, lie so close on the next rays as to shew the points only.

Both fishes, especially the first, are esteemed for the table, and are known to the English under the name of Rowball.

## No. CLXXXV.

*POLYNEMUS digitis septem, primus duplo quam ipsum corpus longior, ceteris sensim brevioribus ; cauda biloba, falcata.*

The POLYNEMUS with seven digiti; the first twice the length of the body, the others gradually shortening. The tail bilobed and falcate.

*Polynemus paradiseus* Lin. S. N. p. 522.

Called by the Natives TUPSEE MUTCHEY.

English MANGO FISH.

B. . D.  $\frac{7}{7}$ .—17. P. 16. V. 6. A. 12. C. 18.

WITH a strong similitude in the form of the head, the rostrum, the mouth, and disposition of the fins, the general figure of this fish is more elegant than either of the two preceding species. The lateral line bends more gracefully, the attenuation of the tail is more gradual, and the caudal fin is not, as in the others, covered with scales.

The number and length of the digiti furnish a sufficient specific character; besides which, the scales are smaller, the pectoral and ventral fins acuminate at the middle, not at top, and the form of the caudal fin is more neat.

	Inches.	Lines.
The <i>length</i> from the rostrum to the caudal fin	6	4
of caudal fin	2	3
of first digit	15	0
of second	12	0
of seventh	3	3

## REMARKS.

The Mango fish is reckoned by much the most delicate of any found at Calcutta. It is in season five or six months in the year, and chiefly at the same time with the Mango fruit; from which, and a resemblance in colour to that fruit, it probably owes its English name.

It is not found at Vizagapatam where the Rowball is not rare. The figure now presented was taken from a specimen in spirits received when in India from Bengal, and in good preservation, the colour excepted. A paper containing a more complete description made at the time has been lost.

## CLUPEA.

## GENERIC CHARACTER.

<i>Caput: maxillarum superiorum mystacibus serratis.</i>	The head: the mystaces of the upper jaw serrated.
<i>Membrana branchiostega radiis viii. branchiæ interne setaceæ.</i>	Eight rays in the branchial membrane; the branchiæ setaceous internally.
<i>Corpus: abdominis carina serrata; pinnae ventrales sæpe novem radiatæ.</i>	The body: the carina of the abdomen serrated; the ventral fins have frequently nine rays.

## No. CLXXXVI.

CLUPEA corpore oblongo-ovale; maxillis sub-equalibus, inferiore truncata; pinna dorsalis radiis novemdecem.

The CLUPEA with an oblong-oval body; the maxillæ nearly of equal length, the under truncate; nineteen rays in the dorsal fin.

*Harengus minor indicus Willough. Ichth. App. Tab. 1. f. 2.*

Called by the Natives KOWAL or KOWARLOO.

*B. v. D. 19. P. 15. V. 8. A. 20. C. 22.*

The *body* oblong-oval, compressed, squamous; scales large, orbicular, deciduous.

The *head* small, compressed, naked; the front gently declivous, depressed, slightly striate. The mouth small, rather oblique, without lips; the jaws nearly of equal length; extractile, the upper emarginate, the under carinate, truncate, and covered by the upper. No teeth perceptible. Tongue small, acute, smooth, free. Palate narrow, not rough. Eyes middle, round, iris silvery. Nostrils double, in a shallow groove near the rostrum. The branchial opercula consist of three laminæ; the two anterior rounded, the posterior roundish, but curve, both without scales: the membrane has five rays only; the aperture large, of a form somewhat triangular.

The *trunk*. The back gently arched, a little convex; the sides and tail compressed; the breast and abdomen thin, carinate, and serrated. The branchiæ consist of four leaves, three pectinate, the setaceous denticles of the first very long. The lateral line supreme, hardly visible. The anus remote.

The *fins*. The dorsal solitary, in the middle of the back, has nineteen declining rays soft and slender; the pectoral low, acuminate above; the ventral opposite to the dorsal, very short; the anal rays a little assurgent, but nearly equal; the caudal fin deeply bifid.

The *colour* of the crown and back changeable green and blue; the face and opercula, silvery; the sides lighter than the back, the belly white. The dorsal and caudal fins have a greenish cast, the latter striped black, the other fins light, or whitish.

The *length* of the subject to the caudal fin four inches four lines.

Five inches and a half is the size of the largest.

## REMARKS.

This fish when fresh, if not superior, is at least in quality equal to the best Scotch herring: though in size much smaller. They begin to make their appearance at Vizagapatam in March, and are abundant through the summer months. The natives cure them in the manner of Sardinias: or sometimes in red earth mixed with salt.

The name given to my drawing by the fishermen at Madras was Kanwali. Bloch received a specimen from Tranquebar under the name Poykia, or Nanalai. His figure of the *Clupea Sinensis*, however differs from the present figure, as well as from that in Willoughby's Appendix.

## No. CLXXXVII.

*CLUPEA corpore lanceolato; linea laterali recta, media, argentea; rostro prominente, obtuso.*

The *CLUPEA* with a lanceolate body, the lateral line straight, middle and silvery. A prominent, blunt, nose.

*Clupea Atherinoides?* Linn. *S. N. p.* 523.

Called by the Natives NATTOO or NETTOOLI.

*B.* xii. *D.* 15. *P.* 16. *V.* 7. *A.* 20. *C.* 22.

The *body* lanceolate, compressed, squamous, pellucid; scales large, smooth, tenacious.

The *head* compressed, without scales, the front depressed, rostrum projecting, obtuse. The mouth low, less oblique than in the last, large, no lips; jaws extractile, the under shortest, the edge of the upper serrated: both filled with numerous, close, acerose, teeth; tongue very short, rough; the palate also denticulate. Eyes middle, round, large; nostrils double, close to the rostrum. The branchial opercula bi-laminate, rounded; the membrane covered; the aperture arched.

The *trunk*. The back less arched than in the last, but a little convex, the sides compressed; the abdomen carinate, straight, and serrated. Branchiæ as in the last; the lateral line consists of a broad silver fillet, middle, straight. The anus nearly middle.

The *fins*. The dorsal a little behind the middle, of a shape slightly falcate; pectoral unusually low, acuminate above, short; the ventral shorter by half, but of the same shape, has seven rays: the anal rises nearly opposite to where the dorsal ends, and is similar to it in shape, but lower; the caudal fin bifid.

The *colour* universally a yellowish-white.

*Length*, five inches.

## REMARKS.

This fish rarely exceeds five inches in length. When about three inches they often, with the Sorings (No. CXIII.) of the same or smaller size, are brought to table on shewers dressed in the manner of Inkle-fish. The fry of other fish sometimes intermixed with them are greatly inferior to the Nattoo, which rivals the English white-bait.

## No. CLXXXVIII.

*CLUPEA pinna dorsali radiis quindecim, anali radiis quadraginta.*

The CLUPEA with fifteen rays in the dorsal fin, and forty rays in the anal.

Called by the Natives DITCHELEE.

*B. v. D. 15. P. 15. V. 7. A. 40. C. 20.*

*THE body.* This species in its shape differs from the herring; the back is more straight, and the hinder part of the tail rises more obliquely towards the caudal fin.

*The head* naked, compressed, the crown and front grooved, rostrum short. The mouth oblique, without teeth; the exterior hinder part of the upper jaw serrated, the lower jaw short and carinate, covered by the upper when the mouth is shut. The tongue, palate, opercula, branchial membrane, and aperture, as described in the Kowal: but the eyes here are larger, and the nostrils closer to the edge of the rostrum.

*The trunk.* The branchiæ, lateral line, and anus, differ inconsiderably from the Kowal.

*The fins.* The position and shape of the fins also as described in the Kowal: only that the pectoral are rather higher, and the anal much longer than in that fish.

*The colour.* The upper part of the head and trunk changeable green; the rest silvery; the belly of a pearl colour.

*Length* of the subject six inches.

## No. CLXXXIX.

*CLUPEA maxilla superiore retro-elongata in processum acutum, denticulatum; operculo posteriore maculato, acuminato; squama lanceolata supra pinnas pectorales et ventrales.*

The CLUPEA with a retroflex process from the upper maxilla, denticulated, and sharp-pointed; the hinder operculum acuminate and marked with a black spot; a lanceolate scale above the pectoral and ventral fins.

Called by the Natives POORAWAH.

*B. xii. D.  $\frac{1}{14}$ . P. 14. V. 7. A. 35. C. 18.*

*THE body* oblong, compressed, covered with large loose scales. The back straight, convex; the sides more convex than in the herring, and the belly more prominent, but thin, carinate, and prickly.

*The head* without scales, compressed, declivous, front depressed, grooved. Mouth oblique, very wide, the lower jaw shortest, and truncate, the upper has a long reflex, serrated process, reaching to the pectoral fin: both jaws have numerous small teeth. The tongue and palate rough. The eyes middle, small, round, iris golden. Nostrils nearer the rostrum than the orbit. The branchial opercula striate, gilded, with a black spot on the pointed margin. The membrane has twelve rays; the aperture wide.

*The trunk.* The branchiæ as already described; the lateral line, as far as could be discerned, straight; anus remote.

*The fins.* The dorsal nearly in the middle, has a small short spine in front of thirteen descending rays; the



pectoral very low, with a large lanceolate squama at its rise; the ventral has one similar, but smaller, and seven rays; the anal has thirty-five; the caudal bifid, with eighteen rays.

The *colour* a dark bluish green on the upper parts; the sides and belly pearly. The opercula, as before mentioned, appear as if gilded, and have a black spot on the margin. The dorsal, anal, and caudal fins have a yellowish cast, the ossicles black; the pectoral and ventral whitish.

*Length* of the subject eight inches.

### No. CXC.

*CLUPEA maxilla superiore retro-elongata in processum denticulatum; operculo mutico; macula et squamis lanceolatis carens.*

The CLUPEA with a retroflex denticulate process from the upper jaw; the operculum not acuminate; and without the spot and lanceolate squamæ.

Called by the Natives PEDDAH POORAWAH.

*B.* xii. *D.*  $\frac{1}{13}$ . *P.* 14. *V.* 6. *A.* 46. *C.* 20.

THOUGH this species agrees with the last in the reverted maxillary process, it differs greatly in other respects.

The *body* is more arched, and the tail has a bend downwards; the lateral line conspicuous, and very slightly curve; the abdomen not serrated.

The *head* small, the front almost horizontal; the mouth extremely oblique; the under jaw shorter than the upper, but not truncate. The teeth, tongue, palate, eyes, and nostrils, as in the former; the opercula also golden, but not striate, and there is no black spot.

The *fins*. The disposition of the fins as in the last; the pectoral low, and the ventral in the middle between it and the dorsal; but the lanceolate scale is wanting in both.

The *colour* the same as in the last species, only that the ossicles of the fins are not black.

*Length* eight inches.

### No. CXCI.

*CLUPEA corpore oblongo; ore simo, oculis magnis; linea laterali sub-curva deorsum.*

The CLUPEA with an oblong body; a flat mouth; large eyes; the lateral line somewhat bent downwards.

Called by the Natives JANGARLOO.

*B.* vi. *D.* 17. *P.* 17. *V.* 6. *A.* 43. *C.* 22.

IN the form of the body and disposition of the fins, as well as in other characters, this species agrees with the last described. It differs in the following: the lower jaw is thicker, shorter and truncate; the upper has no reverted process; the branchial membrane has six rays only; the eyes are much larger; and the lateral line, instead of being arched, bends a little downwards.

The *fins* are nearly of the same shape as in the last species; but the first ray of the pectoral is a remarkable flat, broad, ossicle, with a ramous point; and the ramous rays of the fins are more unequal in length. The caudal fin bifid, as usual.

The *colour* of the head changeable, gold, green, and blue; the rest, of the same colour as the common herring: all the fins have a yellowish cast, the dorsal and pectoral slightly tipped with black.

*Length* eleven inches.

### No. CXCII.

*CLUPEA ore simo; maxilla inferiore truncata; abdomine prominulo, carinato, serrato; pinnis ventralibus exiguis.*

The *CLUPEA* with a flat mouth, the lower jaw truncate; the belly a little prominent, carinate, serrated; very small ventral fins.

Called by the Natives *DITCHOEE*.

*B. vi. D. 17. P. 18. V. 7. A. 37. C. 18.*

This species differs principally from the last, in the belly being more prominent, and the back a little more arched, consequently it is much broader at the shoulders; the scales bigger and broader; the nostrils single; the ventral fins extremely small; the anal squamous at the root, and following the form of the body rises more obliquely to the tail; the lateral line is perfectly straight.

In the other characters there is little variation.

The *colour* of the crown and back, changeable green and blue, with less golden than in the last; the sides and belly pearly. Fins as in the herring.

*Length* seven inches.

#### REMARKS.

It is a much inferior fish for the table, to the Kowal, No. CLXXXVI. and not nearly so abundant.

This species agrees in some respects with the *Clupea Sima* of Linneus.

### No. CXCIII.

*CLUPEA corpore oblongo-ovato; lineis lateralibus duabus; pinnis ventralibus nullis.*

The *CLUPEA* with an oblong-ovate body; two lateral lines; no ventral fins.

Called by the Natives *TARTOORE*.

*B. ii. D. 12. P. 13. V. 0. A. 53. C. 20.*

This species, agreeing in shape of the head, rostrum, jaws, &c. with the three preceding species, is sufficiently distinguished from them by the two lateral lines, the want of ventral fins, and two branchial rays only.

The *body* approaches nearer an oblong-ovate form; and besides the lateral line (which is straight and nearly middle) there is a second parallel, shorter line, near the ridge of the back. The scales are smaller, more compact, especially on the sides, and less deciduous than usual in this genus. The anus middle.

The *fins*. The dorsal remote from the head, and very small; the pectoral nearly middle, longer than the head, acuminate above, and have a flat, long, ramous ossicle, as in No. CXCII; the anal rising near the middle, is continued to within four lines of the tail, being all along of equal height. The caudal fin bifid.

The *colour* very different from that of the herring; the upper parts being of a yellowish-white, the rest silvery. The fins glassy, with a yellowish tinge.

*Length* six inches and a half.

## REMARKS.

This species in the want of ventral fins, and in having two rays only in the branchial membrane, agrees with the *Clupea Sternicula* of Linneus, but by no means with the *Gasteropelicus* described by Gronovius to which reference is made, Linn. S. N. p. 524.

It may be further remarked, that both the *Sima* and *Sternicla* of Linneus are omitted by Gmelin.

## No. CXCIV.

*CLUPEA corpore oblongo; pinna anali radiis quadraginta; macula ad marginem superiorem operculi.*

The *CLUPEA* with with an oblong body; an anal fin of forty rays; and a spot at the upper edge of the operculum.

Called by the Natives POORWA.

*B.* . *D.* 13. *P.* 13. *V.* 7. *A.* 40. *C.* 20.

The *body* oblong, scales large, deciduous.

The *head* large, compressed; the front declivous, grooved, rostrum obtuse. Mouth oblique; jaws rough like a file. Eyes middle, large, iris silvery. Opercula smooth, the posterior lamina acuminate, above which on the lateral line is a roundish dark spot.

The *trunk* comes nearest in form to No. CLXXXIX. a fish bearing nearly the same name; but there is no reverted, serrated, maxillary process; no prickle before the dorsal fin; and the large squamæ at the pectoral and ventral fins are wanting. The abdomen is straighter, and the lateral line more conspicuous.

The *fins*. The dorsal, ventral and anal fins as in No. CLXXXIX.; the pectoral acuminate in the middle; the caudal fin bifid.

The *colour*. My memoranda here defective, as also in respect to the branchial membrane.

*Length* seven inches and a half.

## No. CXCV.

*CLUPEA corpore ovato; maculis parvis obscuris, in serie, supra lineam lateralem.*

The *CLUPEA* with an ovate body; and a row of small, obscure spots, above the lateral line.

Called by the Natives KEELEE.

*B.* v. *D.* 15. *P.* 15. *V.* 8. *A.* 18. *C.* 20.

This species differing in its exterior shape, and somewhat in the colour, from the Kowal, No. CLXXXVI. agrees nearly in other respects with the description given of that fish.

The *body* is broader, shorter, more ovate; the eyes larger; the nostrils not in a groove; the lateral line supreme, and (as in the Kowal) hardly discernible.

The *fins*. The position and shape of the fins are the same in both, the dorsal only higher, thicker, and more falcate.

The *colour*. The upper part of the head and back greenish, less changeable than in the Kowal; the face and sides bright silver; the belly pearl-white. The fins glassy; the dorsal, anal, and caudal of a light greenish cast.

The *length* six inches; but they grow to eight or ten.

#### REMARKS.

With the smell and flavour of the herring, they are much inferior to the Kowal. They are less abundant, and less in request. The spots have some resemblance to the Clupea Alosa; but that fish has eight branchial rays, and differs in several other respects.

#### No. CXCVI.

*CLUPEA corpore ovato; radio postremo pinnae dorsi longissimo, setaceo.*

The Clupea with an ovate body; the hinder ray of the dorsal fin very long, and setaceous.

*Clupea Thrissa Linn. S. N. p. 524.*

*Bloch. Pl. 404.*

Called by the Natives KOME.

*B. v. D. 16. P. 16. V. 9. A. 25. C. 24.*

THE *body* ovate, compressed; scales somewhat orbicular, imbricate, deciduous.

The *head* small, declivous, compressed, without scales; the front smooth, rostrum obtuse, projecting over the mouth. Mouth nearly transverse, small; jaws hardly extractile, without teeth; no lips. Tongue very small, smooth, fixed; the anterior part of the palate slightly tuberculate. Eyes middle, orbicular; iris pearl-colour; nostril in the middle between the orbit and the rostrum, divided by a valve. The branchial opercula seemingly three-leaved, the posterior somewhat shield-form, smooth, splendent; the membrane easily discovered; the aperture large, somewhat angular.

The *trunk*. The back arched, at first carinate, afterwards a little convex; the breast and abdomen carina-serrated; the sides and tail compressed. The denticles of the exterior branchiæ very long. Lateral line middle, straight. The anus remote.

The *fins*. The dorsal middle, a little falcate, the last ray setaceous, reaching to the tail; the pectoral low, nearly as long as the head, acuminate above; the ventral half as long as the pectoral, opposite to the beginning of the dorsal; the anal consists of twenty five rays, nearly of equal length; the caudal fin bifid.

The *colour*. The crown of the head greenish, the rest white; the upper part of the opercula gilded; the back changeable, less brilliant than in the Kowal; several dusky horizontal fillets above the lateral line hardly visible when the fish is dead; the sides of a pearl-colour mixed with gold, changeable; the abdomen white; the dorsal and caudal fins have a yellowish tinge.

*Length* seven inches.

## No. CXCVII.

*CLUPEA corpore ovato; radio postremo pinnæ dorsæ setaceo, longo: ossiculis membranæ branchialis latissimis.*

The *CLUPEA* with an ovate body; the last ray of the dorsal fin long and setaceous; the ossicles of the branchial membrane remarkably broad.

*Clupea Nasus, Bloch. Pl. 429.*

Called by the Natives PEDDA KOME.

*B. v. D. 16. P. 15. V. 8. A. 22. C. 24.*

THIS, with a strong resemblance to the last, is held by the fishermen to be a distinct fish. The rays of the branchial membrane remarkably broad; the nostrils distant from each other; the anal fin more falcate; eight rays only in the ventral; and the lateral line more obscure. These variations appeared to be constant: in other respects, the description of the last fish may serve equally for the present.

*Length*, nine inches six lines.

Neither of them are common at Vizagapatam.

## No. CXCVIII.

*CLUPEA corpore ovato; pinna caudæ squamosa; squama longa, acuminata, ad pinnas pectorales.*

The *CLUPEA* with an ovate body; the caudal fin squamous; a long pointed scale at the pectoral fins.

Called by the Natives PALASAH.

*B. vi. D. 18. P. 15. V. 9. A. 20. C. 28.*

THE *body* broader, rounder, and thicker than usual in this genus; but the breast and abdomen carinate and serrate. The scales large, loose, and singularly extended on the anal and caudal fin.

The *head* large, without scales, compressed, and, when the mouth is shut, obtuse; the front declivous, depressed; the rostrum blunt. The mouth a little oblique, lips thin; the jaws equal, the upper, as usual, covers the under, but has a dent at the point for the reception of a small protuberance on the lower jaw: both are without teeth. The tongue and palate smooth. The branchial opercula large, round, without scales, splendid; the membrane has six ossicles. The branchial denticles setaceous. No visible lateral line. The anus remote.

The *fins*. The dorsal middle, of eighteen declining rays; the pectoral low, with a long, curve pointed squama at the root, consists of fifteen rays, acuminate, slightly falcate, and three inches long; the ventral opposite to the middle of the dorsal, acuminate above, has nine rays almost one half shorter; the anal remote, with twenty declining, short rays; the caudal fin bifid, and very remarkably squamous.

The *colour*. The crown a dark green, the face and opercula splendid white; the back changeable blue,

green, and yellow; the breast, sides and belly, like mother-of-pearl. The dorsal and part of the caudal fin above the scales, darkish, the other fins light, whitish.

	Feet.	Inches.	Lines.
<i>Length</i> from the rostrum to the tail - - - -	1	6	0
the tail - - - -	0	2	7
to the dorsal fin - - - -	0	5	0
to the pectoral fin - - - -	0	3	6
Height from the abdomen to the ridge of the back - -	0	4	8

## REMARKS.

This fish is known at Calcutta under the name of Sable fish, and highly esteemed. At Vizagapatam it had passed unnoticed, like many others left to the lower ranks of the people. On its appearance, by my request, in the way of experiment at my brother's table, it was recognised by him as a Bengal acquaintance; and allowed by all to be a rich and luscious fish, with much of the herring flavour.

On questioning the fishermen why it had never been brought before to the Chief's table, they replied, "It was not a gentleman's fish; the multitude of small troublesome bones utterly disqualifying it." I found it however well known to the Portuguese race, who used it souced, or prepared with tamarinds.

In some respects it resembles the Shad, or *Clupea Alosa*, but differs in shape, has no spots, and the branchial membrane has only six ossicles.

## No. CXCIX.

*CLUPEA corpore elongato, cultrato, alepidoto; pinna dorsi remota, ventrali exigua.*

The *CLUPEA* with an elongate, knife-form body, without scales; the dorsal fin near the tail, and the ventral extremely small.

*Clupea Dorab? Forskal. No. 108.*

Called by the Natives WAHLAH.

*B. viii. D. 16. P. 14. V. 6. A. 31. C. 23.*

The *body* long, straight, knife-form, compressed, smooth, without scales.

The *head* small, compressed; the rostrum hardly declining; the front depressed, with a small ridge in the middle. The mouth large, very oblique, without lips. The under jaw longest, carinate, and when received into the upper, makes the rostrum appear pointed. In the upper jaw, are four long, projecting, lanceolate, teeth, with many smaller marginal behind; in the under jaw they are long, distant, reflex. Tongue small, ovate, smooth, loose; palate also smooth. Eyes supreme, moderate size; nostrils oval, divided by a valve. The branchial opercula two-leaved, with the appearance of a third, smooth, rounded; the membrane easily seen: the aperture large and gular.

The *trunk*. The back quite straight, a little rounded, the sides compressed; the abdomen carinate, but serrated, differently from the others, by small fibres. The branchial denticles very long. The lateral line middle, straight, faint. The anus remote.

The *fins*. The dorsal near the tail has sixteen slender, declining rays, the points extending beyond the edge of the membrane; the pectoral low, with twelve or fourteen rays, acuminate above, and a large lanceolate squama at the root; the ventral middle, of six very slender, short rays; the anal commences opposite to the dorsal, of the same shape, but twice as long; the caudal fin strong, bifid, two inches in length.

The *colour* of the crown green and blue, the face and opercula splendid white; the ridge of the back a rich azure, below which are several green fillets; the rest a bright leaden. The pectoral and caudal fins glassy, the others light.

					Inches.	Lines.
The <i>length</i> from the rostrum to the tail	-	-	-	-	10	0
of the caudal fin	-	-	-	-	2	0
Breadth from the back to the abdomen	-	-	-	-	1	9
Where narrowest	-	-	-	-	0	11

## REMARKS.

This fish never appears at the European tables, but is esteemed by the natives.

## No. CC.

*CLUPEA corpore sub-cultrato: pinna ani caudali unita.*

The *CLUPEA* of a shape somewhat knife-form; the anal fin united with the caudal.

*Clupea Mystus* Linn. *S. N.* p. 524.

Called by the Natives QUALA PARAGAH.

*B. x. D. 13. P. 16. V. 7. A. 62. C. 16.*

The *body*, particularly the hinder part, more of a knife-form than that of the herring, pellucid, white, the scales orbicular, deciduous.

The *head* ovate, compressed, the crown grooved, the rostrum obtuse. The mouth oblique, wide; the lower jaw shortish, truncate; the upper has a short retroflex process. Teeth very small. The tongue and palate smooth, the latter very red. Eyes supreme, near the rostrum, orbicular; nostrils double or divided by a valve. The branchial opercula two-leaved, thin; the membrane half discovered; the aperture arched.

The *trunk*. The back almost straight, convex, the sides compressed; the abdomen prominent, carinate, serrated. The branchial denticles long, setaceous; lateral line high, straight; the anus middle.

The *fins*. The dorsal nearly middle, small, with thirteen assurgent rays; the pectoral low, with sixteen rays, of which six are very long and setaceous; the ventral exceedingly small; the anal arising near the anus is continued to and joined with the caudal; caudal long, lanceolate, somewhat oblique, with about sixteen rays.

The *colour*. The head silvery; the rest resplendent white, with a row of silver dots under and parallel to the lateral line, on each side. The fins light, or glassy.

*Length*, five inches and a half.

## No. CCI.

*CLUPEA corpore lanceolato; processu maxillæ superioris retroflexo, setoso, longissimo.*

The CLUPEA with a lanceolate body; a retroflex, setous process of the upper maxilla, extremely long.

*Clupea Setirostris, Linn. Ed. Gmel. p. 1407.*

Called by the Natives YEKА POORAWAH.

*B. xii. D. 13. P. 13. V. 7. A. 25. C. 20.*

THE form of the body lanceolate; but in most of the other characters, the deciduous scales, the oblique mouth, opercula, branchiæ, &c. it agrees with the genus; the lateral line nearly middle. What chiefly distinguishes it is the length of the maxillary process, which is as long as half the body.

The *fins*. The dorsal middle, short, consisting of thirteen declining rays; the pectoral low, small, acuminate above; the ventral of the same form, small; the anal opposite to the posterior part of the dorsal, with twenty-five declining rays; the caudal bifid, the lower lobe longer than the upper.

The *colour* omitted in my memoranda; but to the best of my recollection, it was that of the herring. I found it at Bimblipatam, when my painter was not in the way to make a drawing.

The *length*, four inches.

## REMARKS.

This species was found also by Forster in the Pacific Ocean; and an accurate description with a figure has been given by Broussonet, from a specimen in the British Museum.\*

## No. CCII.

*CLUPEA? corpore lanceolato; membrana branchiale radiis octodecem; abdomine nec carinato nec serrato.*

The CLUPEA with a lanceolate body; a branchial membrane of eighteen rays; the abdomen neither carinate, nor serrated.

Called by the Natives MARRAWA.

*B. xviii. D. 16. P. 14. V. 9. A. 15. C. 18.*

THIS, in its form as well as in colour, resembles the herring, only that the head is more richly gilded. The mouth, teeth, tongue, eyes, and opercula as in the last. The back nearly straight, sides and tail compressed, the breast carinate, the abdomen thin, but convex: neither of them serrated. The denticles of the branchiæ setaceous and long; the lateral line hardly perceptible.

The *fins*. The dorsal nearer the tail than the head, with sixteen declining rays; the pectoral low; the ventral has nine short rays; and the anal, opposite to the dorsal, fifteen very slender rays; the caudal bifid.

The *length*, seven inches.

\* Brouss. Ichth. Fasc. I. Lond. 1782.



## REMARKS.

The number of branchial rays, and the carina of the abdomen not serrated, are remarkable deviations from the character of the Clupea, if the present subject belongs to that genus. An accident prevented my getting a drawing made of it.

## No. CCIII.

*CLUPEA corpore oblongo, squamis permagnis; radio ultimo pinnæ dorsi longo, setaceo.*

The CLUPEA with an oblong body; very large scales; the last ray of the dorsal fin long and setaceous.

*Clupea Cyprinoides, Linn. Ed. Gmel. p. 1407.*

Called by the Natives KUNDINGA.

*B. xxiii. D. 18. P. 15. V. 9. A. 25. C. 26.*

THE *body* oblong, compressed, smooth; scales very large, orbicular, with a white, membranous margin.

The *head* declivous, compressed, without scales; the front depressed, furrowed; the rostrum obtuse. The mouth low, a little oblique, large; no lips. The upper jaw extractile, the lower ascendent, truncate: both rough like a file. Tongue small, ovate, loose, and, as well as the palate, rough. Eyes supreme, very large, orbicular, covered with the common skin. Nostrils double, the anterior small, round, the posterior oval. The branchial opercula two-leaved, rounded, smooth, shining; the membrane exposed, with twenty-three slender ossicles; the aperture large, covered below by the membrane.

The *trunk*. The back slightly arched, a little rounded; the sides compressed, convex; the breast and abdomen straight, almost plane, not carinate nor serrated. The denticles of the exterior branchiæ very long, the others decreasing gradually in length. The lateral line bends down at first towards the pectoral fin, afterwards becomes middle and straight: very conspicuous, from the scales being singularly striated. The anus remote, linear.

The *fins*. The dorsal in the middle of the back consists of seven assurgent and eleven declining rays, of which the last is setaceous, three inches in length; the pectoral low, large, acuminate above; the ventral of the same shape: both have a large, sharp, sub-falcate squama at their roots; the anal fin remote, sub-lunate, the first and last ray slightly setaceous; the caudal fin deeply bifid.

The *colour*. The upper part of the head and front greenish; the face and opercula bright silver and golden. The back changeable like that of a herring; below the line pearl-colour; the breast and belly mother-of-pearl. The dorsal and caudal fins a little darkish; the others glassy or light.

				Inches.	Lines.
The <i>length</i> from the nose to the tail	-	-	-	10	4
to the branchial aperture	-	-	-	2	6
of the caudal fin	-	-	-	2	8

## REMARKS.

The serrated carinæ of the abdomen forming a principal generic character of the Clupea, the want of it in this and the preceding species, left me doubtful whether they were properly placed here: the agreement, however, in other characters (the remarkable difference in the number of branchial ossicles excepted,) induced me not to separate them from this genus.

Having since my return from India, found that the Clupea Cyprinoides, notwithstanding the number of branchial ossicles, and the smooth abdomen, had been admitted by Bloch and Gmelin, I have no remaining doubt of the Marrawa being a Clupea.

## CYPRINUS.

## GENERIC CHARACTER.

*Caput ore edentulo; os nasale bisulcum.*  
*Membrana branchiostega radiis tribus.*  
*Corpus læve albens. Pinnæ ventrales sæpe*  
*novem radiatæ.*

The head: mouth without teeth; the nasal bone forked. Three rays in the branchial membrane. The body smooth and whitish. Nine rays often in the ventral fins.

## No. CCIV.

CYPRINUS *cirris quatuor; pinna dorsalis radiis undecem, tertio longo, crasso, rugoso, postice serrato; pinnis omnibus flavescens.*

The CYPRINUS with four cirri; eleven rays in the dorsal fin, of which the third is long, thick, rough, and on the hinder part serrated. All the fins have a yellowish cast.

Called by the Natives KUNNAMOO.

*B. iii. D.  $\frac{3}{11}$ . P. 15. V. 9. A. 9. C. 20.*

THE *body* oblong-ovate, compressed, squamous, resplendent; scales large, the base truncate, the posterior margin rounded, ciliate, imbricate, tenacious.

The *head* small, declivous, compressed, obtuse, without scales, the front a little convex, smooth. Mouth small, round, somewhat oblique; the lips thickish. Jaws extractile, the under a little shorter, both without teeth. Tongue short, roundish, smooth, tied. The palate smooth. The eyes high, round, plane; nostrils oval, contiguous, near the edge of the rostrum. The branchial opercula three-leaved, the middle leaf round, the first and third angular. The membrane has three stout ossicles; the aperture lateral, large, arched. The cirri very short; one on the upper lip, and one at the corner of the mouth, on each side.

The *trunk*. The back and abdomen arched, the former somewhat carinate, the latter convex; the sides and tail compressed. Branchiæ pectinate, and tuberculate. Lateral line from the edge of the opercula bends gently downwards to the end of the anal fin, then rising, it runs straight and middle to the tail. The anus very remote.

The *fins*. The dorsal middle, consists of three spinous, and eight single rays, the first of the spinous very short but sharp, the second lies close on the third, which is the longest, strong, a little curve, serrated behind, and rough on the side; the pectoral fin low, acuminate in the middle; the ventral opposite to the dorsal, also acuminate; the anal close to the anus, very near the tail; the caudal fin bifid.

The *colour*. The head, back, and sides a shining white; the throat and belly a yellowish white. The fins whitish with a faint yellow tint.

*Length* six inches.—Found in the river, and also in a tank at Casemcottah.

## No. CCV.

CYPRINUS *corpore oblongo; cirris quatuor; pinna dorsi radiis octo, secundo serrato.*

The CYPRINUS with an oblong body; four cirri; eight rays in the dorsal fin, of which the second is serrated.

Called by the Natives KAKOO, or KAROO.

*B.* iii. *D.*  $\frac{2}{8}$ . *P.* 12. *V.* 9. *A.* 7. *C.* 20.

THE *length* six inches.

This species approached very near to the Cyprinus Barbus. The principal difference was in the number of dorsal and pectoral rays: in all other respects it agreed with the Barbel.

It was found in a tank near Tartoor.

## No. CCVI.

CYPRINUS *corpore ovato, argenteo; cirris quatuor, duo ad nares, duo ad rictus angulos.*

The CYPRINUS with an ovate body, silver colour; four cirri, two at the nostrils, and two at the corner of the mouth.

Called by the Natives KADOON.

*B.* iii. *D.*  $\frac{1}{11}$ . *P.* 14. *V.* 9. *A.* 8. *C.* 20.

THE *body* ovate, compressed, squamous, scales somewhat rounded, square-form, large, ciliate, deciduous.

The *head*, mouth, jaws, tongue, palate, branchial membrane and aperture as before described in No. CCIV. The eyes nearly middle; the opercula rounded, the last lamina with a ciliate margin. Two of the four cirri from the corner of the mouth, the other two from the nostrils.

The *trunk*. The back less arched than the abdomen; sides and tail compressed. The lateral line, without bending down, as in the Kunnamoo, sloped gently before it became straight near its termination.

The *fins*. The dorsal nearly middle, declining, with one short spine; the pectoral low, small; the ventral a little more advanced than the dorsal; the anal remote, declining; the caudal fin bifid.

The *colour*. The back a little darkish; the head and sides a dull silver, but splendid; the throat and belly white; the fins darkish, yet less so than the back.

The *length* eight inches.—Caught in the lake at Ankapilly. There was no opportunity of making a drawing.

## No. CCVII.

CYPRINUS? *corpore elongato, lanceolato; pinna ventralis radiis undecem; squamis insolitæ formæ ad nuchas, pinnasque dorsi et ani.*

The CYPRINUS with an elongate, lanceolate body; eleven rays in the ventral fin; scales of an unusual shape on the shoulder, and at the roots of the dorsal and the anal fin.

Called by the Natives PALAH BONTAH.

*B. iv. D. 14. P. 16. V. 11. A. 9. C. 28.*

The *body* long, lanceolate, compressed, squamous, resplendent. Scales large, scallop-shape, striated, above the lateral line; but smaller and not striated under it. On the shoulder they are of a singular form: oblong, roundish, acuminate at both ends, and placed obliquely; smaller scales of a pear-shape, acuminate, the point a little curve, are found at the roots of the dorsal and anal fins, one to each ray.

The *head* narrower than the body, conical, compressed, without scales. The front gently declivous, a little depressed, smooth. The mouth small, with very thin lips. The jaws rather short, hardly extractile; the superior longer, emarginate, covering the under, which is carinate; both are destitute of teeth. Tongue short, obtuse, smooth, fixed, sheathed. Palate smooth. Eyes very large, near the rostrum, orbicular, covered by the skin of the head. A nostril divided by a valve, between the rostrum and orbit. Branchial opercula rounded, resplendent, without scales; the branchial membranes joined, each having four rays; the aperture arched, lateral.

The *trunk*. The back less arched than the abdomen; the sides convex but compressed; the diminution of the tail owing more to the form of the lower parts, than to the declension of the back. Branchiæ pectinate. The lateral line bends down a little towards the pectoral fin, then straight and middle to the end. The anus remote.

The *fins*. The dorsal nearly middle, sub-falcate; points of the lobes setaceous. The pectoral very low, long, broad, pointed above; the ventral opposite to the dorsal: both have a large, lanceolate squama at their rise. The anal remote, somewhat falcate, like the dorsal; the caudal fin long and deeply bifid.

The *colour*. The crown and front green, the face and opercula mother-of-pearl; the back changeable, dark green, and blue. The sides below the line, and the belly, mother-of-pearl. The dorsal and caudal fins darkish green, the others whitish.

				Feet.	Inches.
The <i>length</i> from the rostrum to the tail	-	-	-	1	3
to the dorsal fin	-	-	-	0	7
to the edge of the opercula	-	-	-	0	3
of the caudal fin	-	-	-	0	3

## REMARKS.

This fish is frequently brought to the English tables under the name of Milk Mullet, but is much inferior to the Gray Mullet.

## No. CCVIII.

CYPRINUS? *corpore lanceolato, aurato; radiis dorsalibus quindecem; pinnis omnibus viridiscentibus.*

The CYPRINUS with a lanceolate body of a golden colour; fifteen dorsal rays; all the fins of a greenish cast.

Called by the Natives TOOLELOO.

*B. iv. D. 15. P. 15. V. 11. A. 9. C. 24.*

THE *body* lanceolate, compressed, squamous, the scales small, suborbicular, ciliate, imbricate, tenacious.

The *head* ovate, compressed, without scales; the crown and front a little depressed, striate, the rostrum obtuse, emarginate, short. The mouth small, roundish, lips simple. The jaws, when shut, nearly of equal length, short, very little extractile, without teeth. The tongue and palate smooth, the former very small, hardly moveable. The eyes middle, orbicular, covered with the common skin. The nostrils very small, on the edge of the rostrum, single, divided by a valve. The opercula two-leaved, without scales, one angular, the posterior rounded; the branchial membrane has four ossicles; the aperture lateral.

The *trunk*. The back rather less arched than the abdomen, both are a little rounded, not carinate; the sides and tail compressed; the latter somewhat roundish near the fin. The branchiæ four-leaved, pectinate. The lateral line bends at first parallel to the belly, afterwards middle and straight to its termination. The anus remote.

The *fins*. The dorsal central, in shape somewhat lunate, has fifteen or sixteen rays; the pectoral low, acuminate above, and a lanceolate squama beneath each; the ventral broad, as long as the pectoral, distant, acuminate above; the anal very small, lunate like the dorsal, remote; the caudal fin deeply bifid.

The *colour*. The head a yellowish green; the opercula and trunk a gold colour; the fins the same colour with the head.

The *length* nine inches.

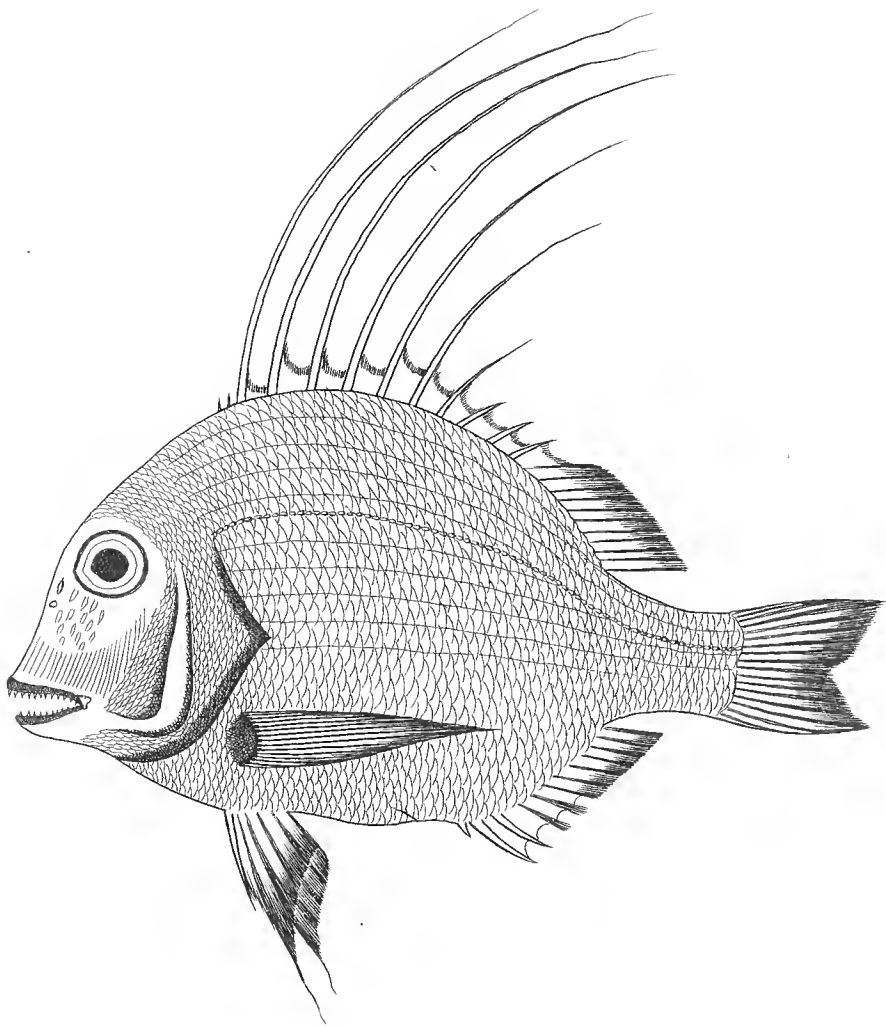
## REMARKS.

The subject described was received in spirits from Madepollam, in the month of September. It was known under the name of Mountain Mullet at Madepollam, from being found in the river only when the freshes come down; and never caught in the sea outside of the surf. It was represented to be a well tasted fish, but full of small bones.

The specimen sent to me was not accompanied with any description. The golden colour appeared to be in tolerable preservation: the other colours had probably suffered some alteration from the spirits.

It should be remarked of the present subject and the fish immediately preceding it, that the branchial membrane contains four ossicles; in which respect both deviate from the generic character of Cyprinus: their agreement with the genus in some other respects obtained them a temporary place here.

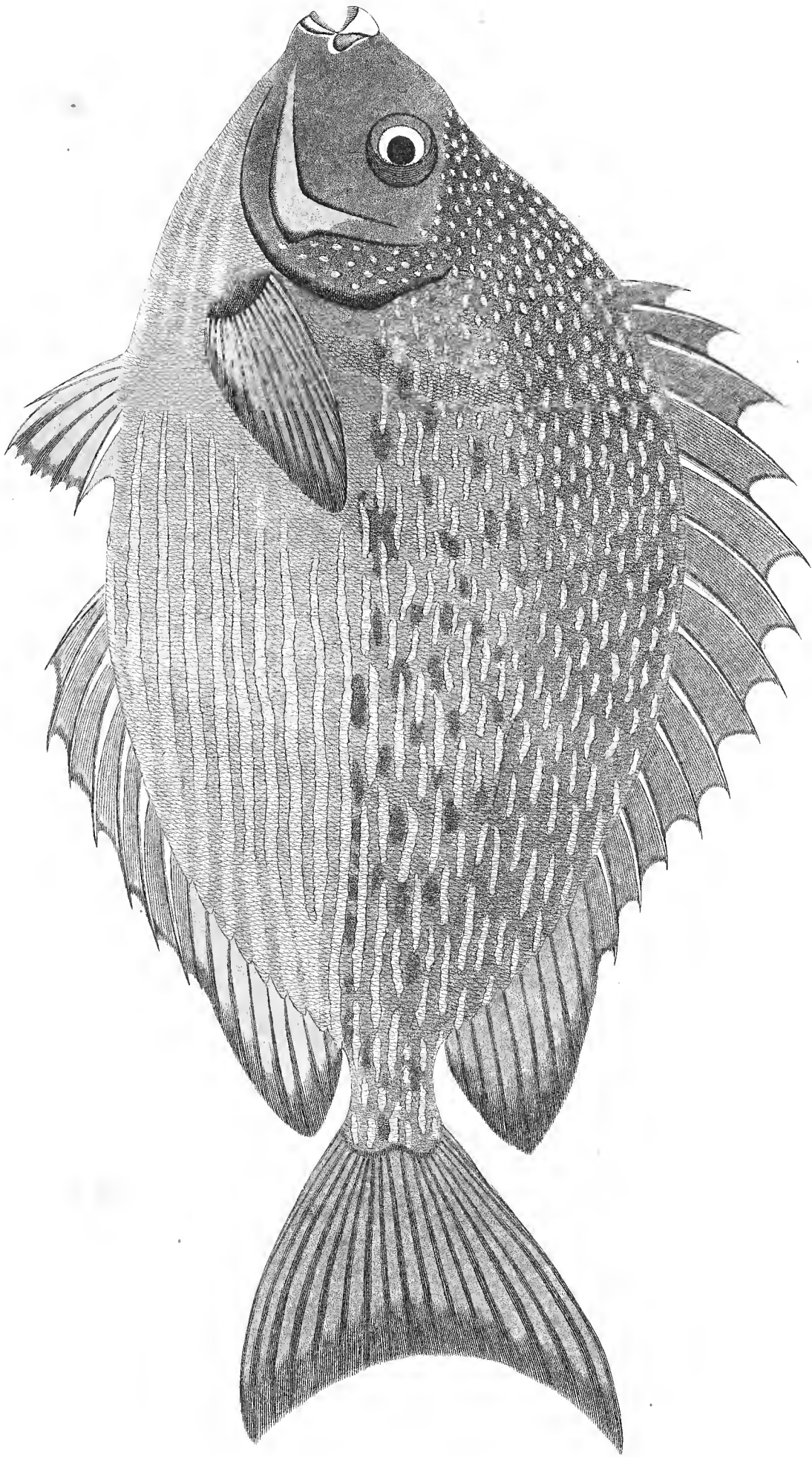




KOOROOTA

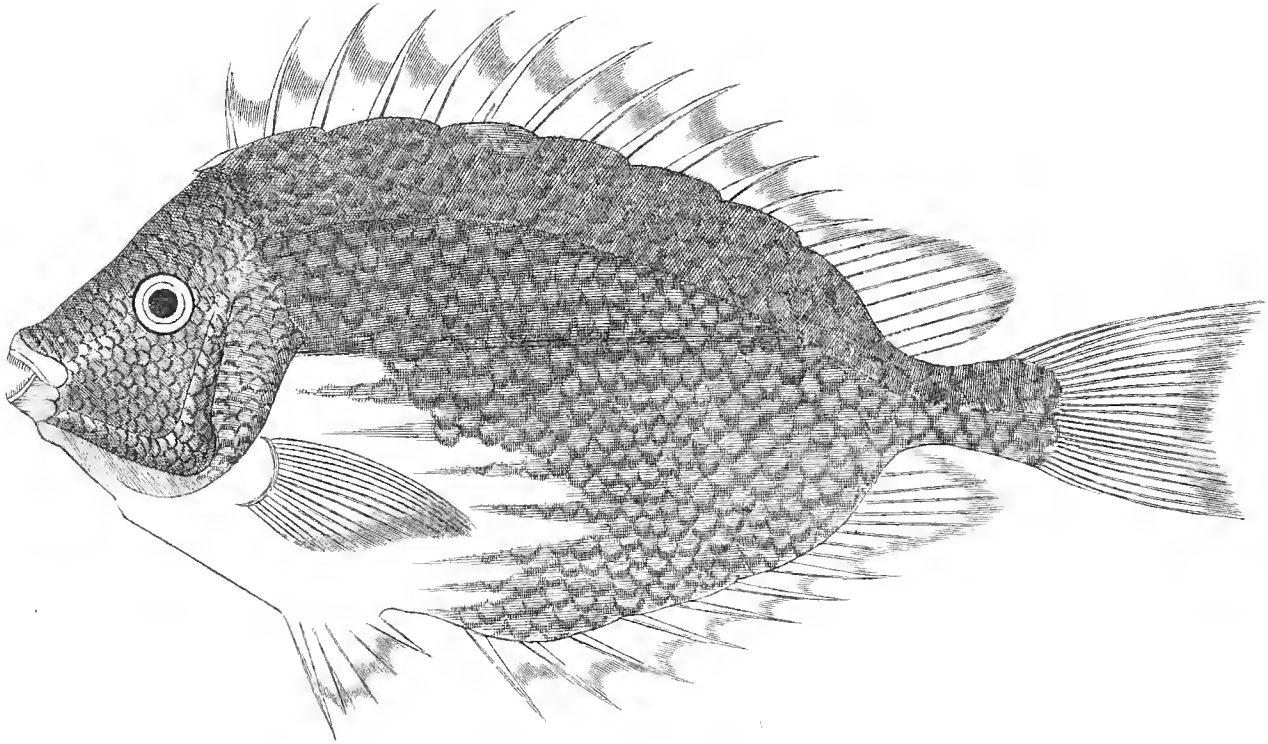






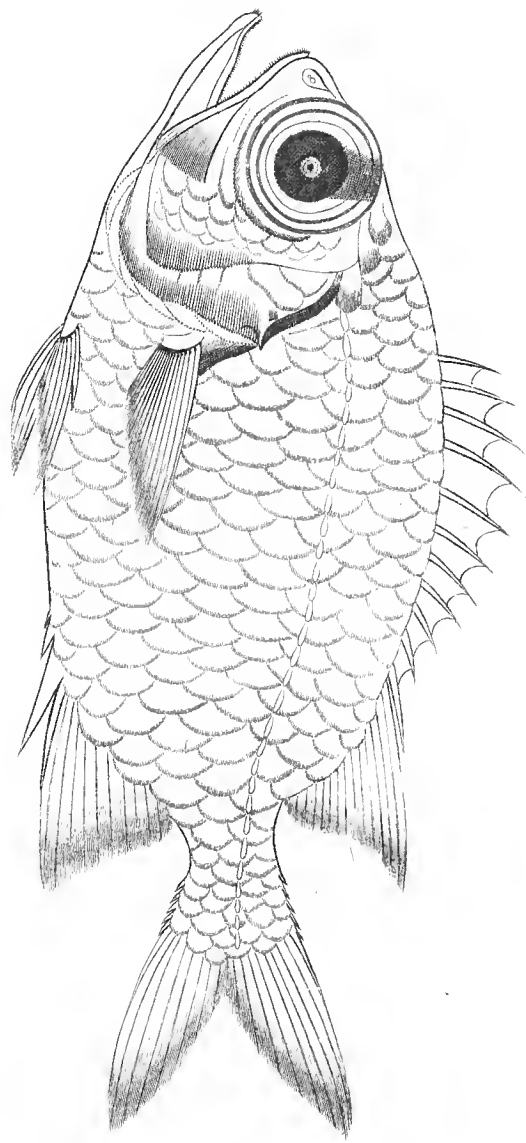
WORAIWAH.





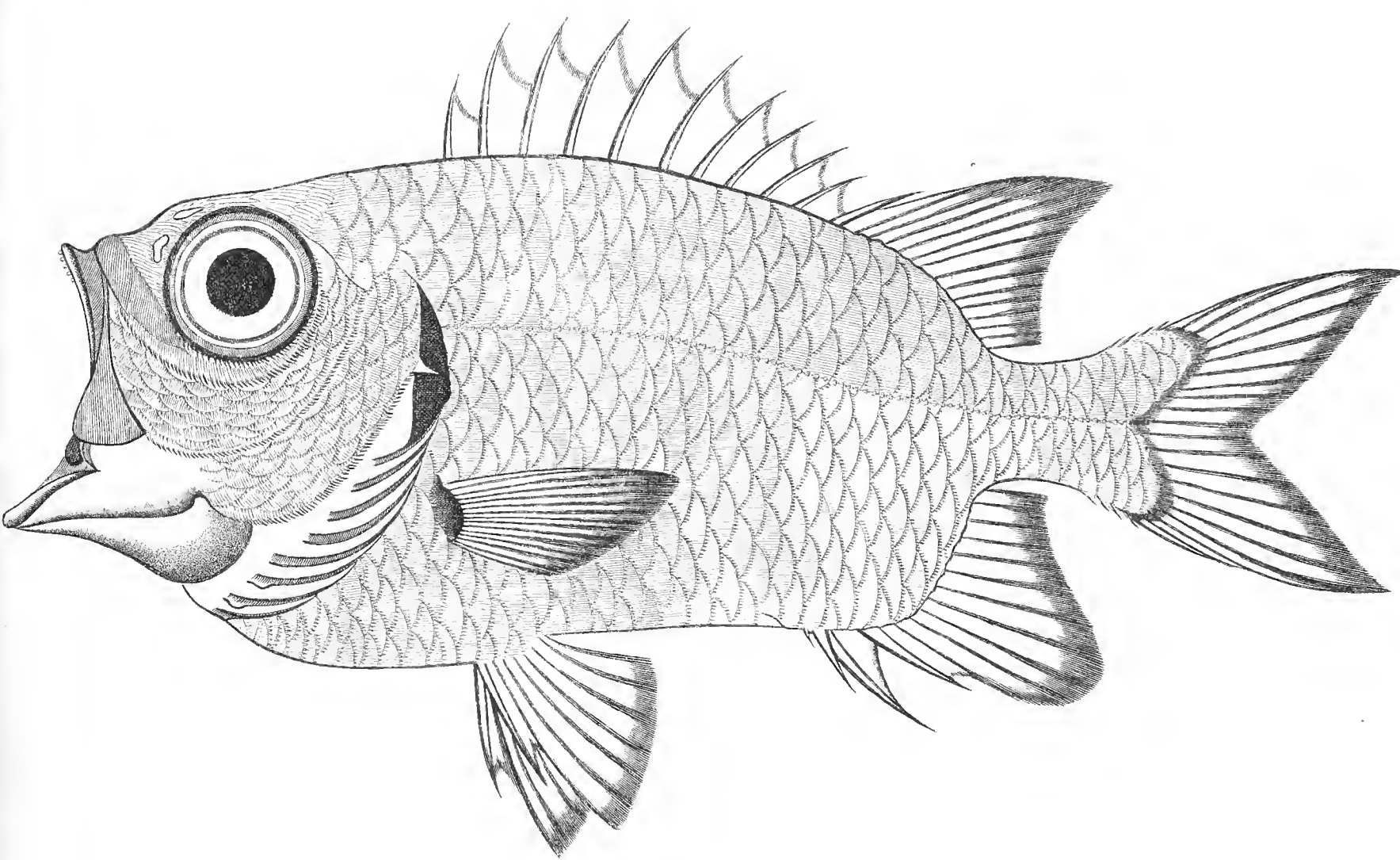
WORAHWAI.





SULLANEROO KUNTEE.

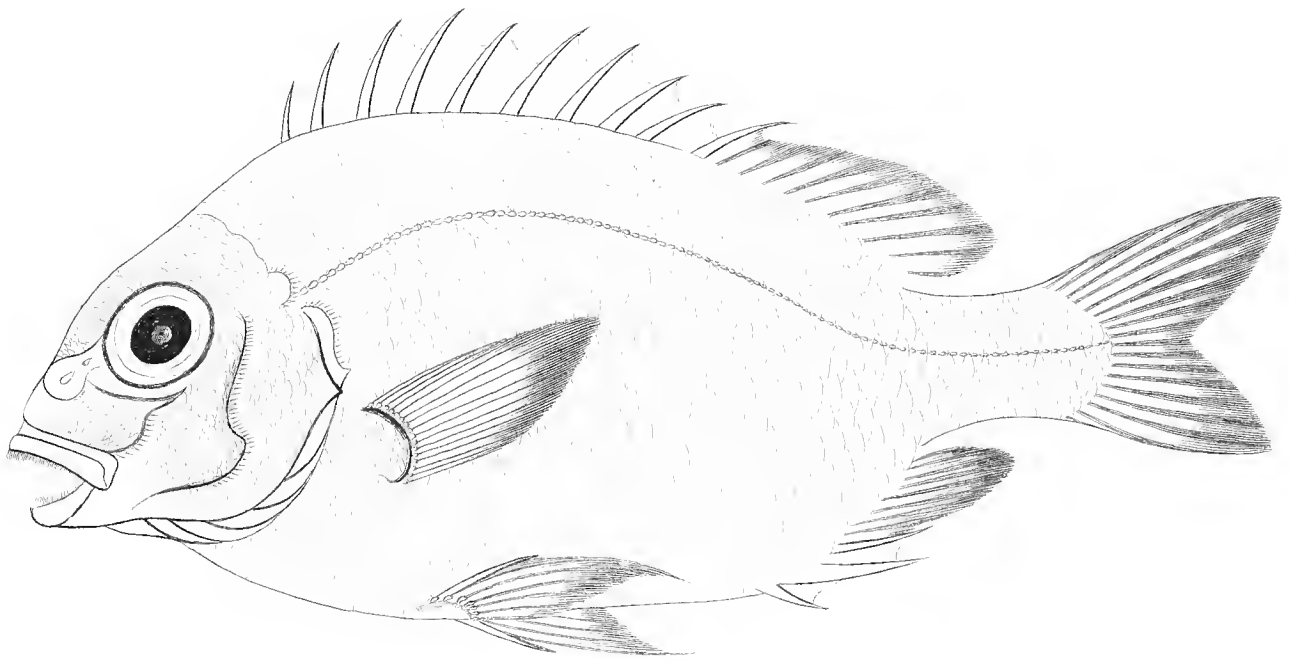




BOTCHE.

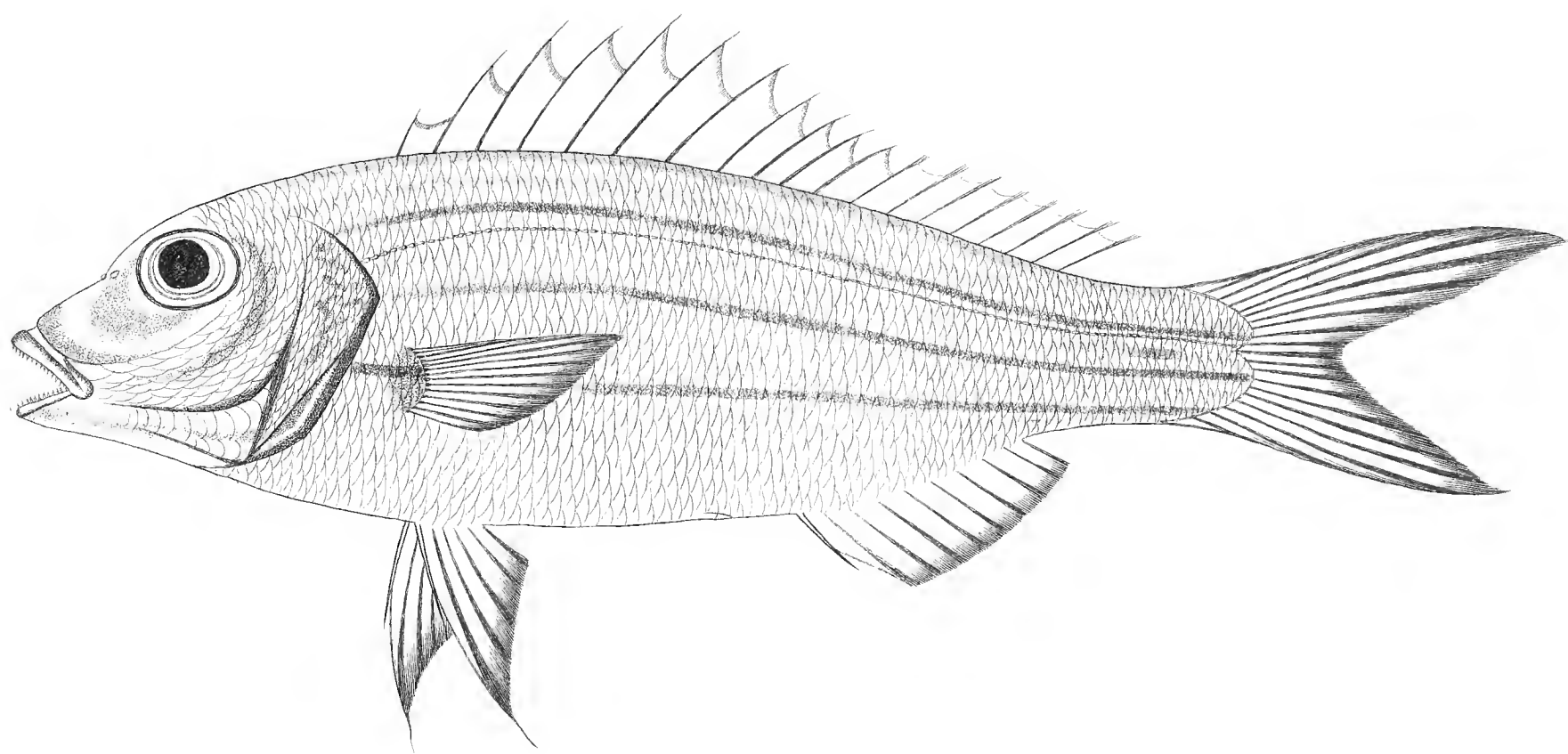






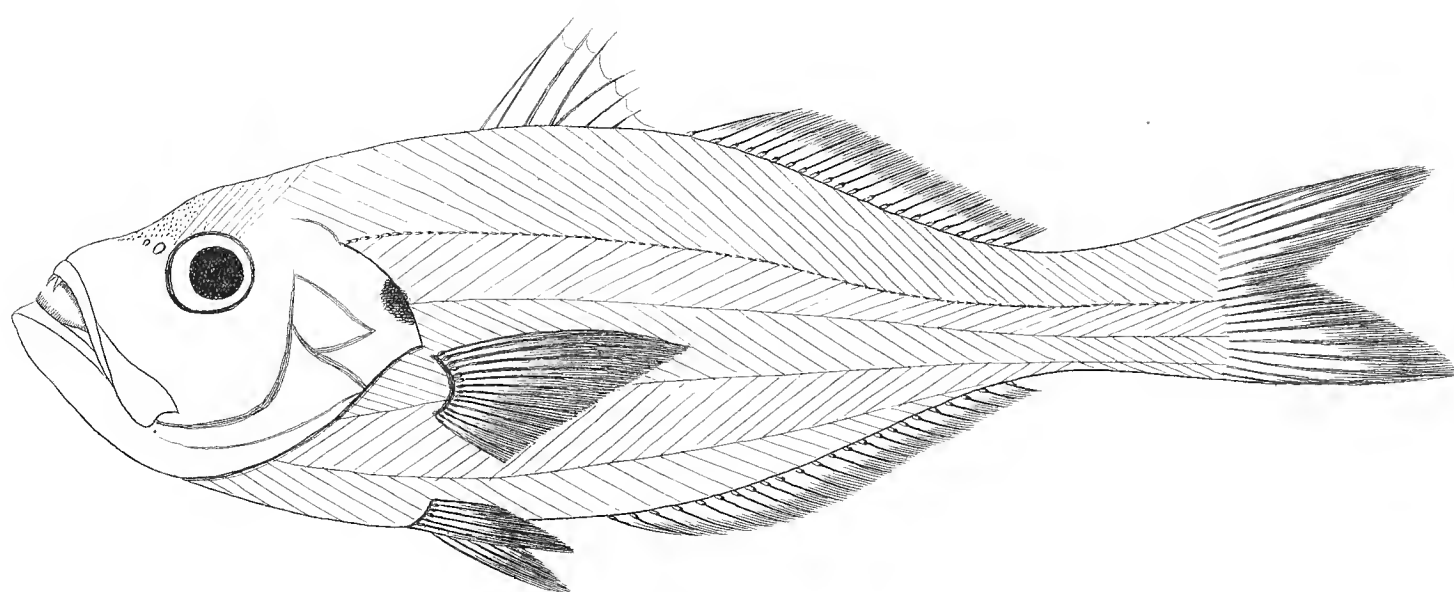
KURITE





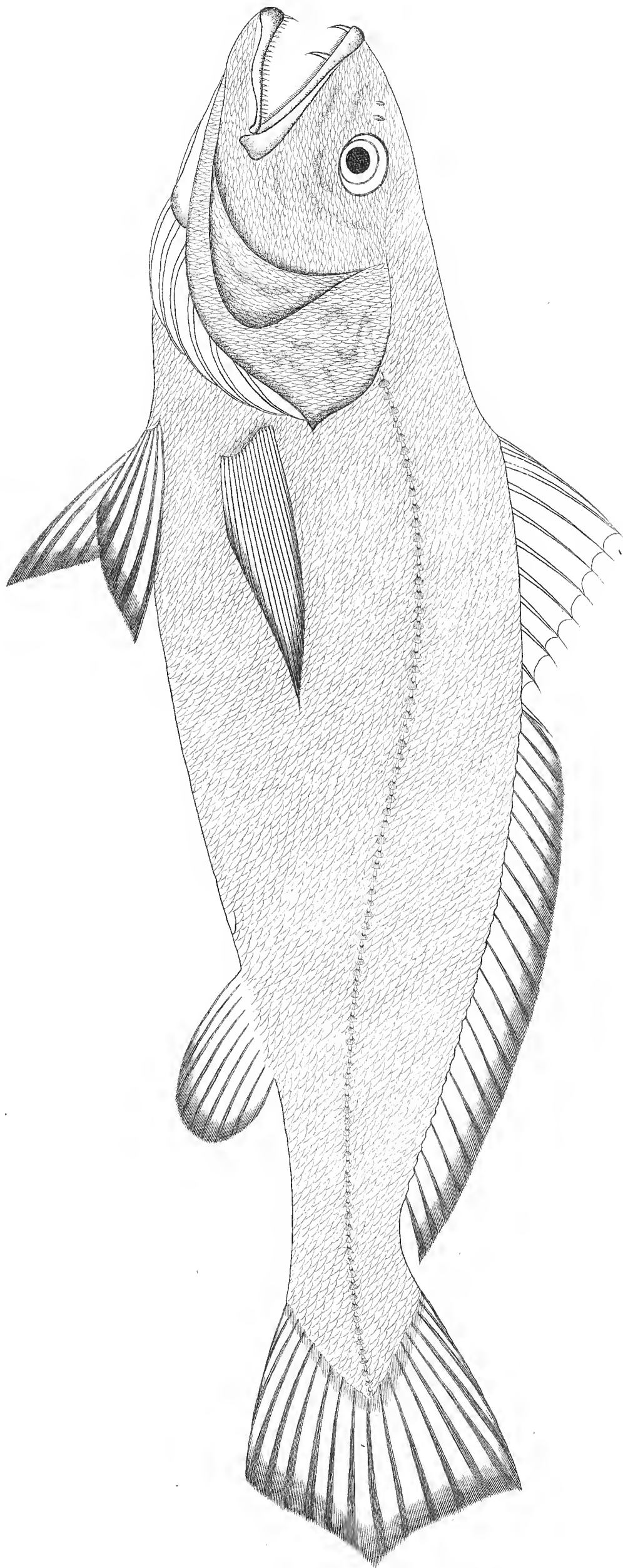
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CHUNDAWAH

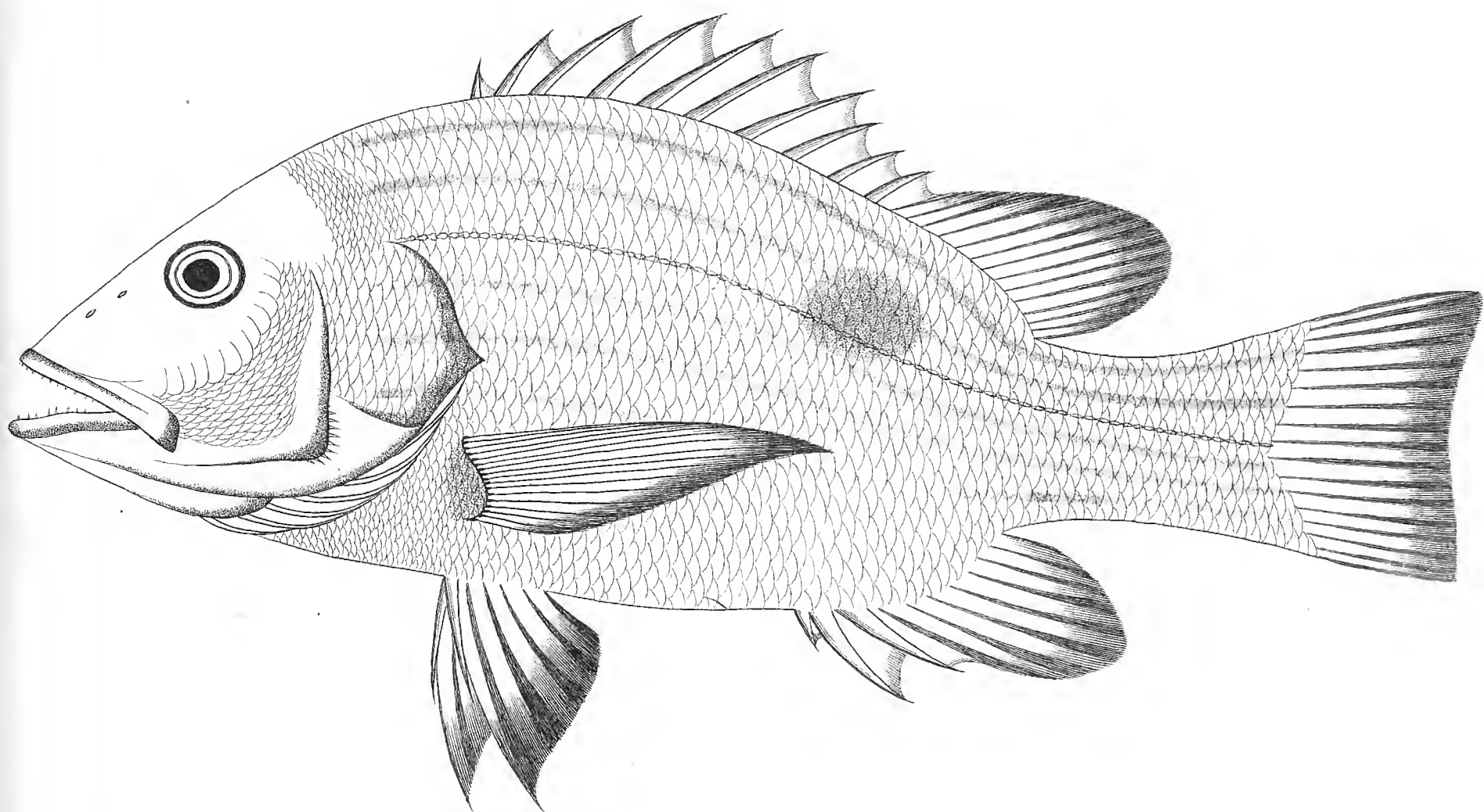




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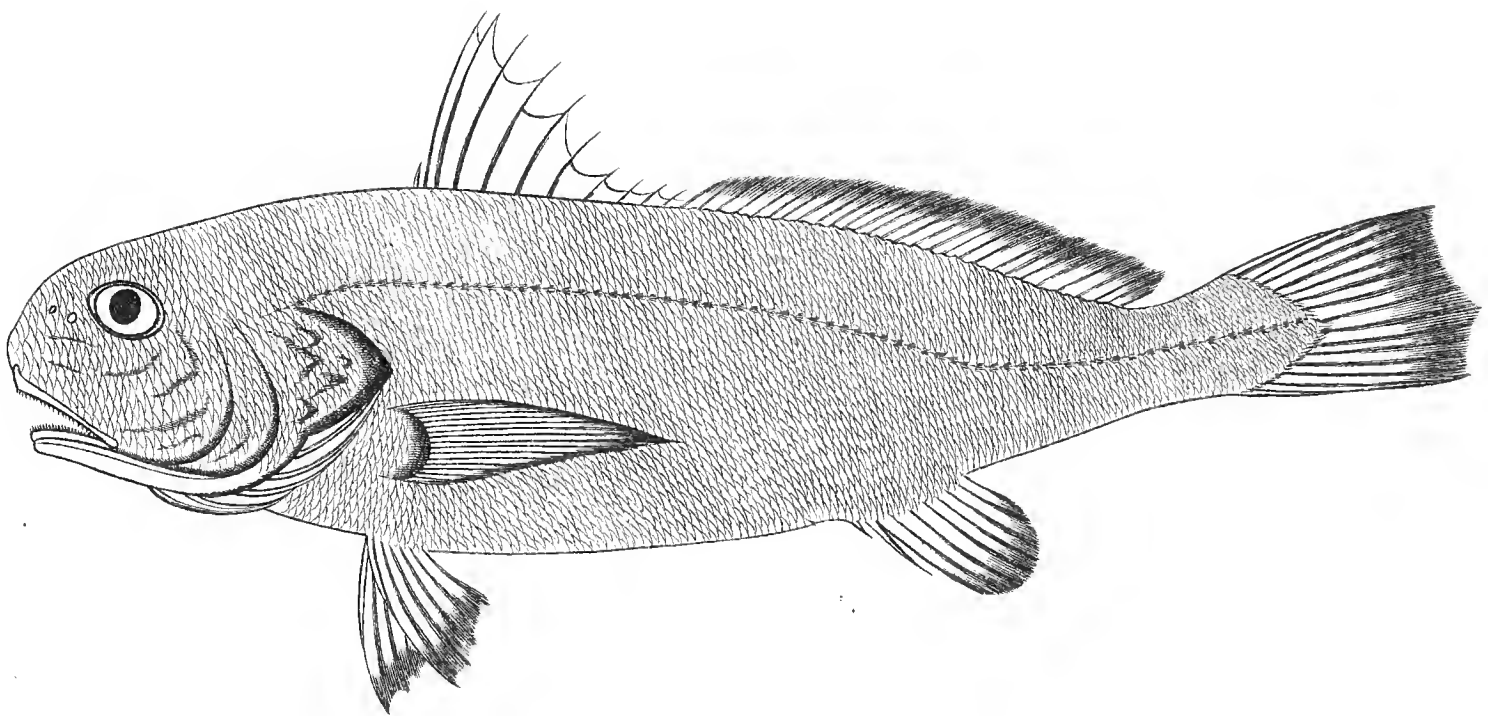




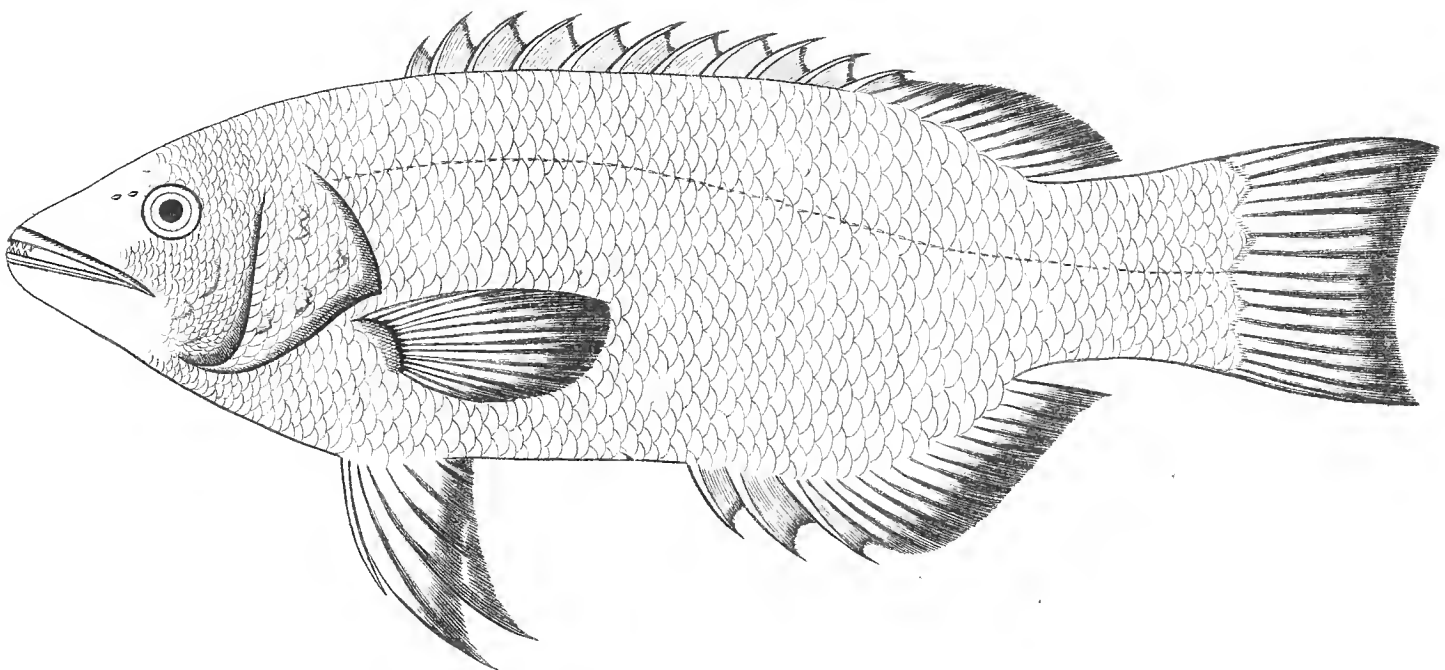


MUNGI MUPUDEE

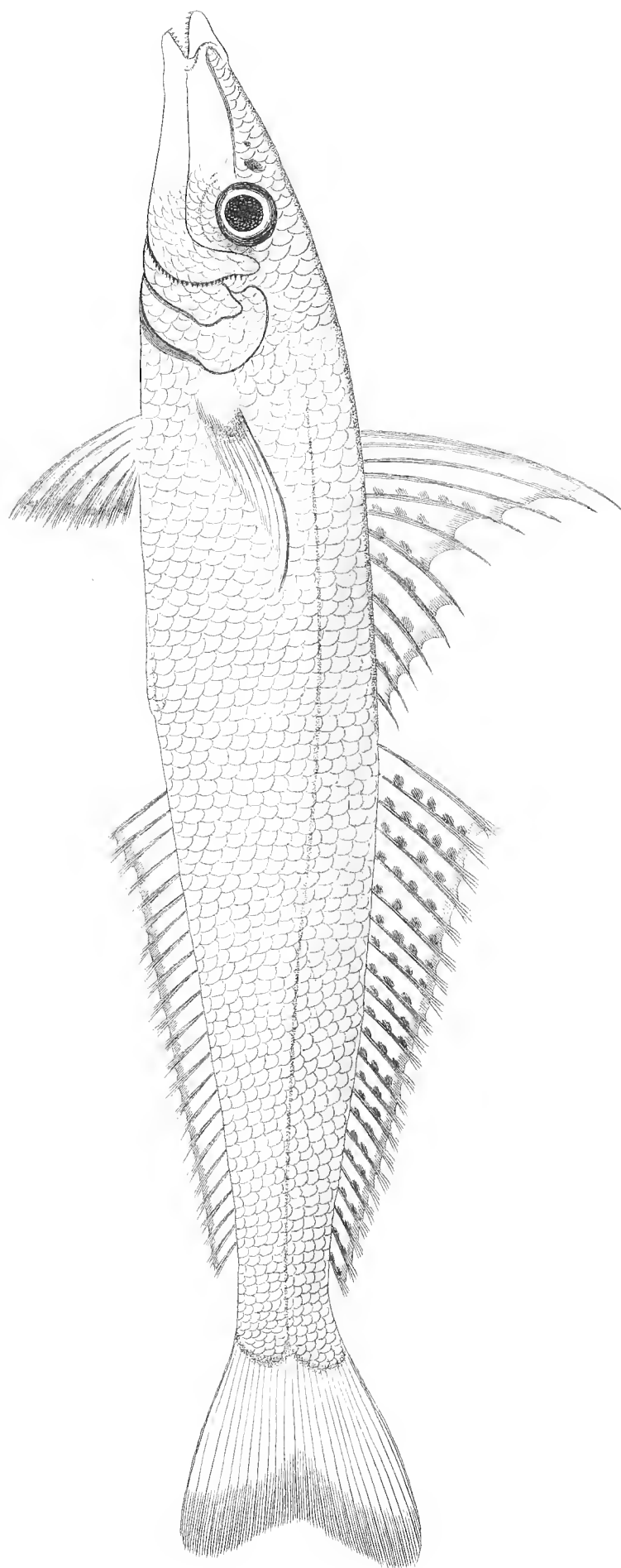








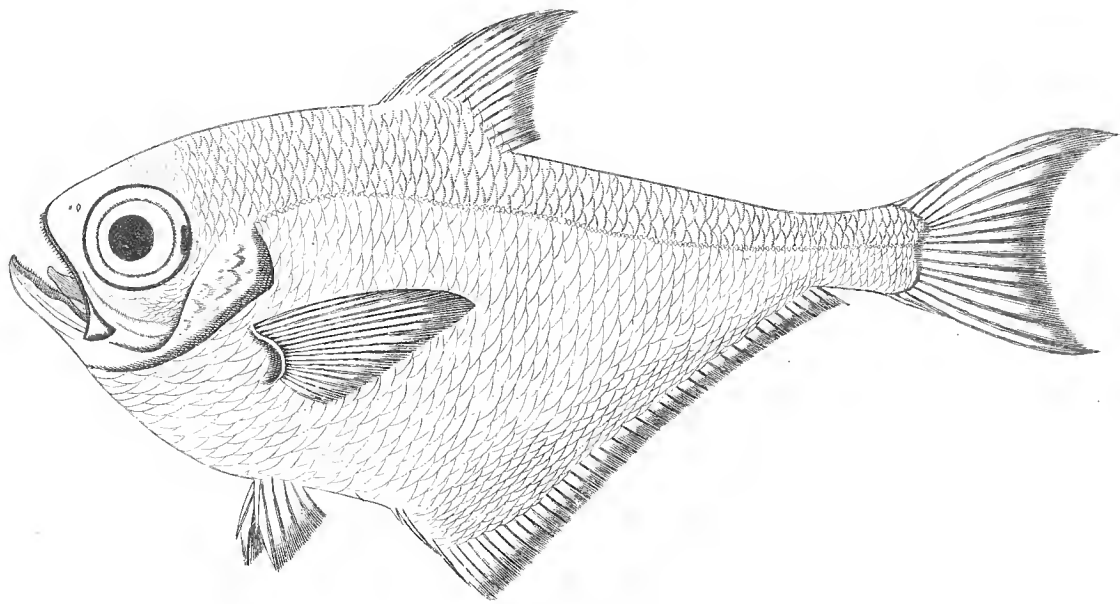




SORING

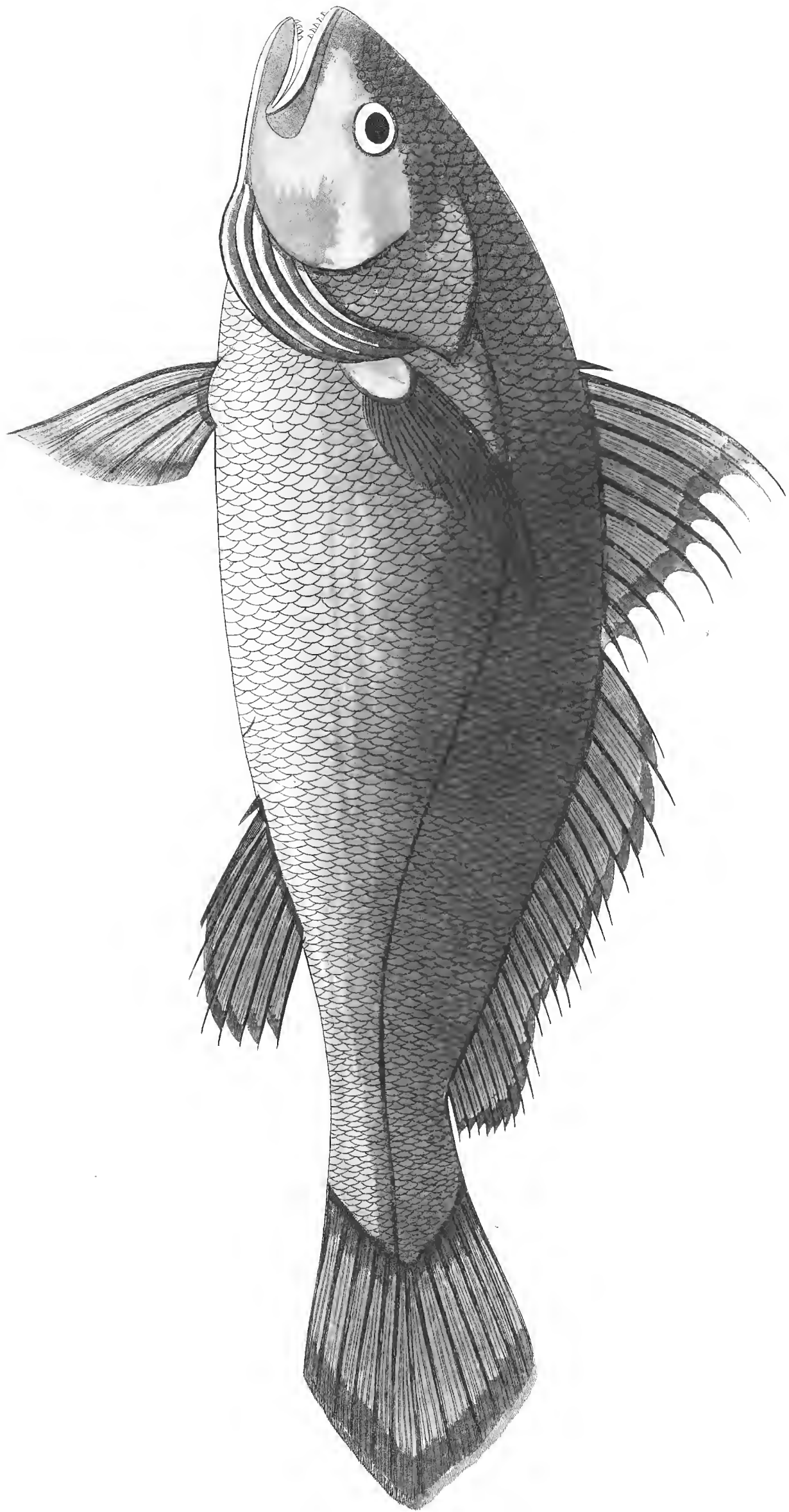






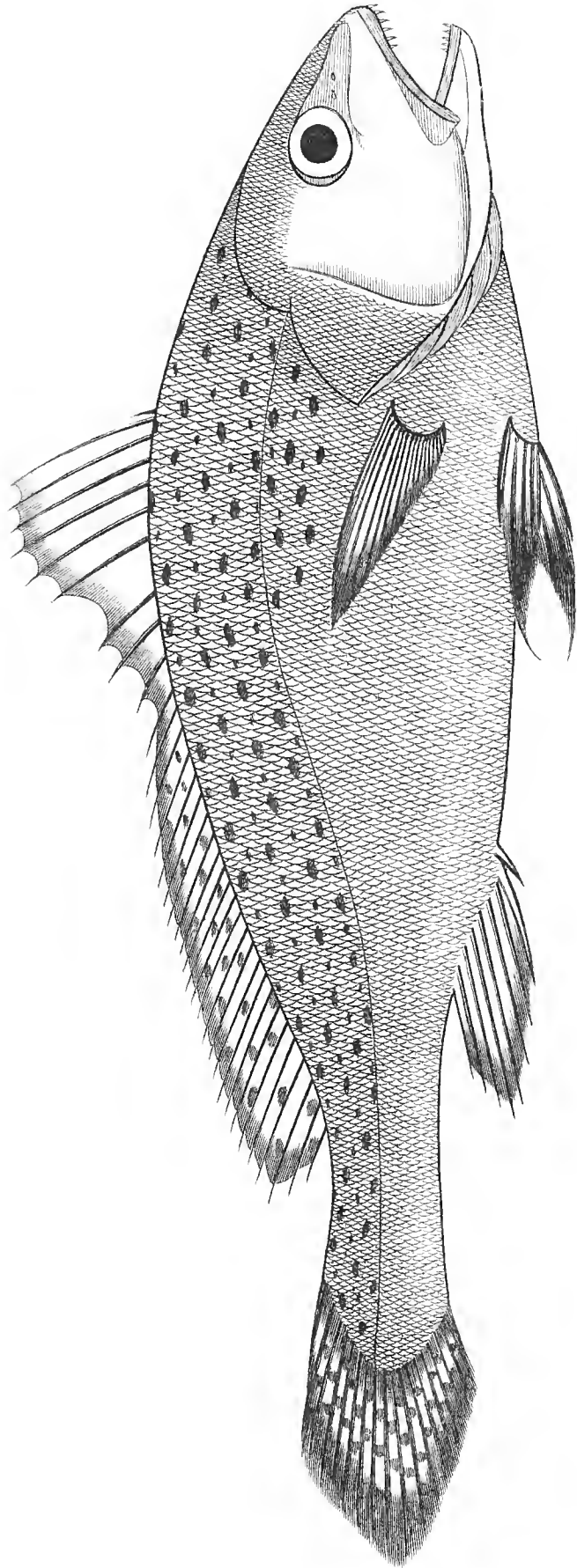
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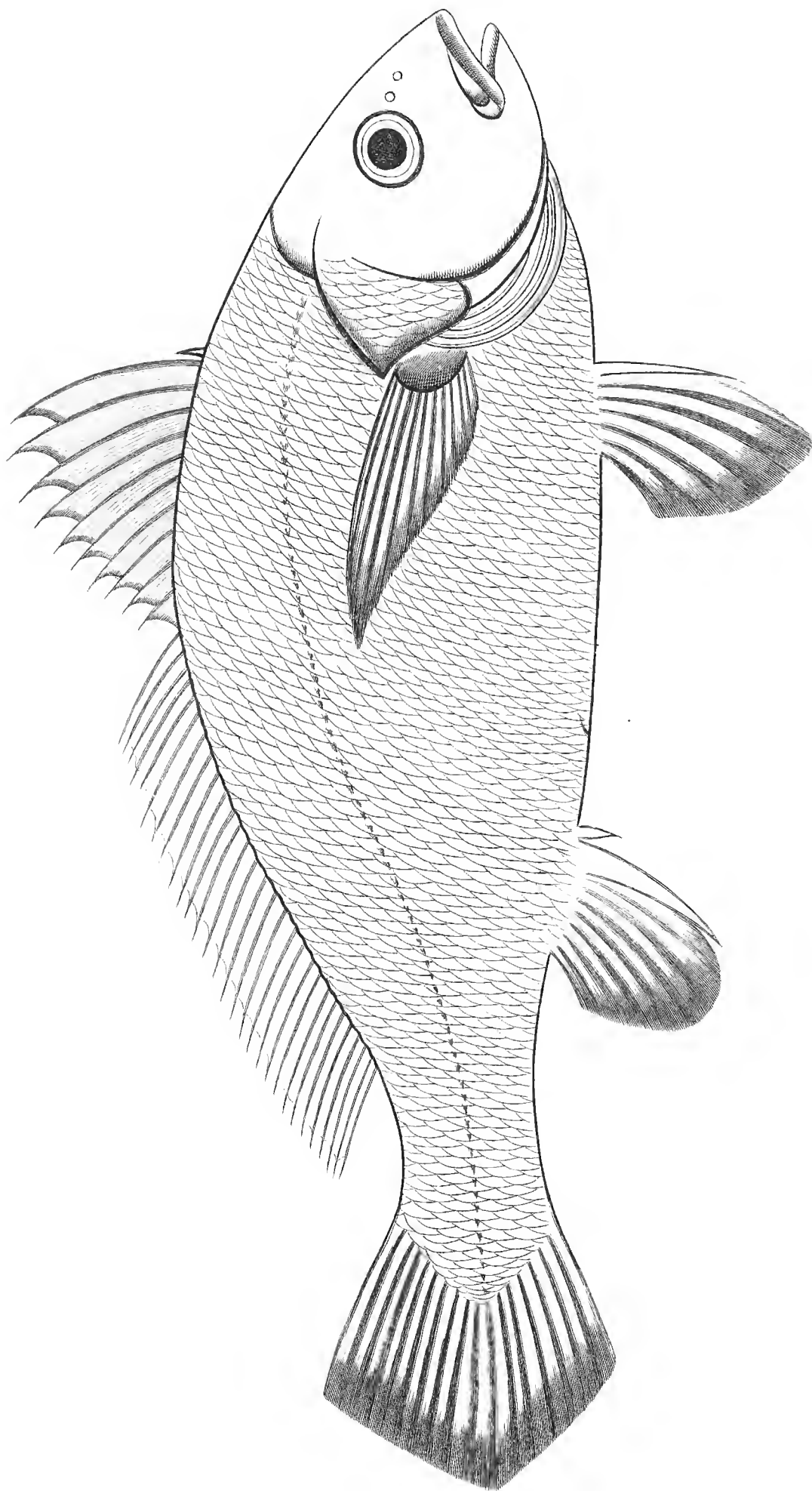
NALLA KATCHELEE.





KATCHELEE.

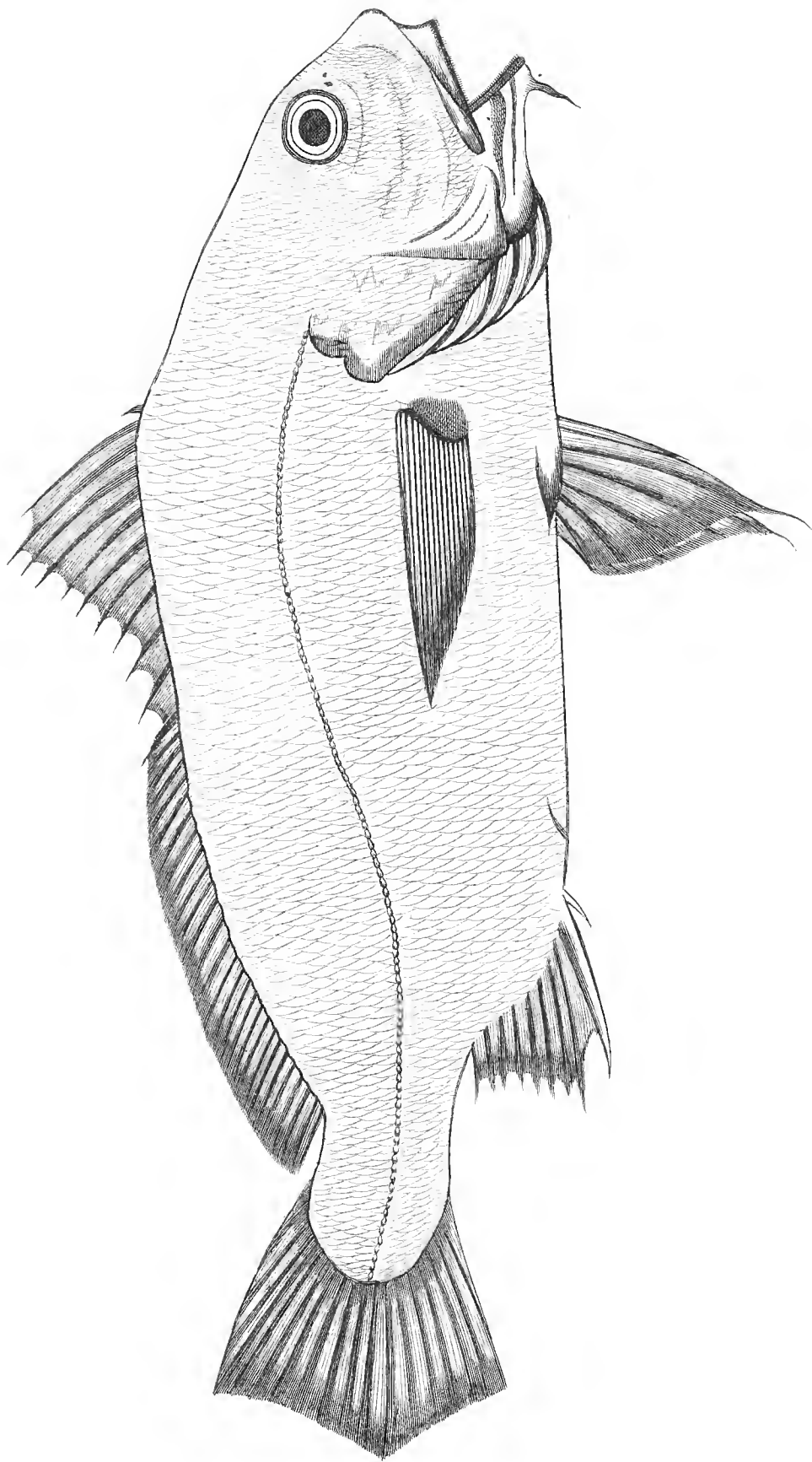




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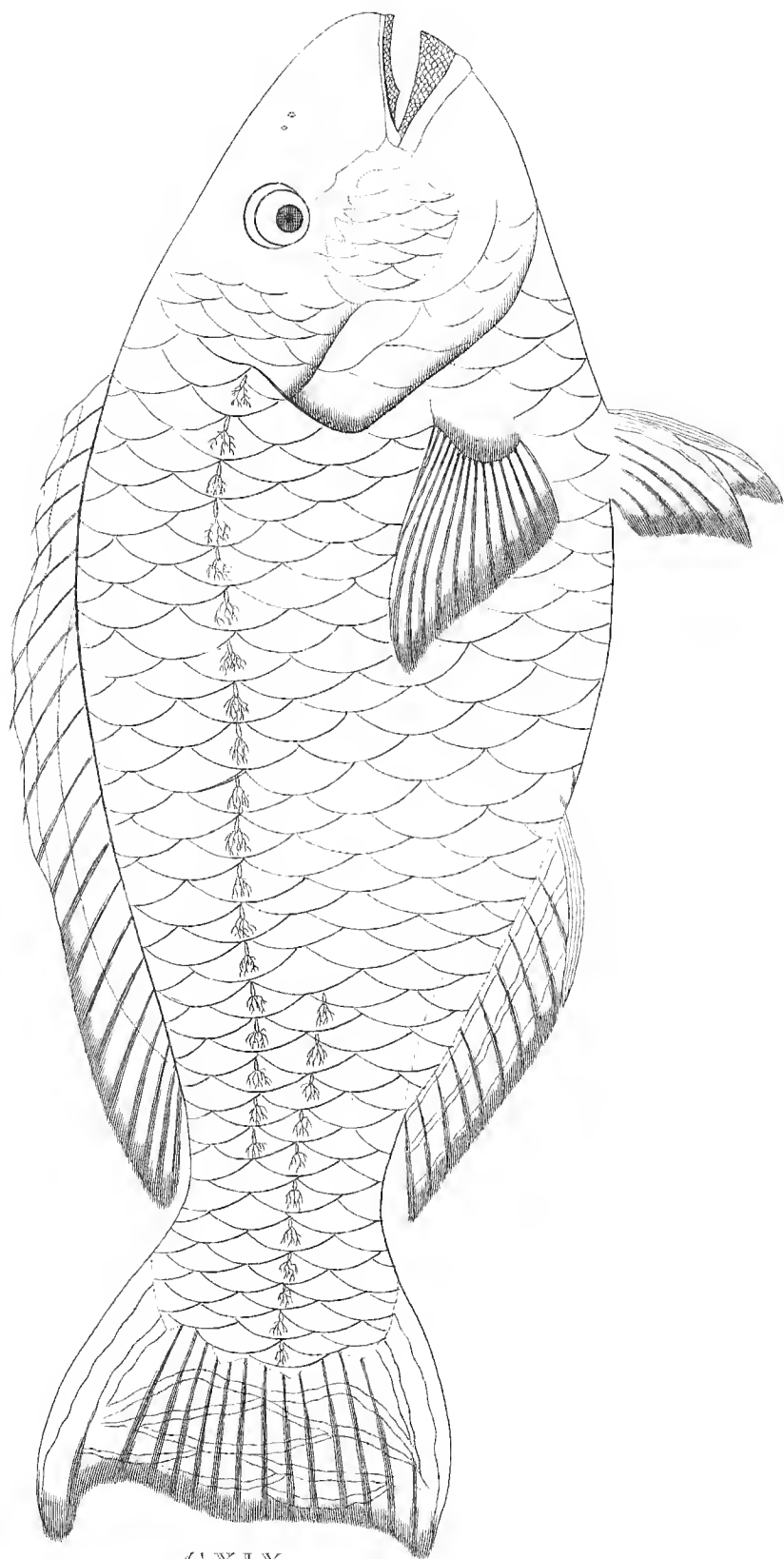




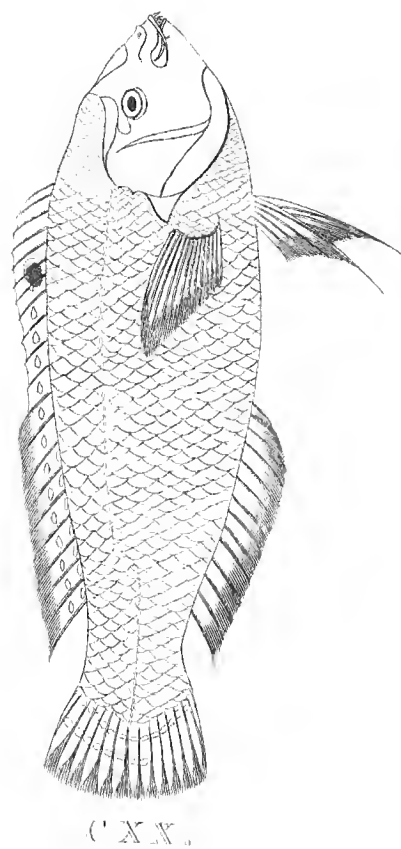


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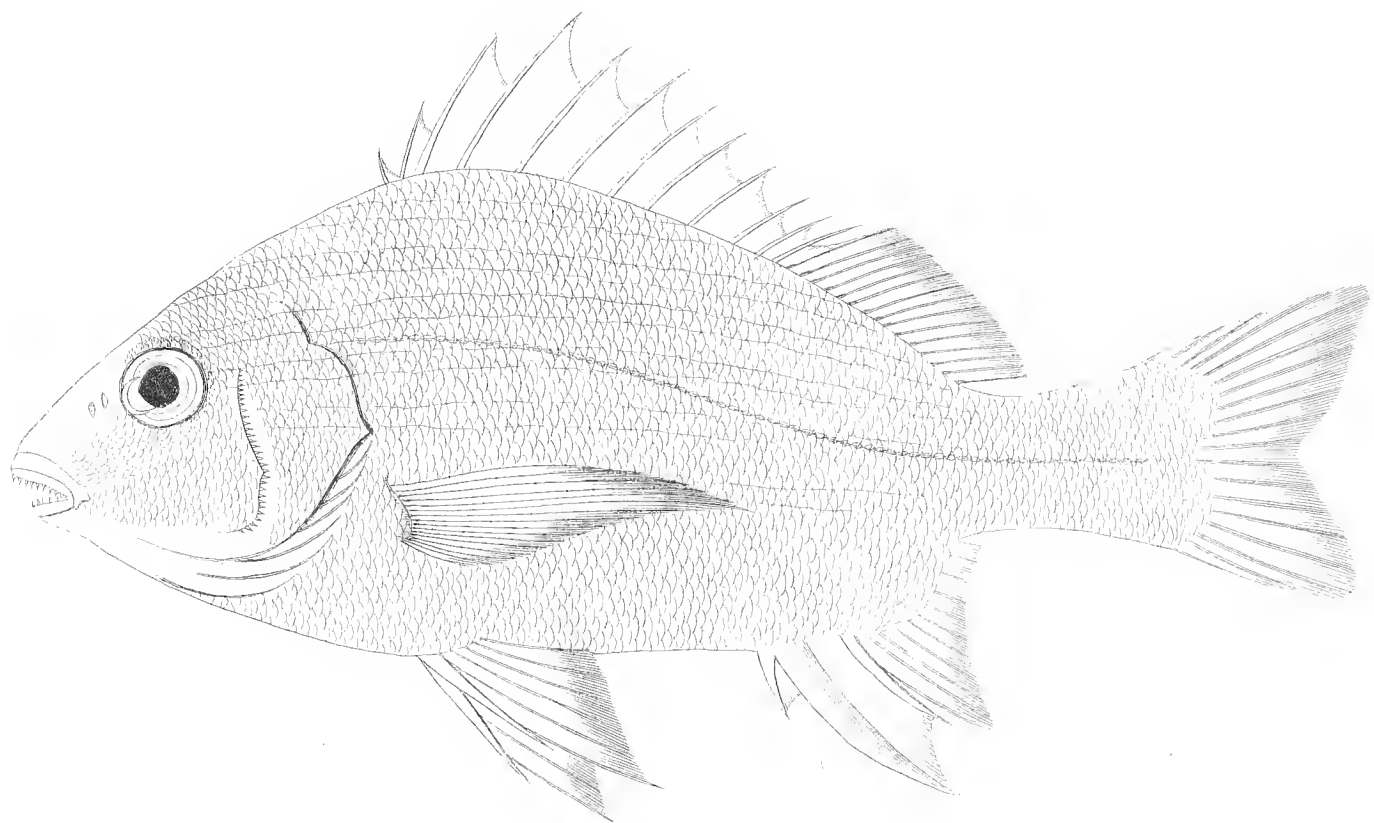


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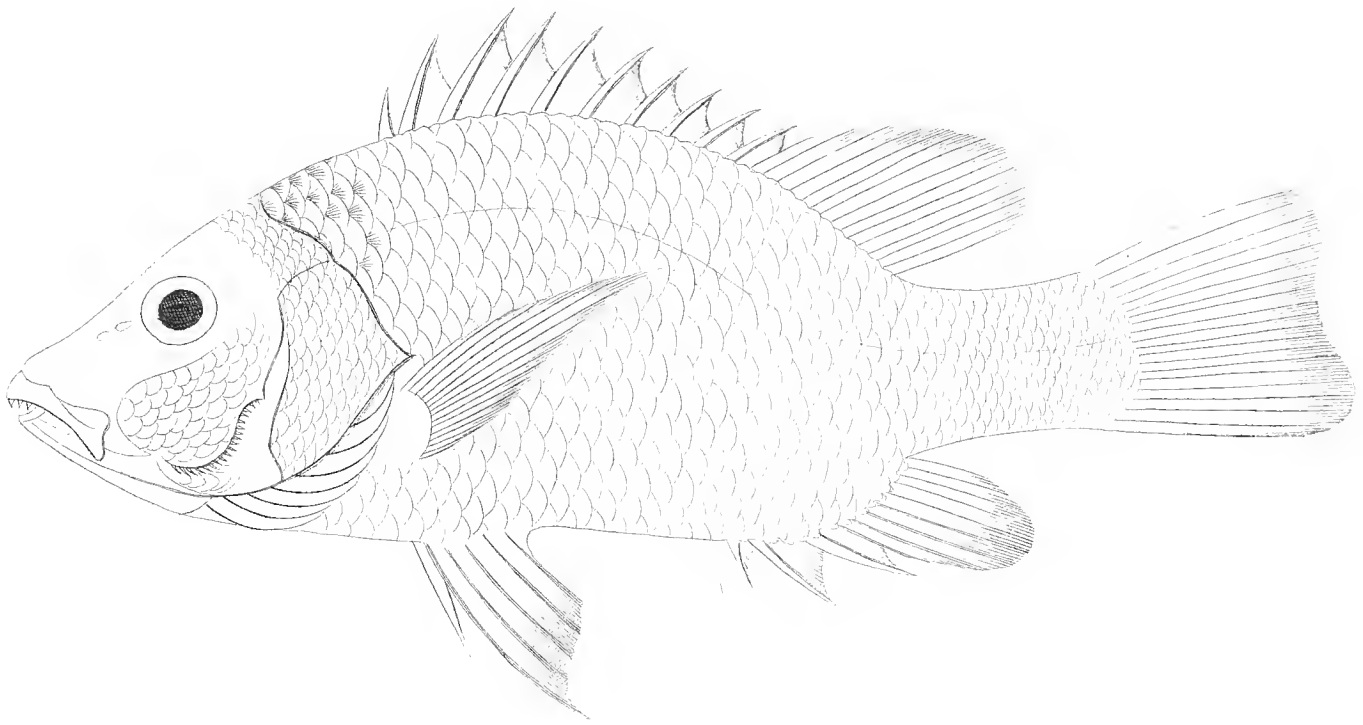
SAHNE MOLA





PAUKFELI

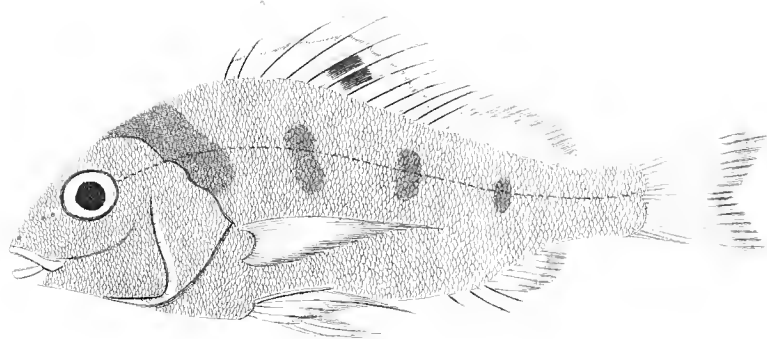




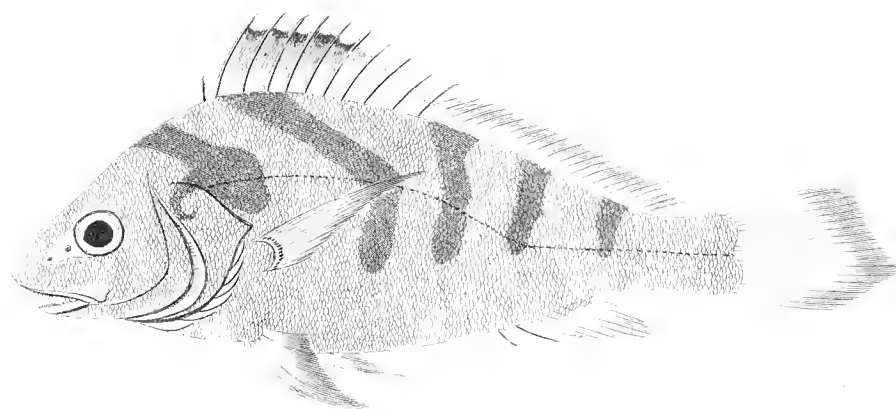
DOONDAWAH







CXXIV

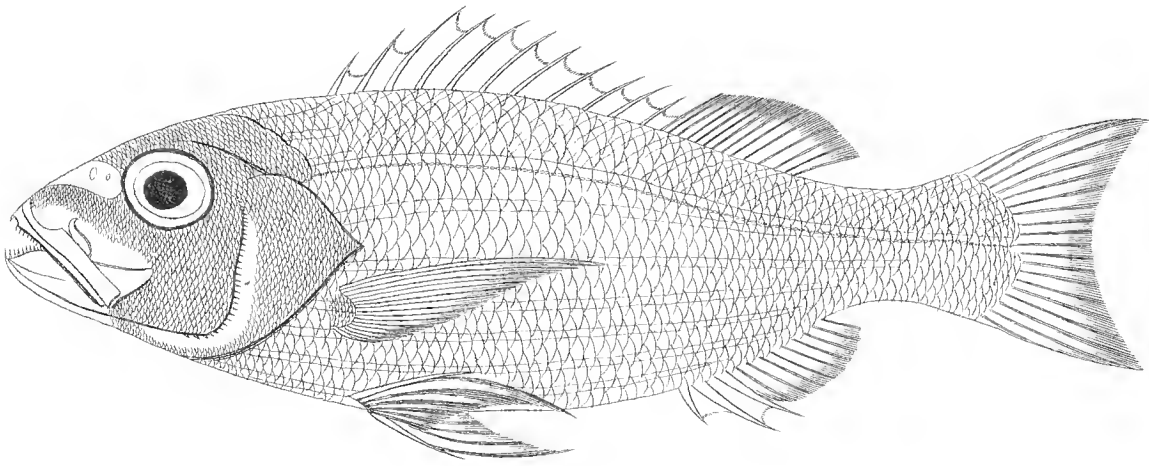


CXXIII

SARI KULLA

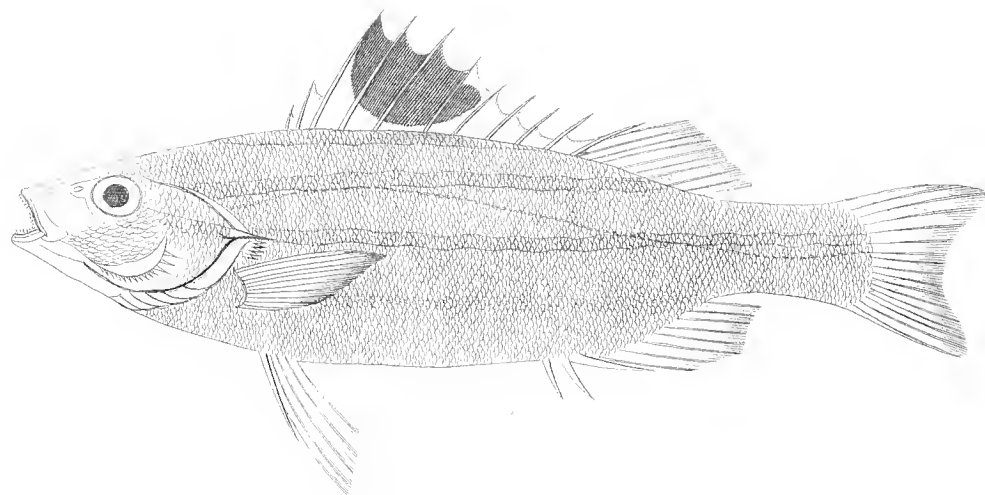
CARIPE





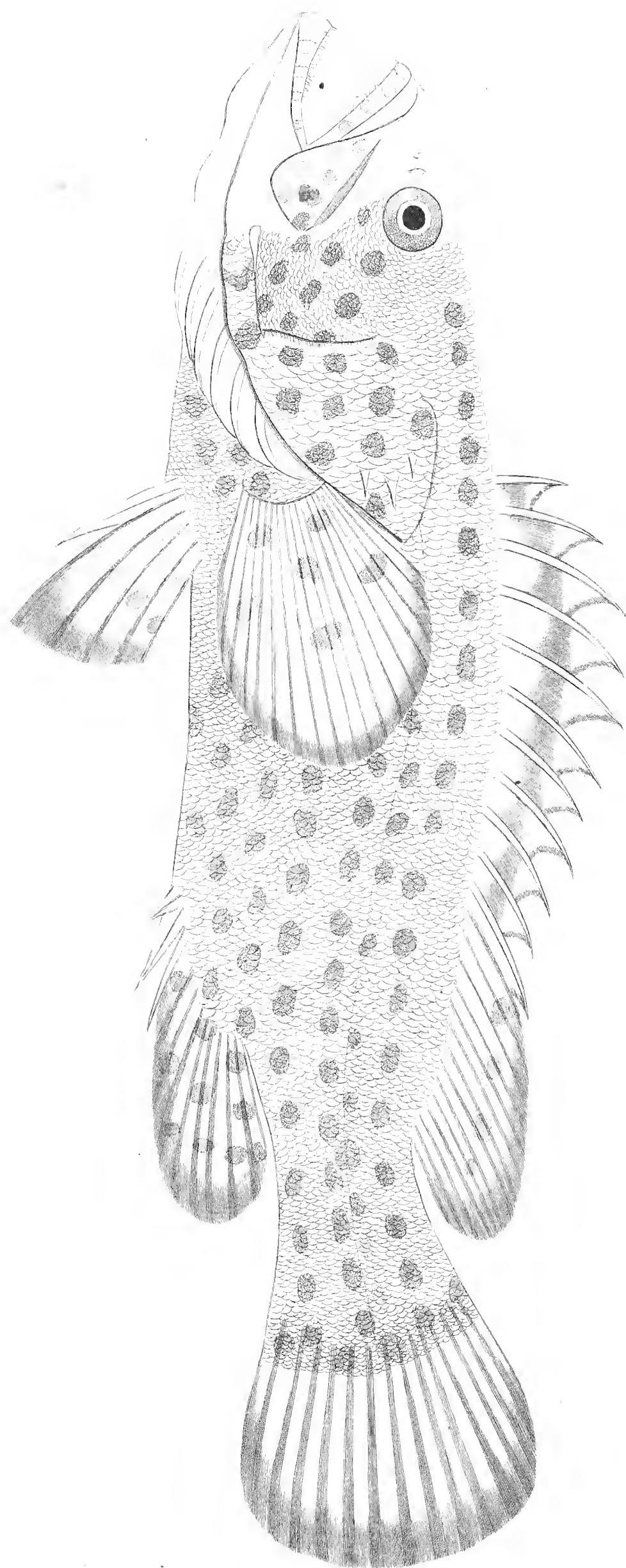
KAROOI





KEELPUTA

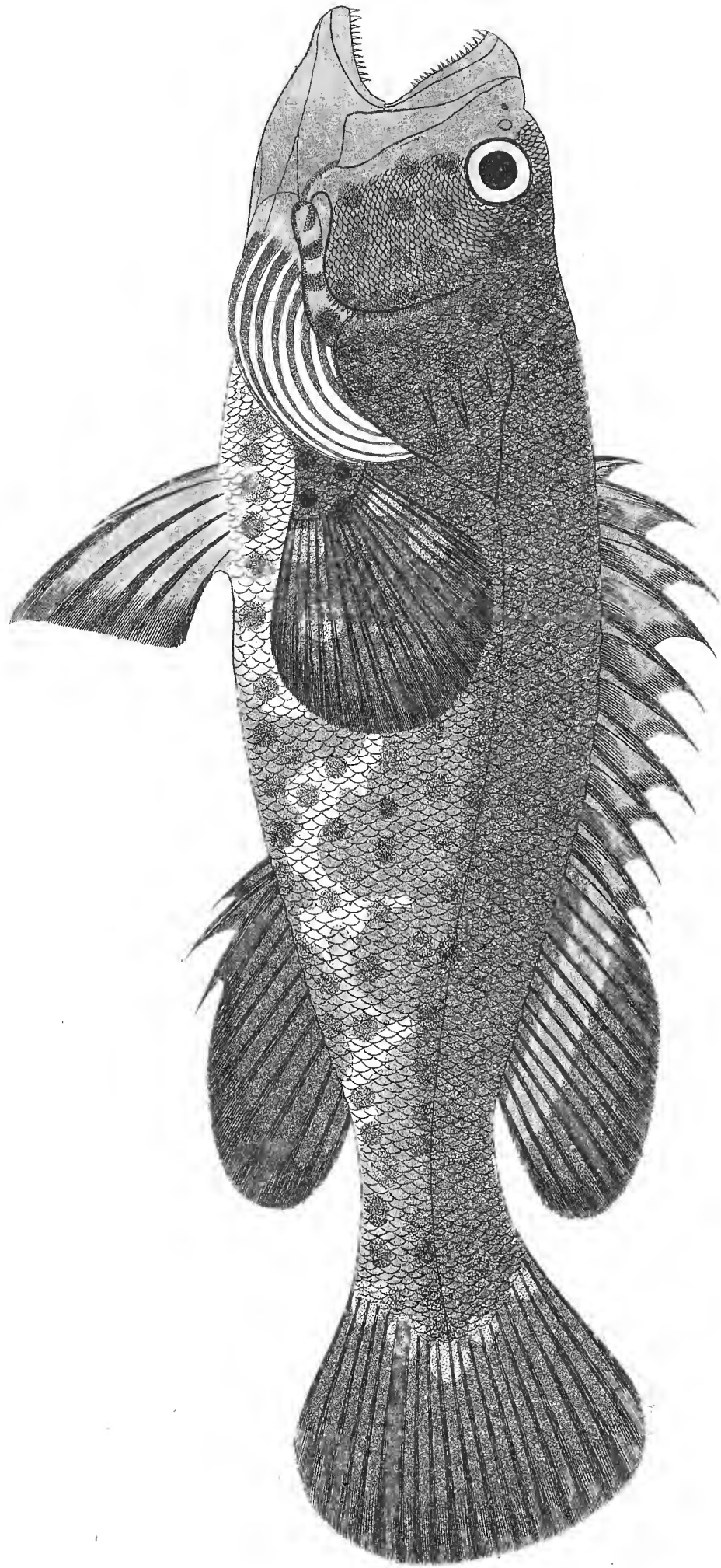




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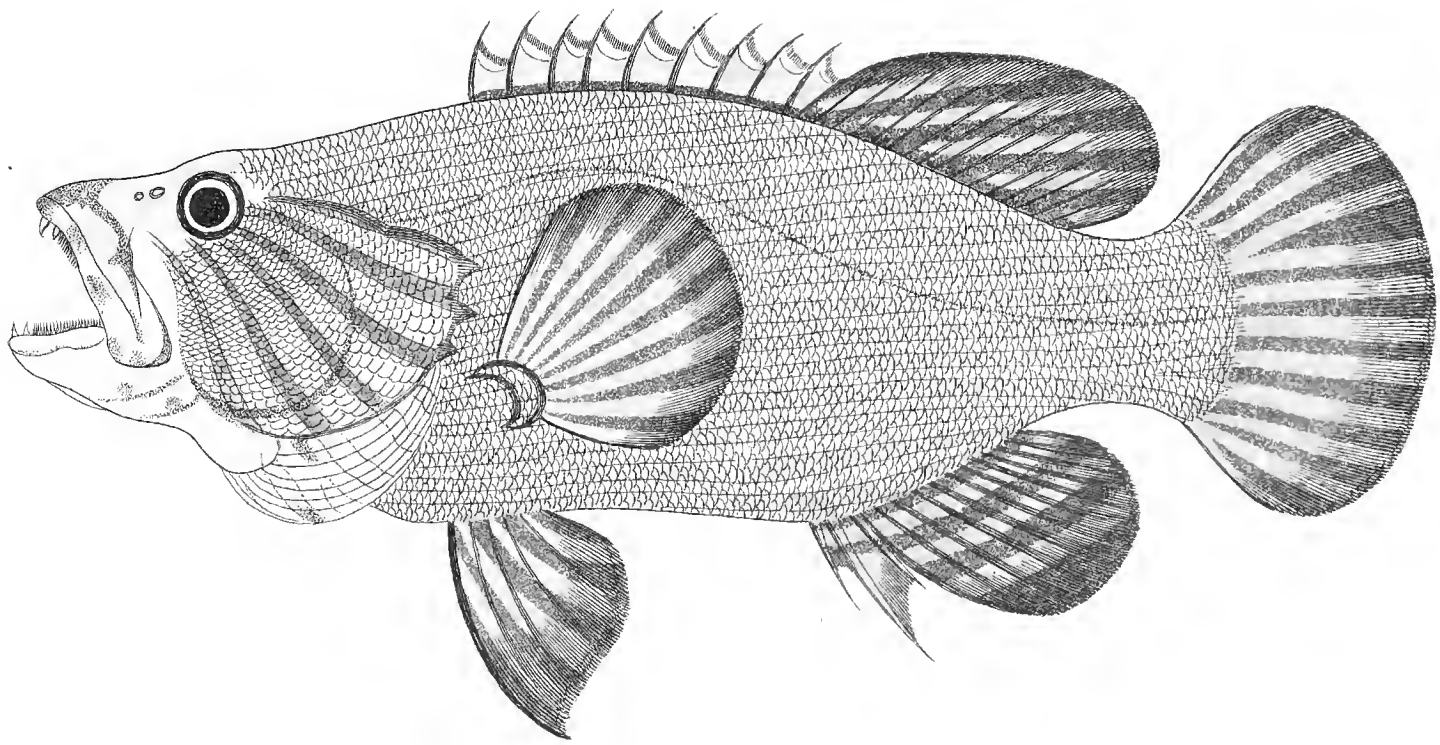






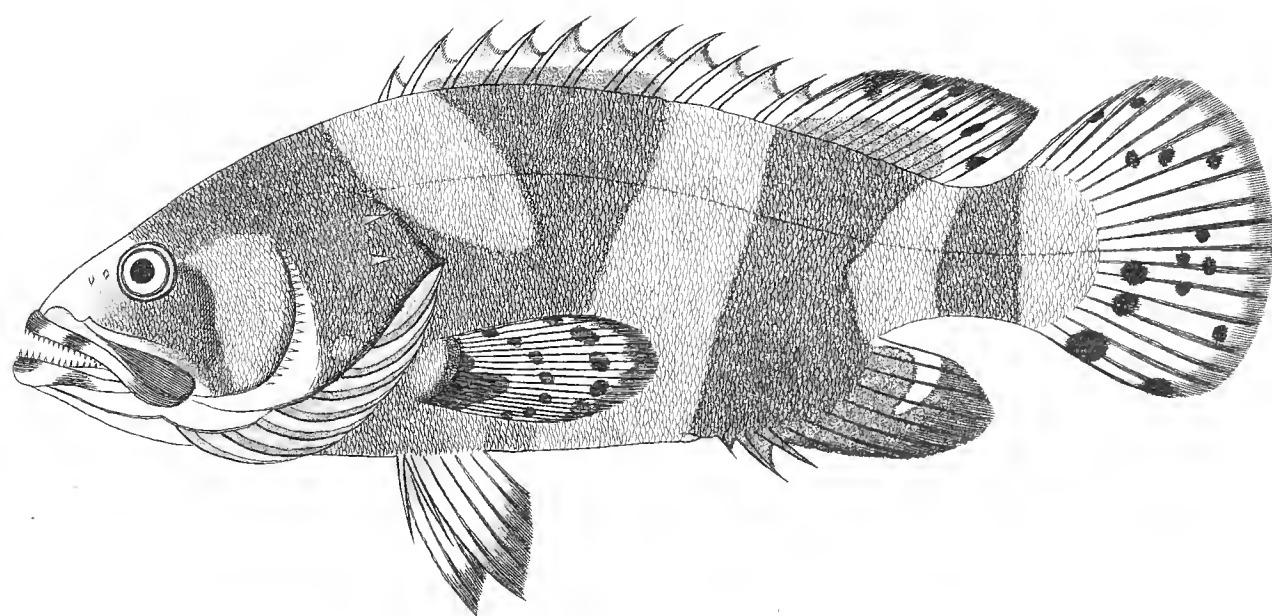
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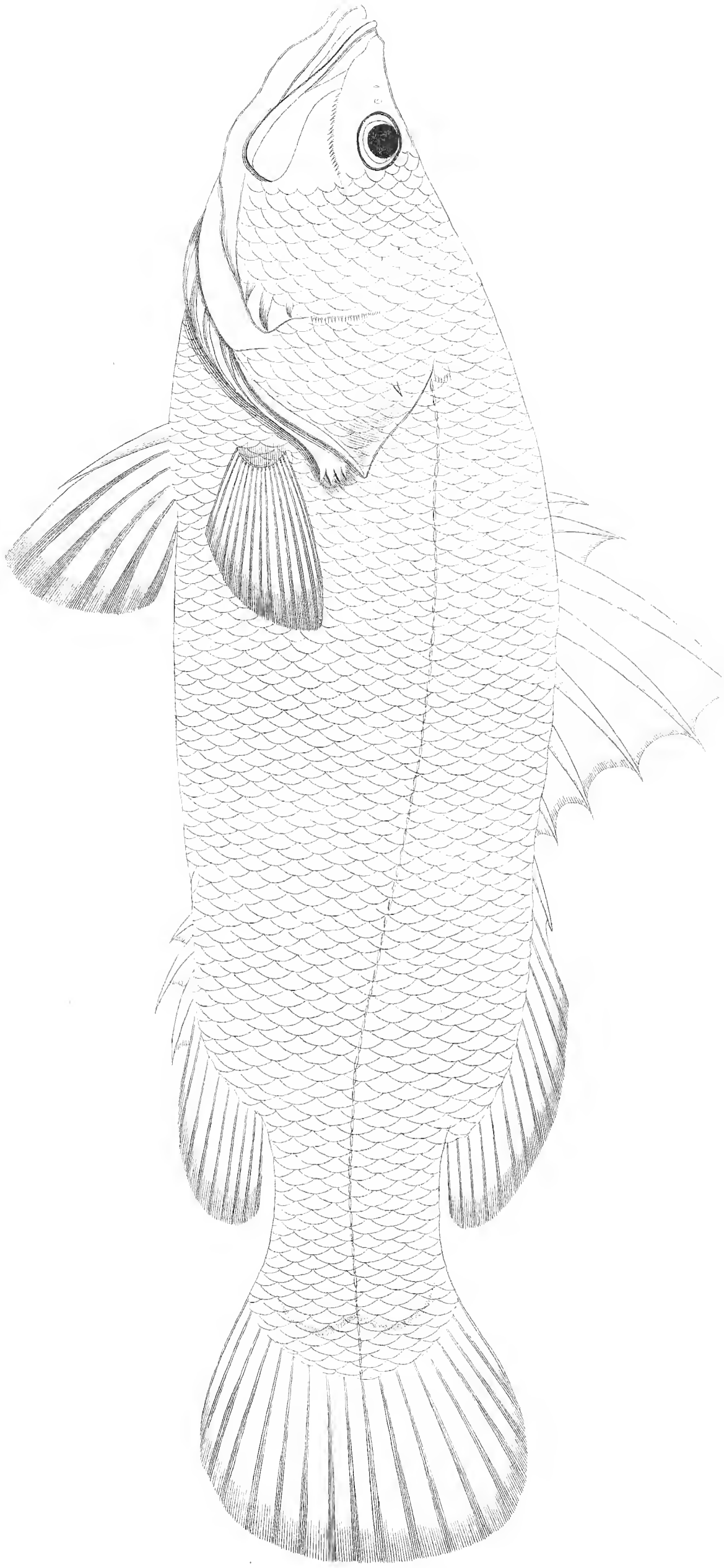
RAHTEE BONTOO





SUGGALAITOO BONTOO

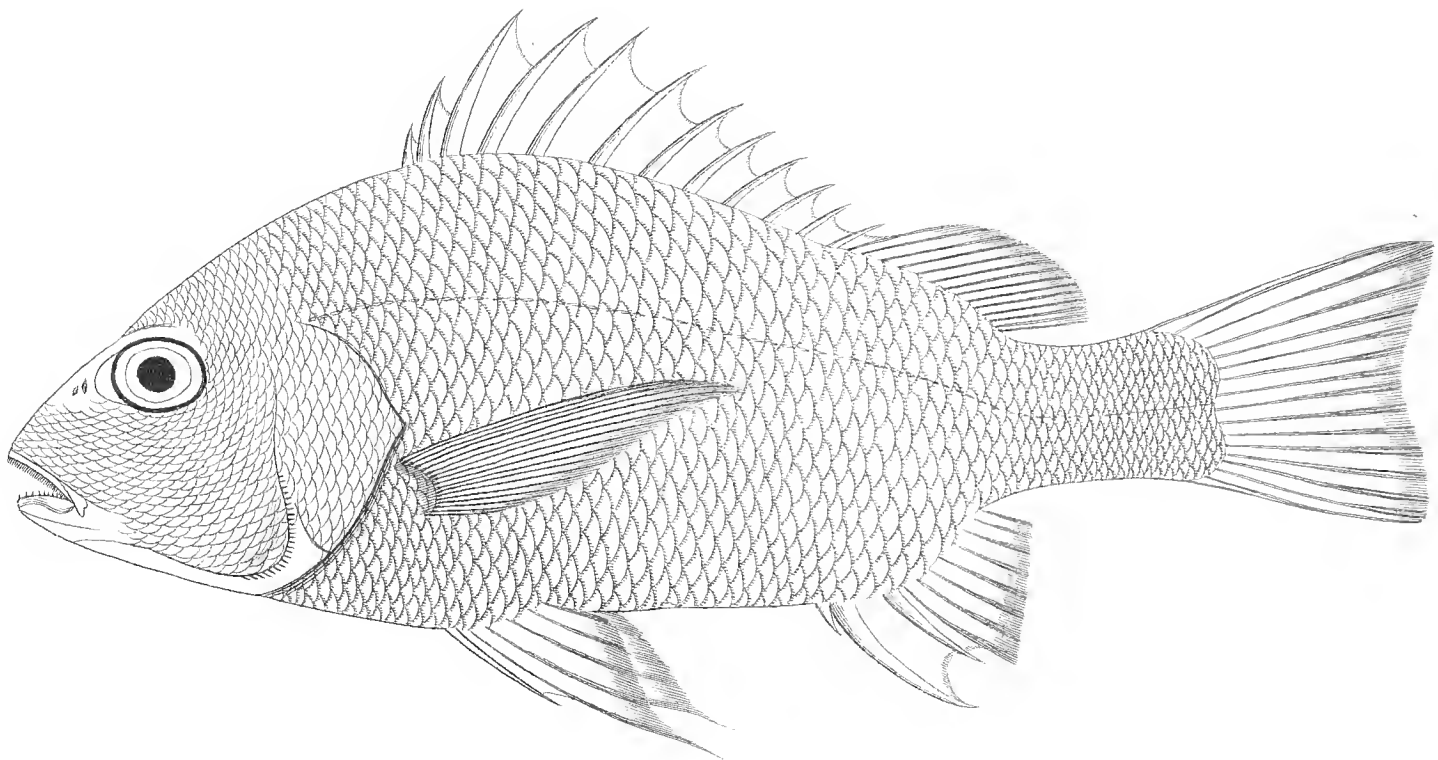




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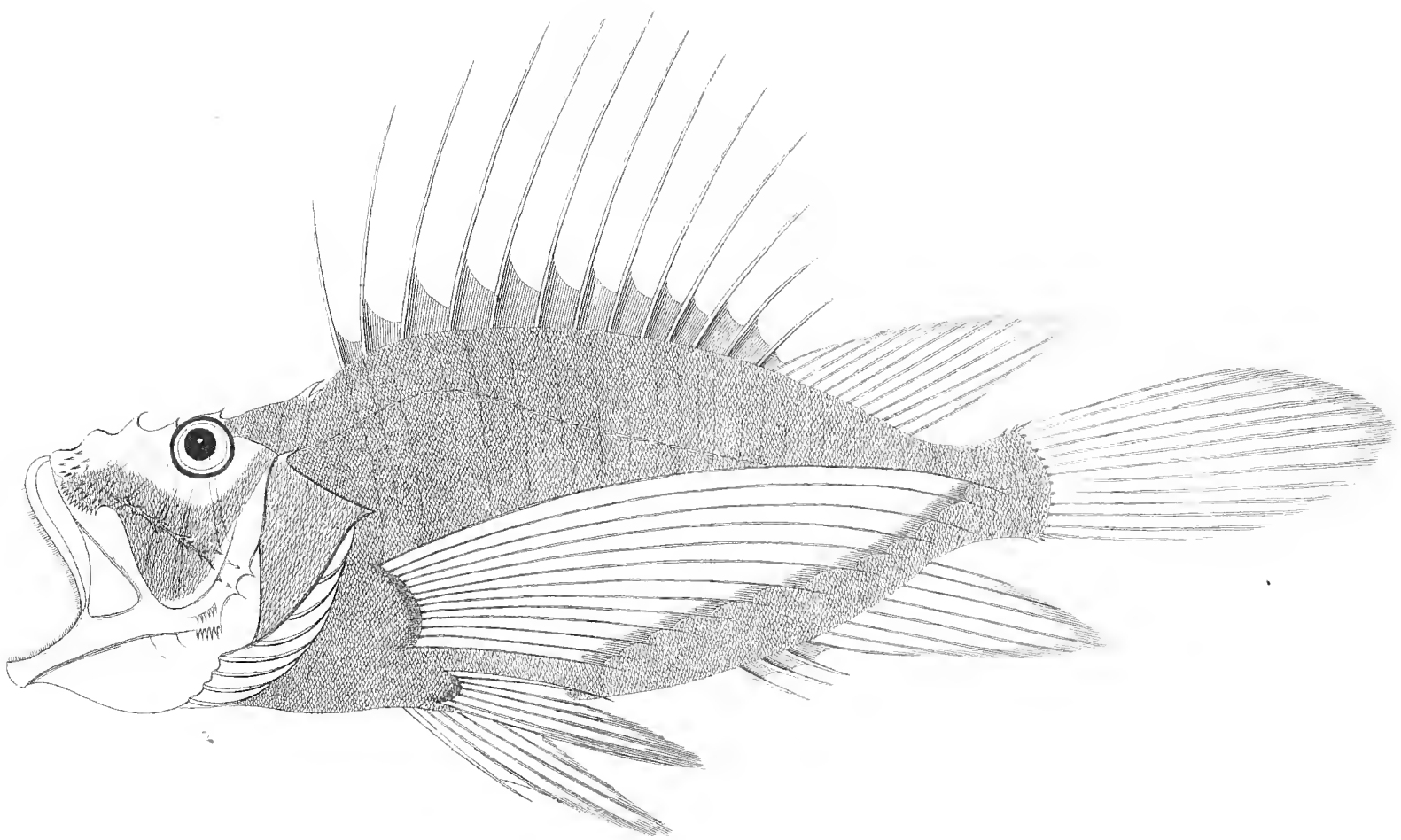






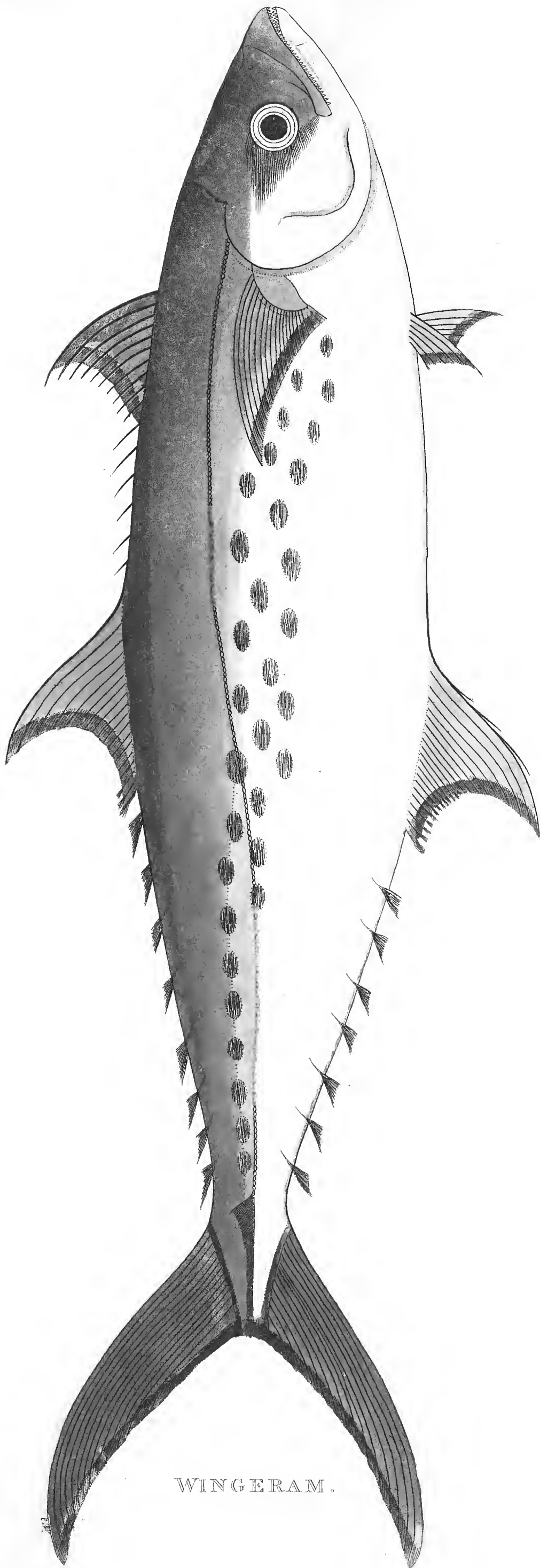
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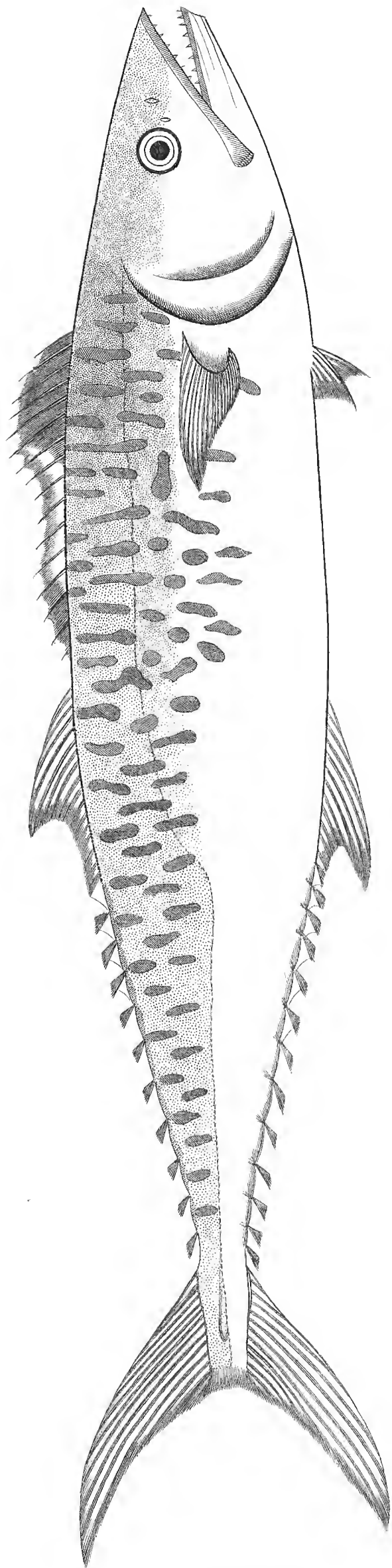
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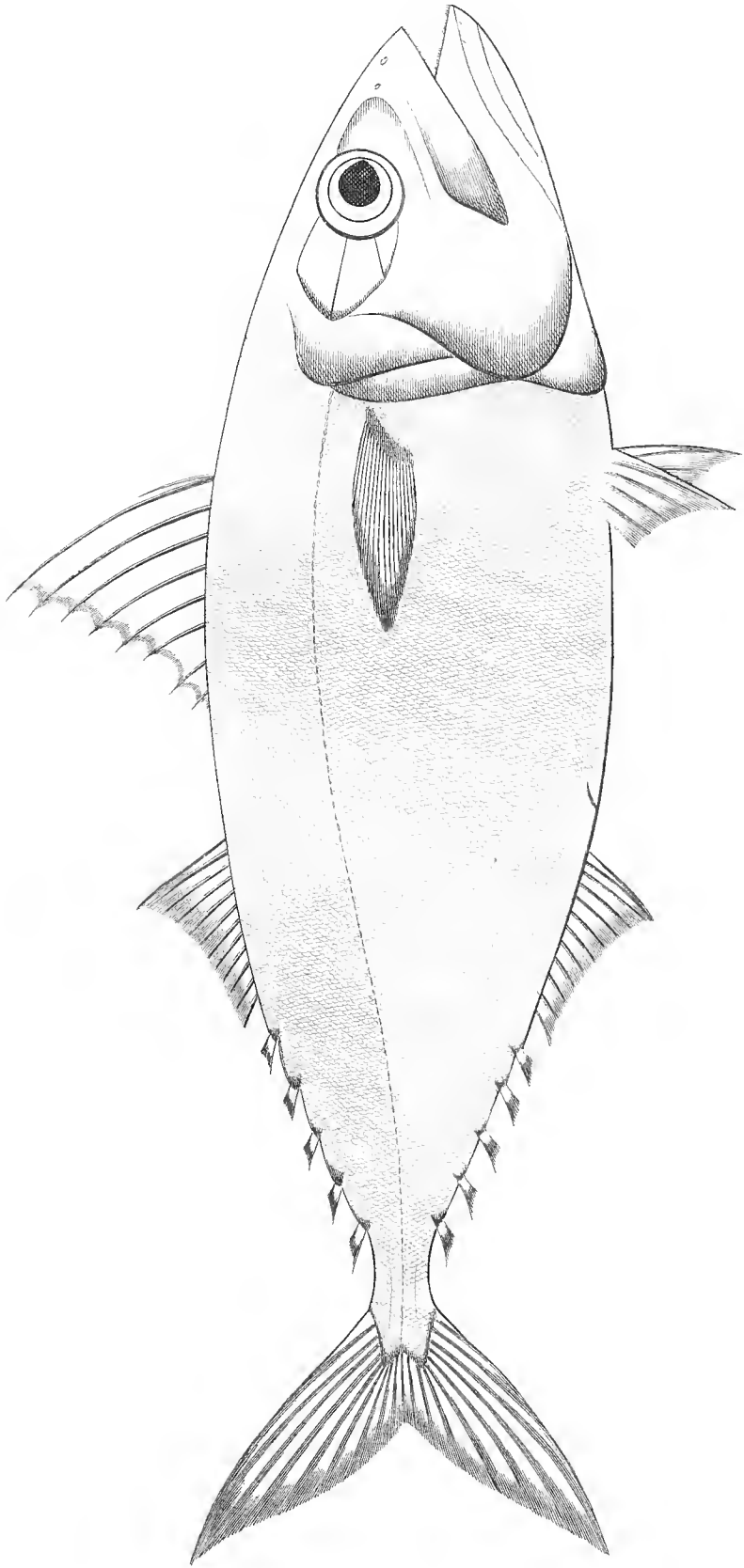




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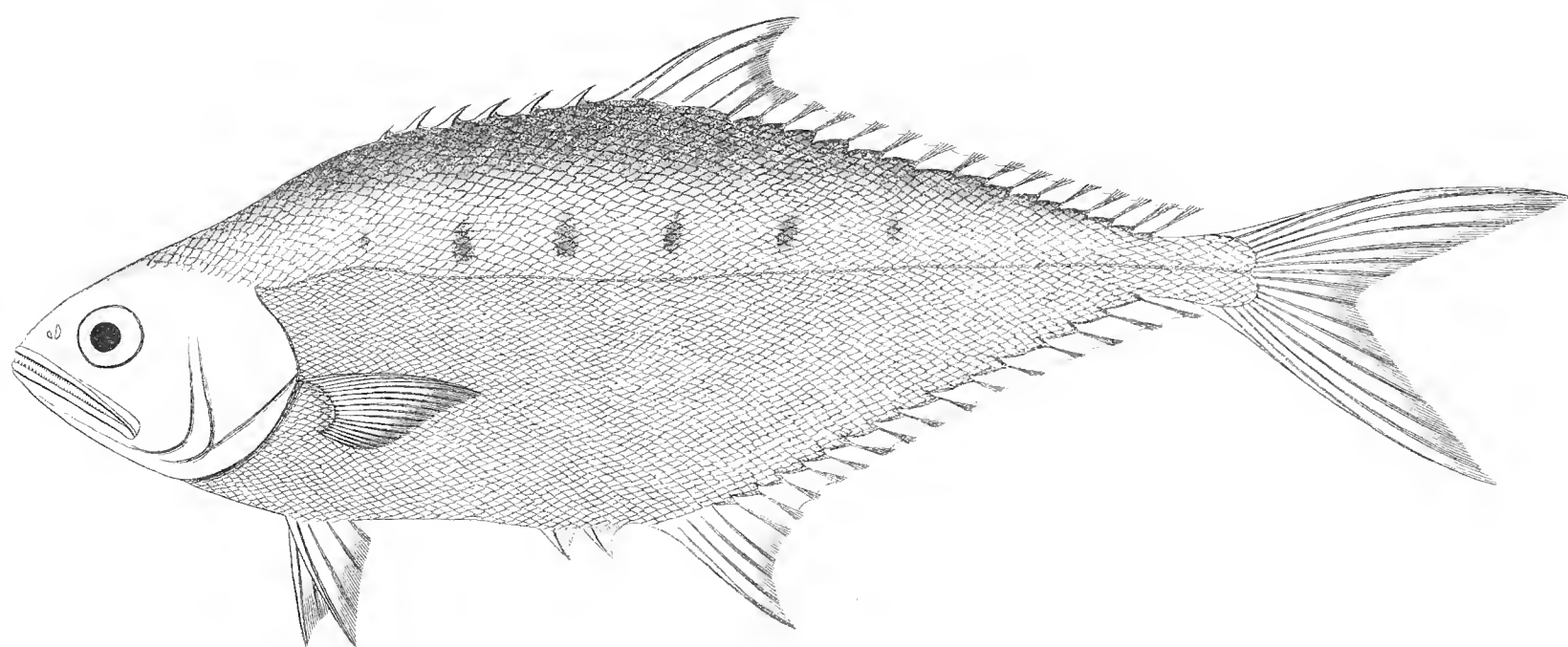






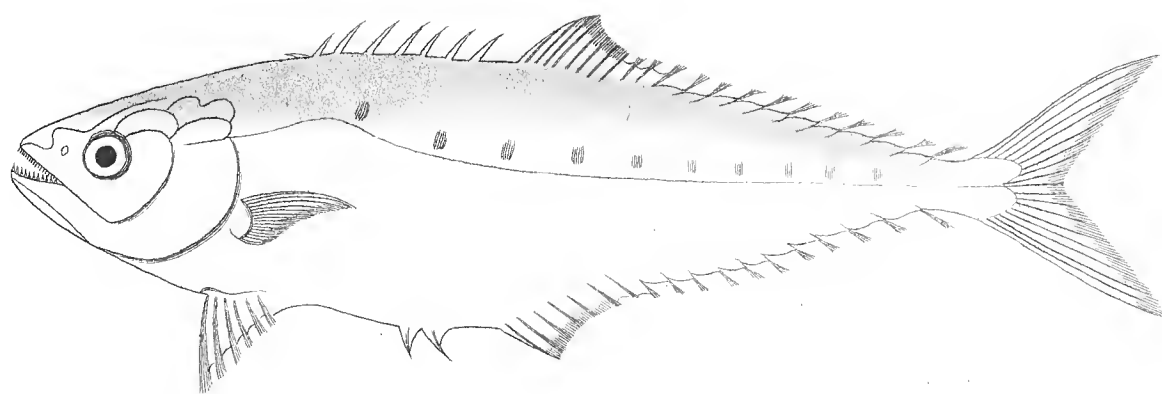
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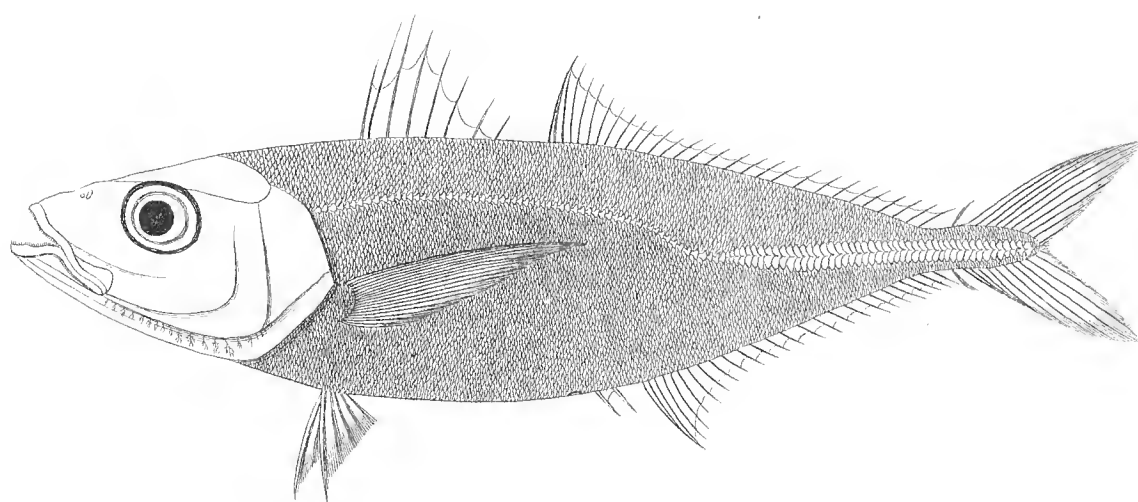
TOLOO PARAH





TOL PARAH

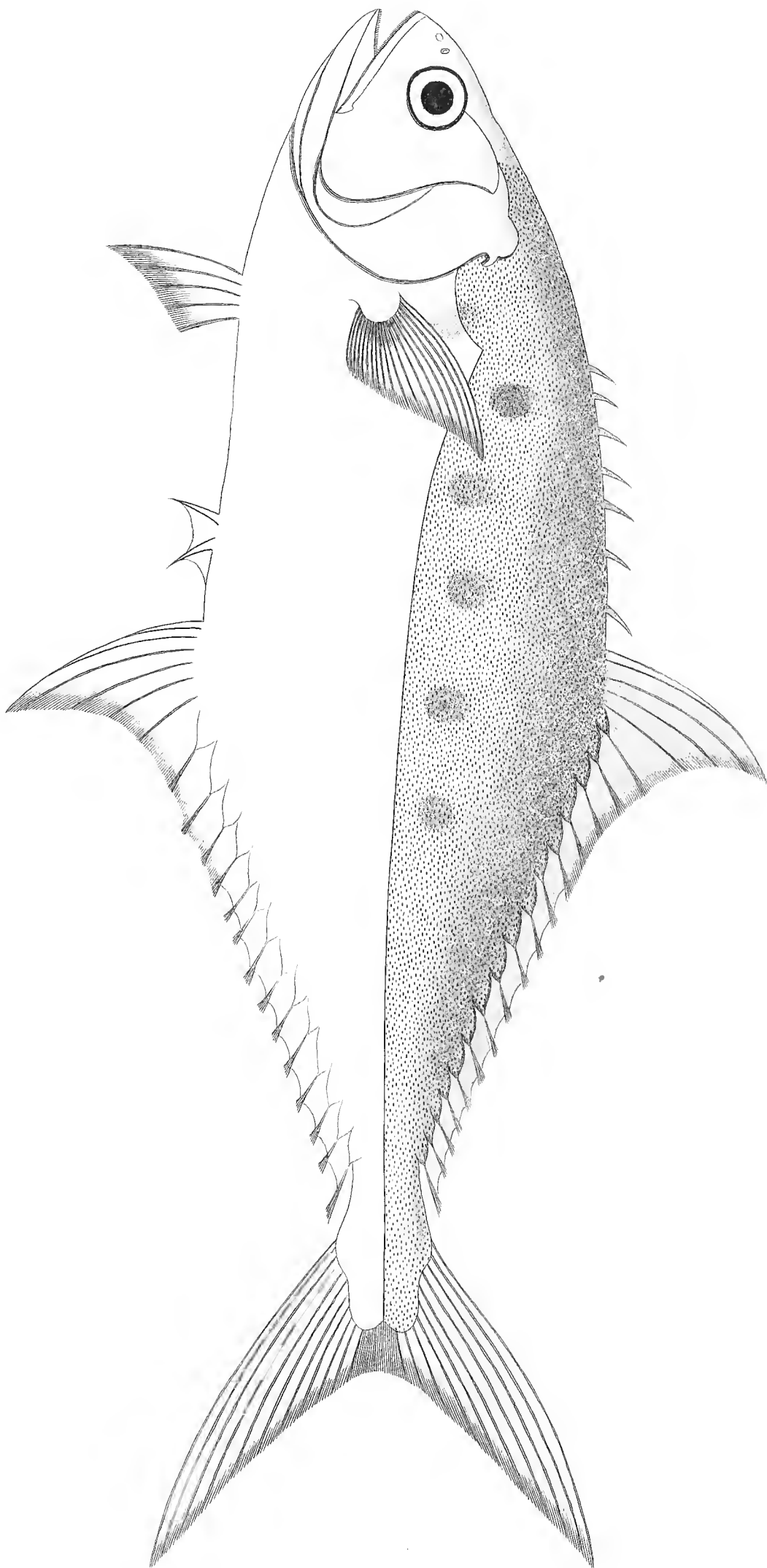




KURRA WODAGAHWAH

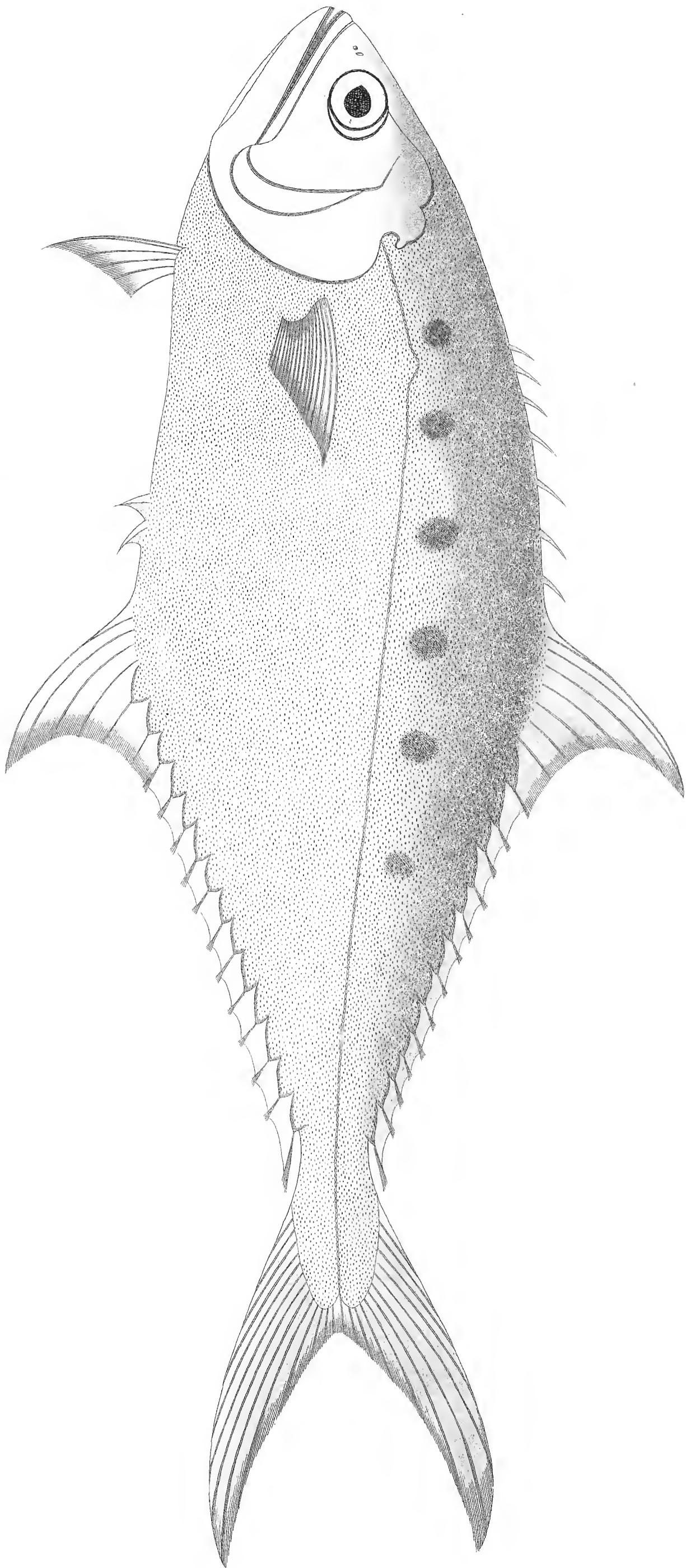






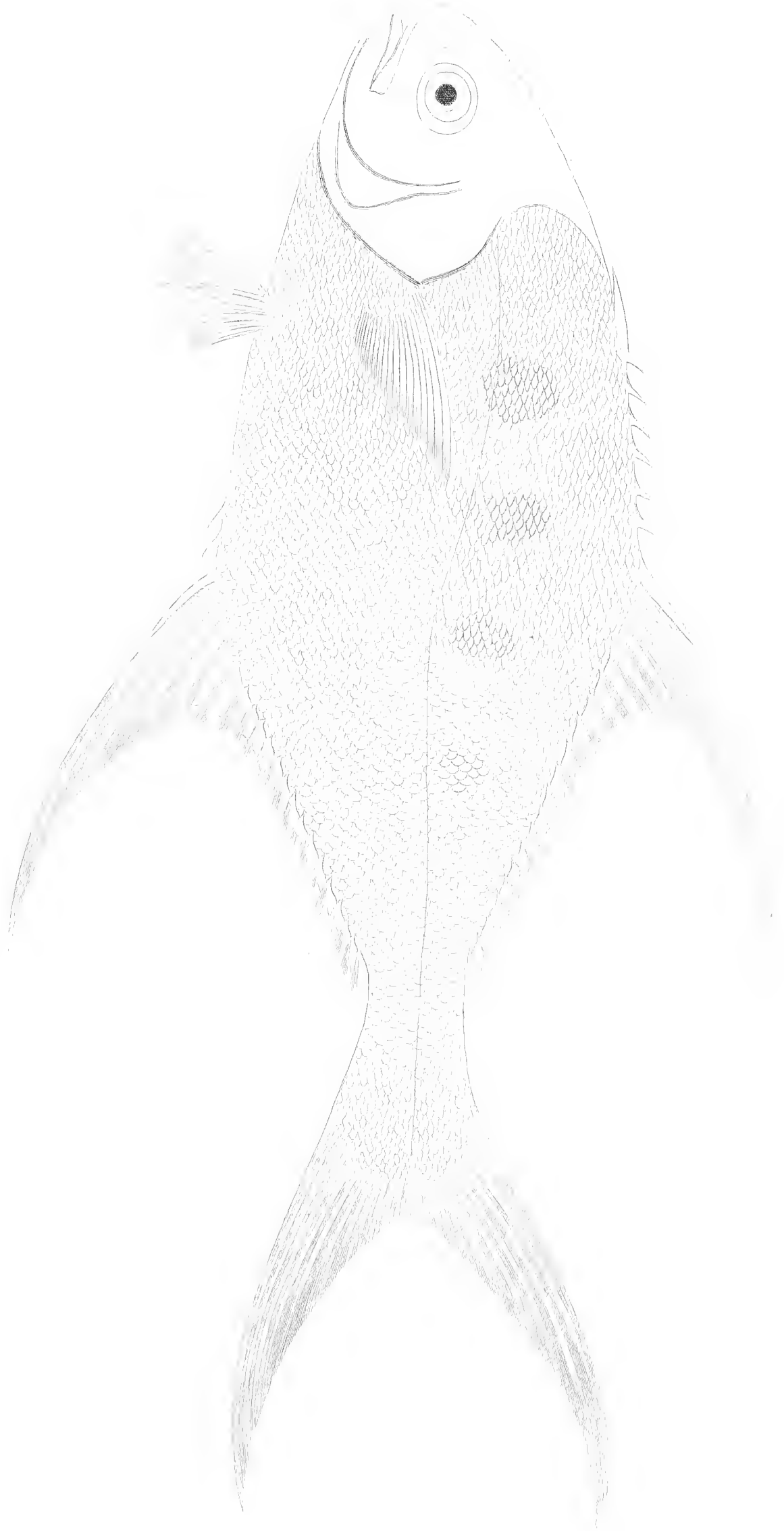
TALA PARAH





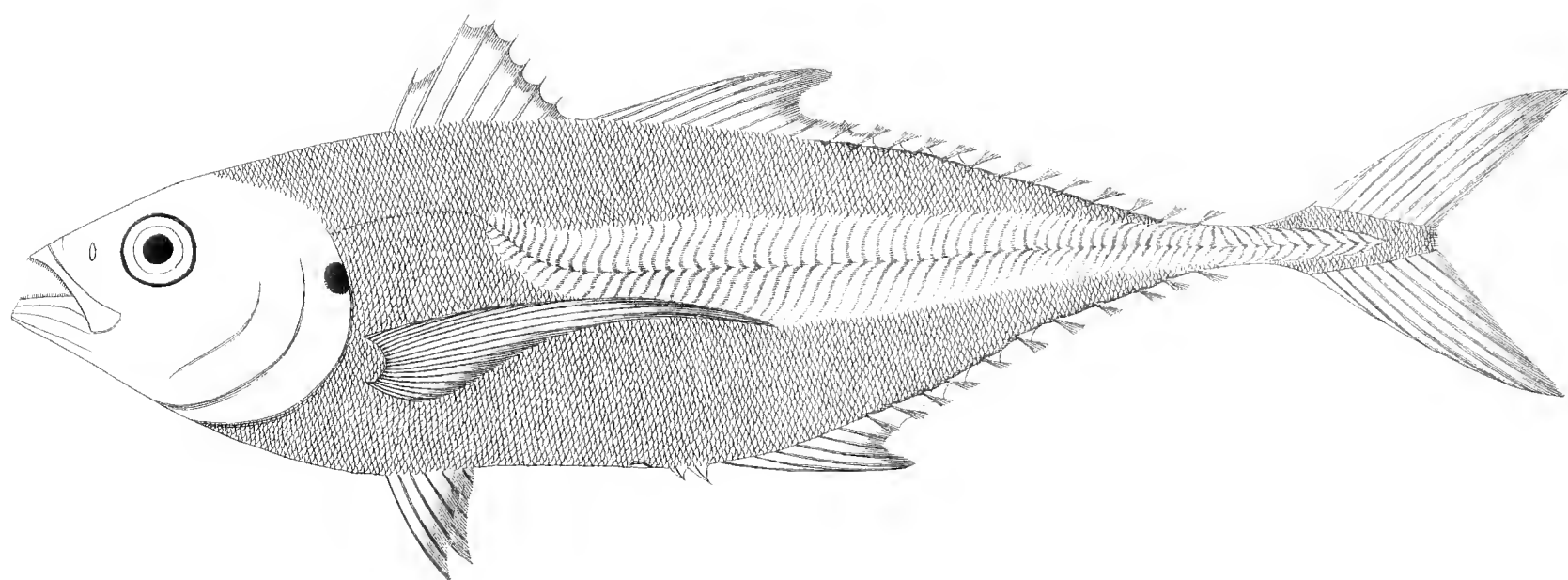
AKEN PARAH





BOTLA PARANI

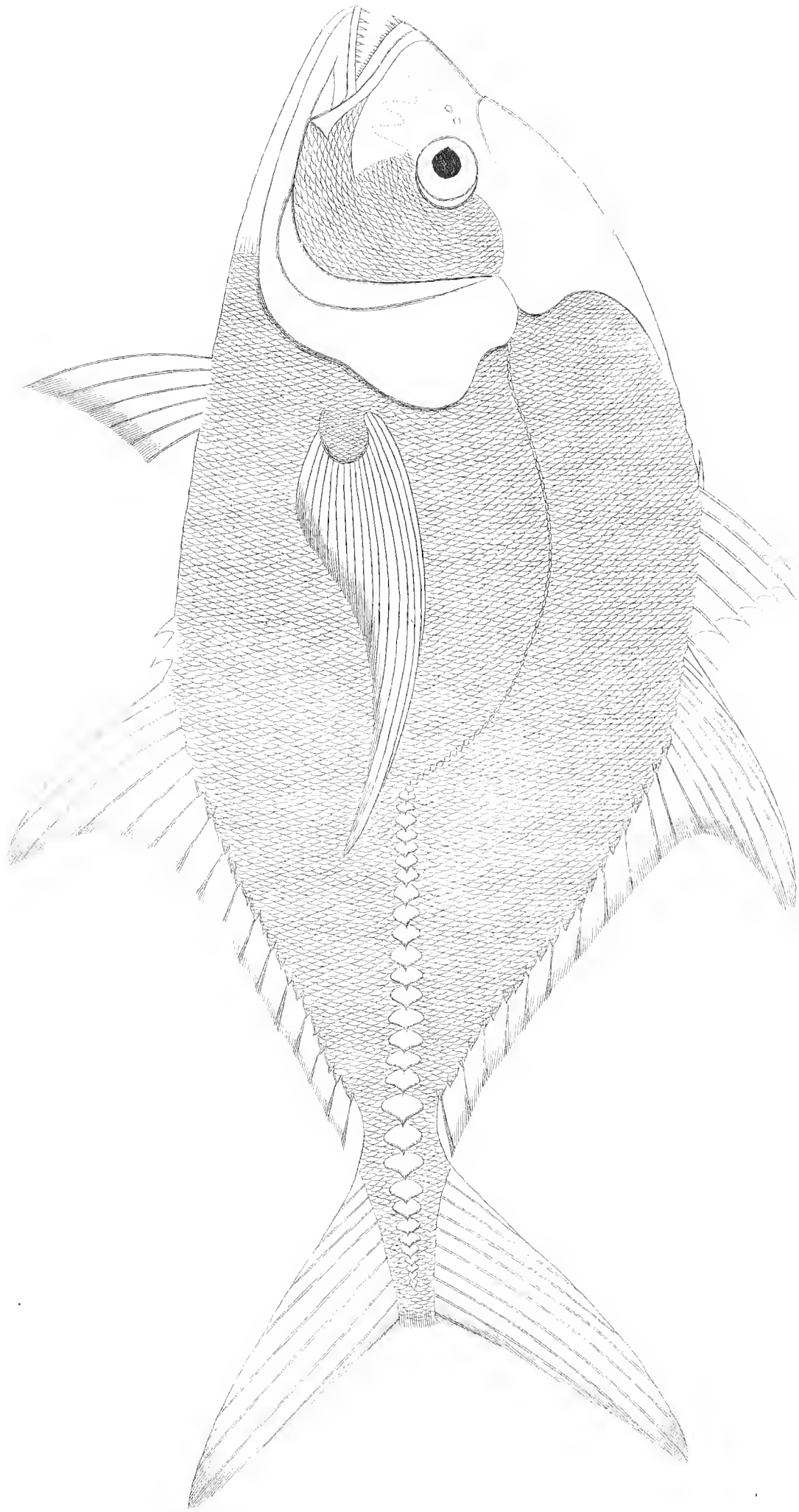




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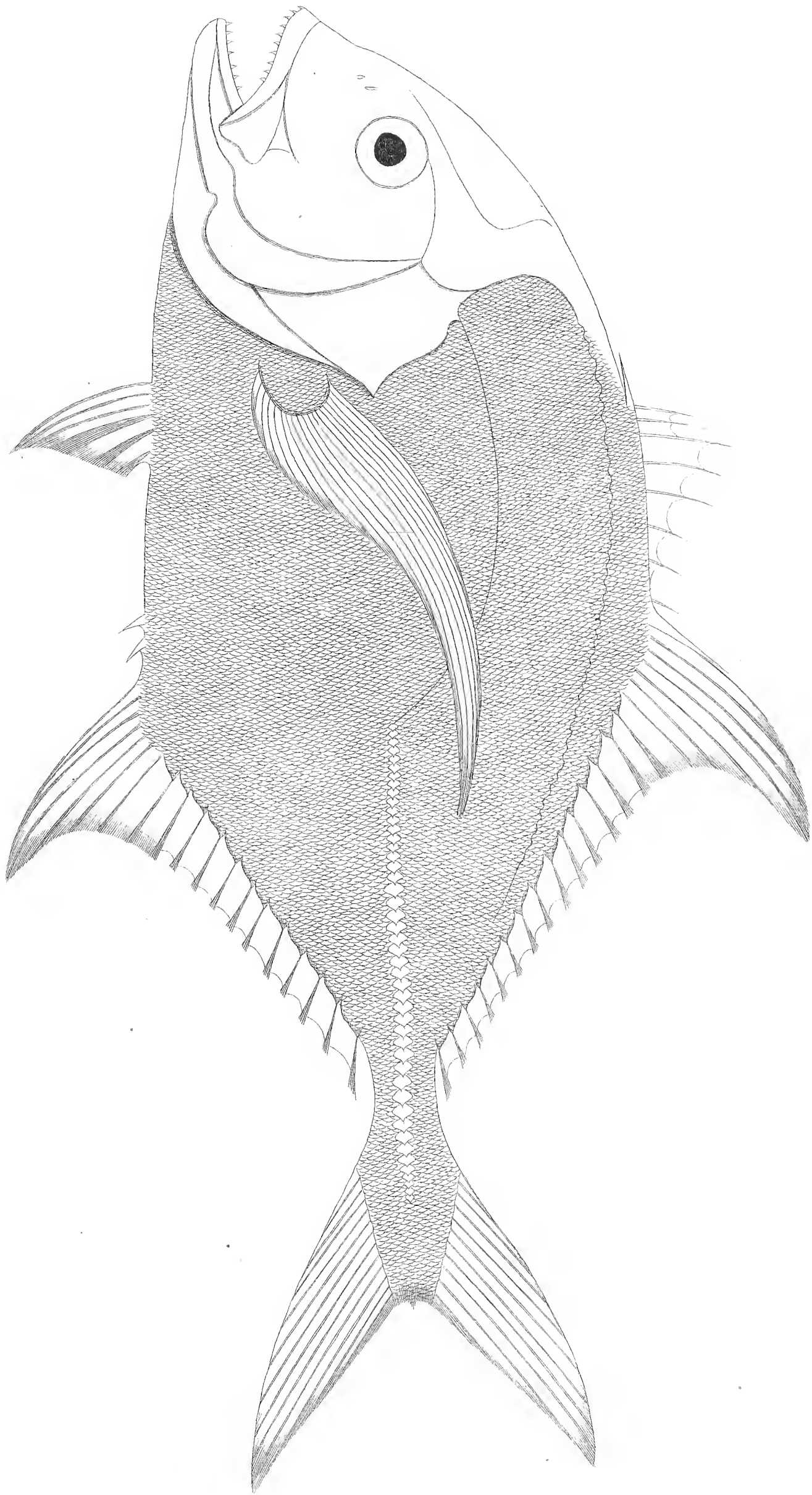






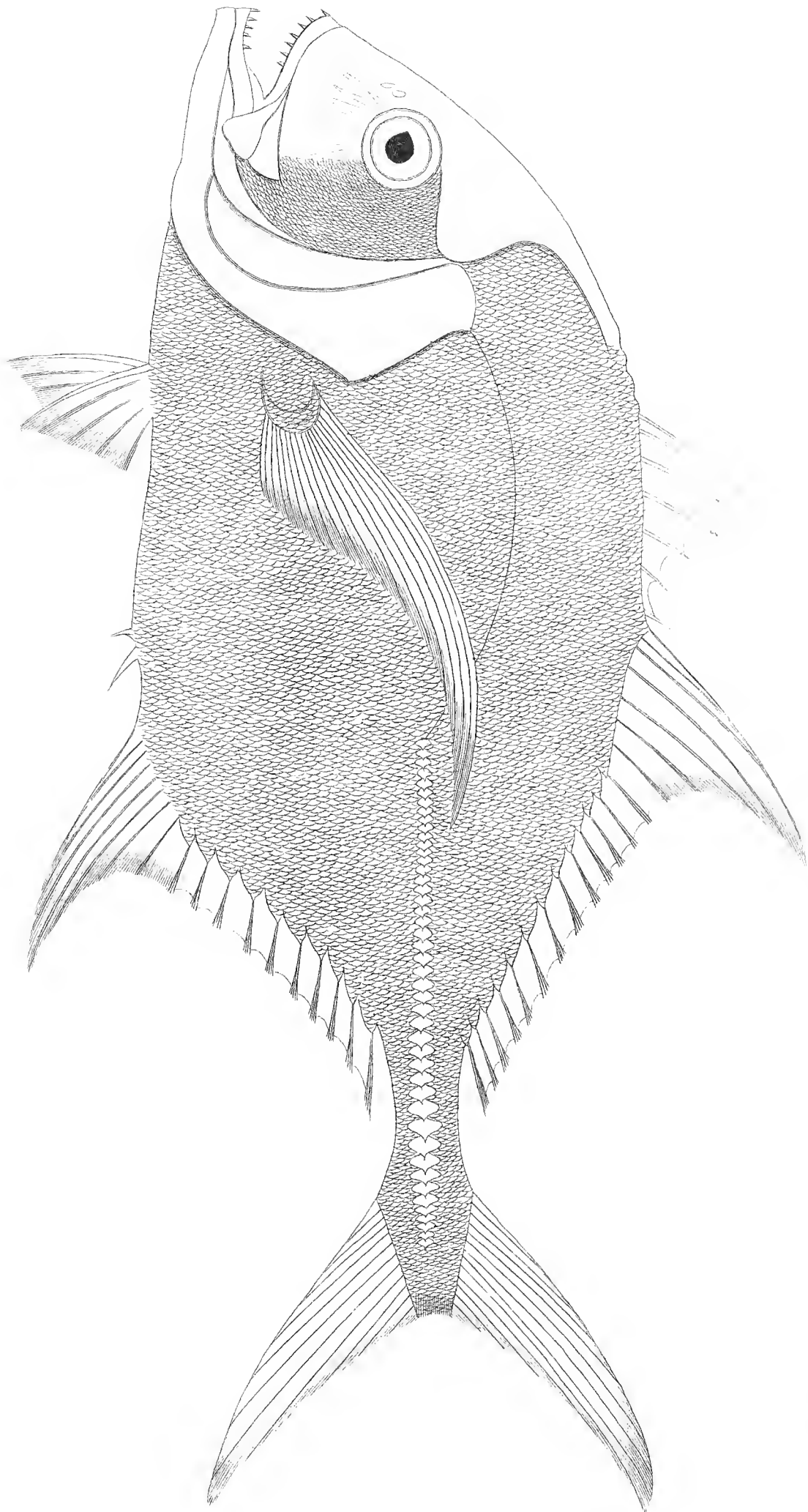
GUNDI PARAH





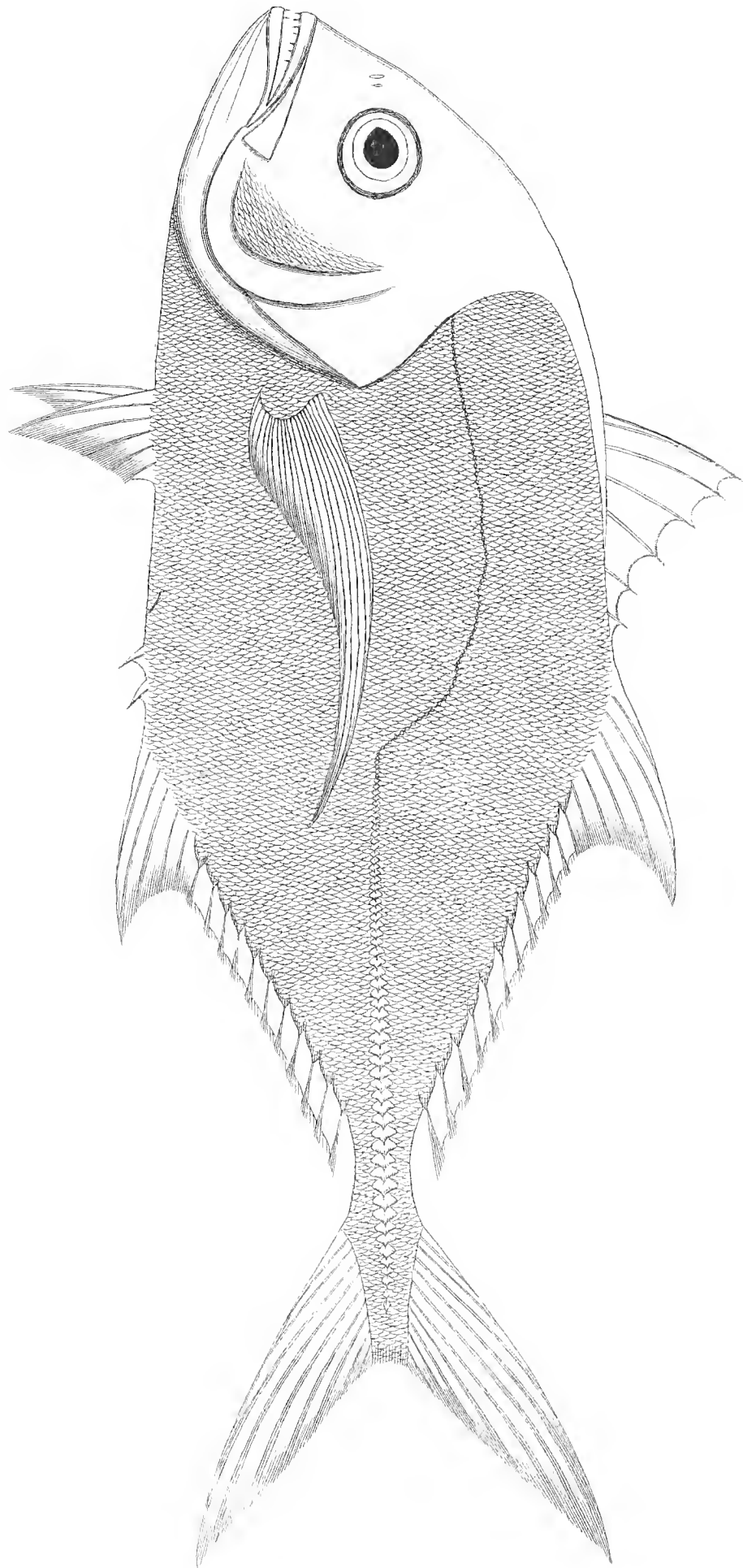
KIRUGOO PARAH





ECALAH PARAH

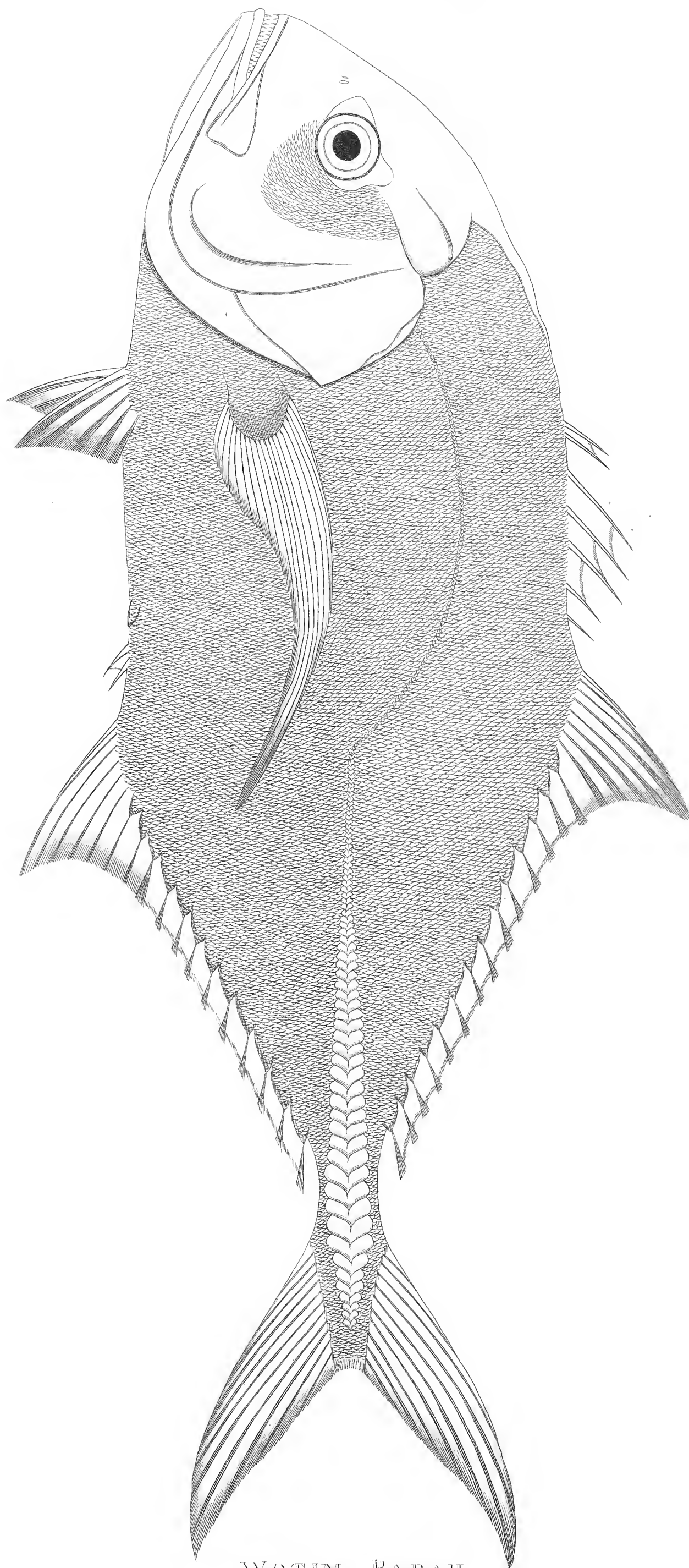




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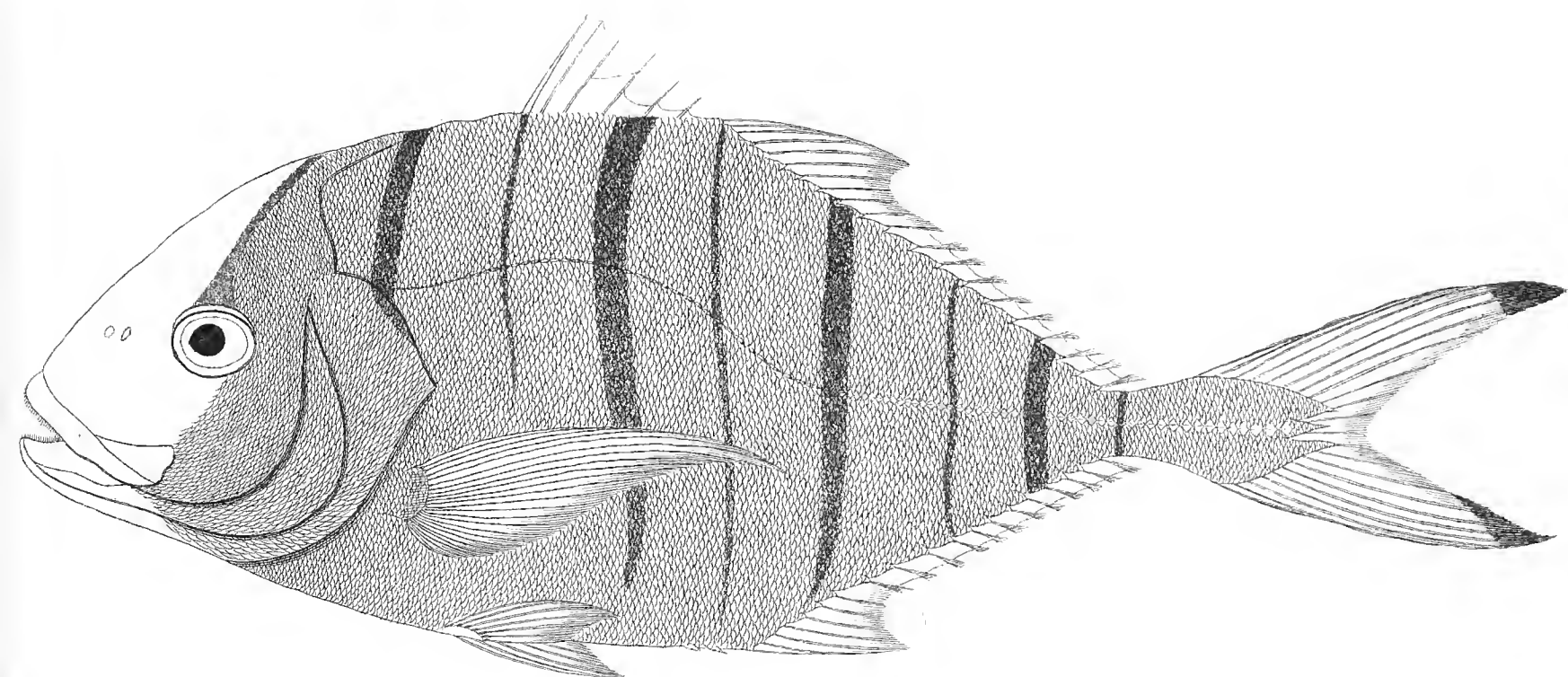






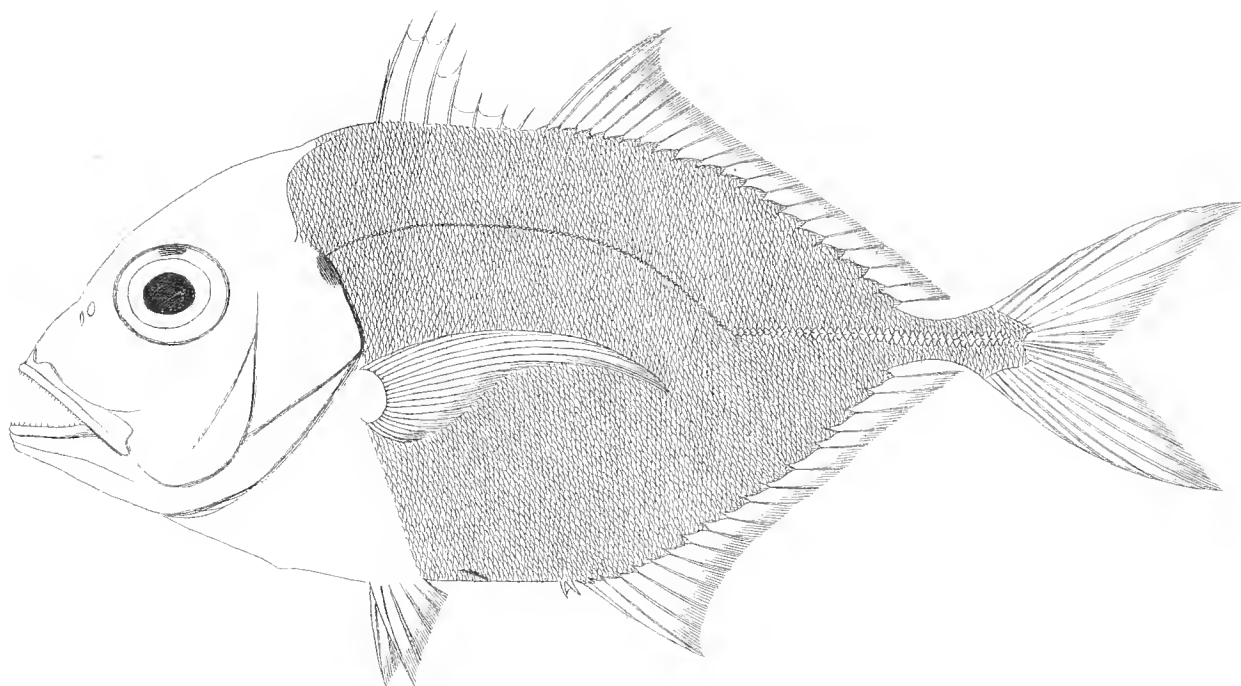
WOTIM PARAH





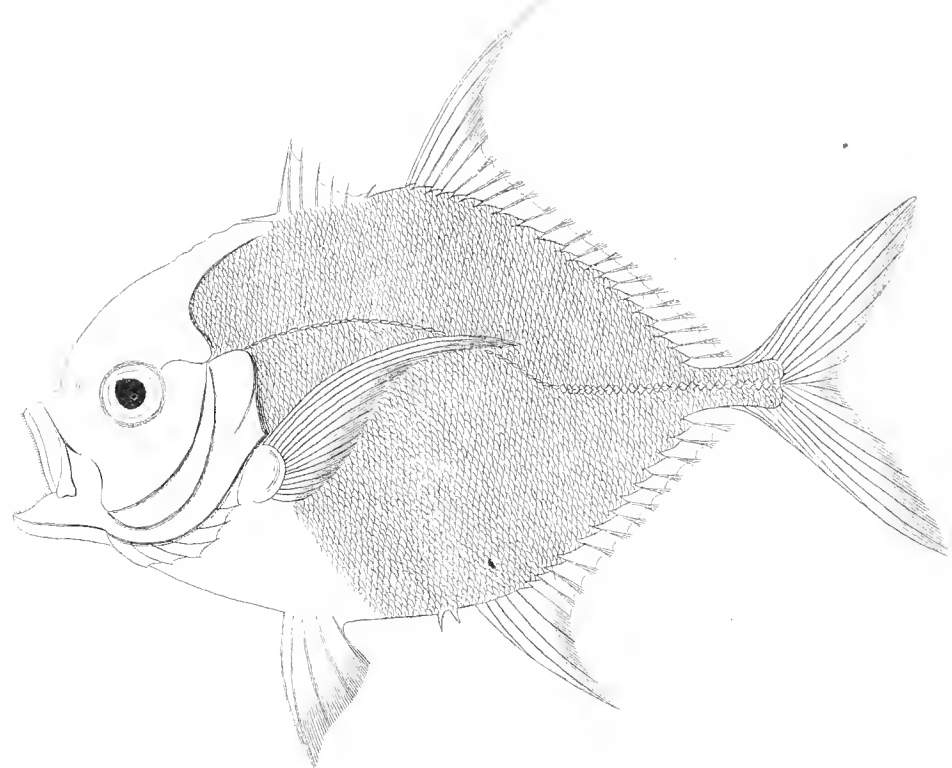
POLOOSO PARAH





TALLAM PARAH

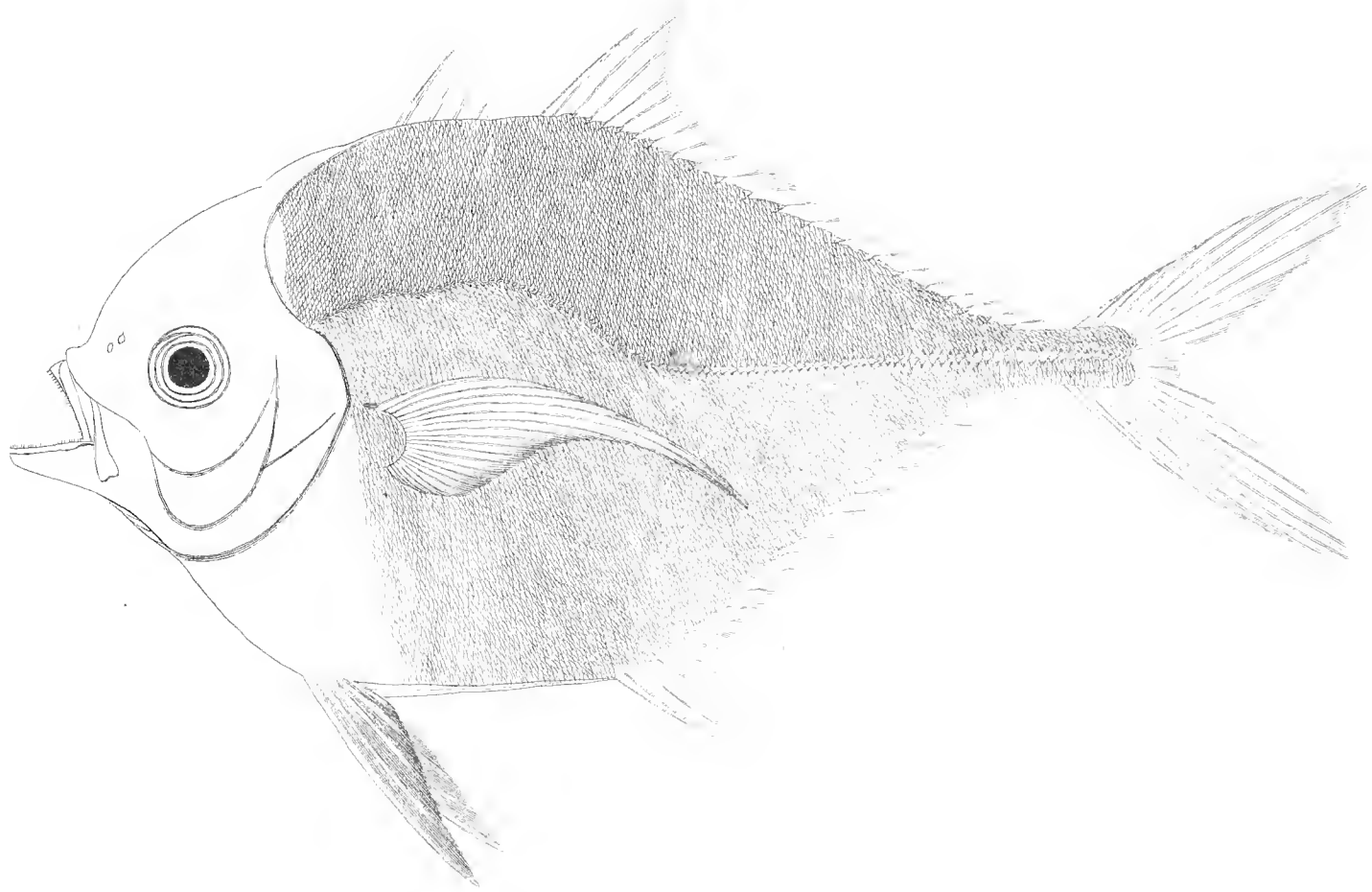




TCHAVII. PARAU

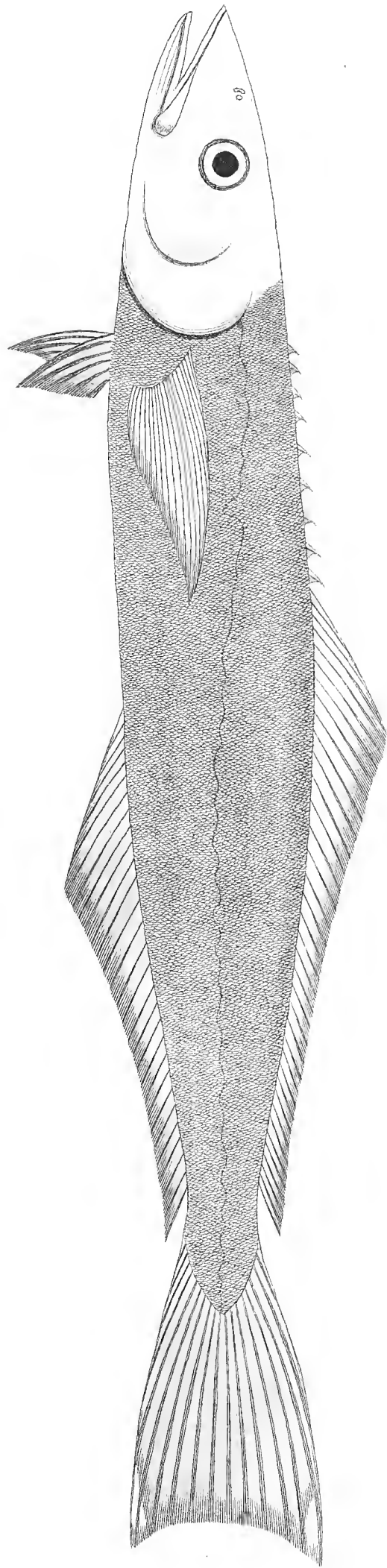






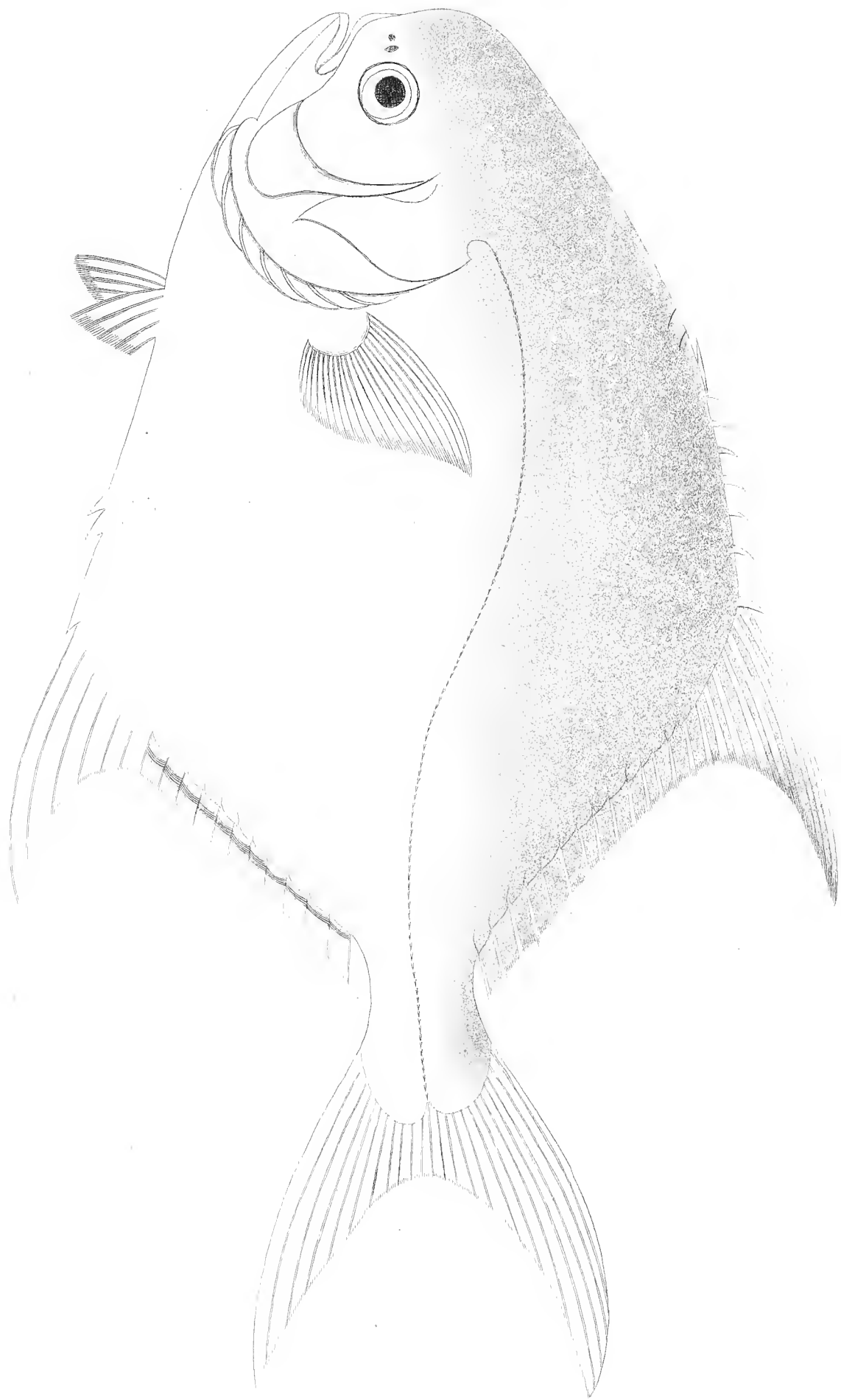
MATS PARAH





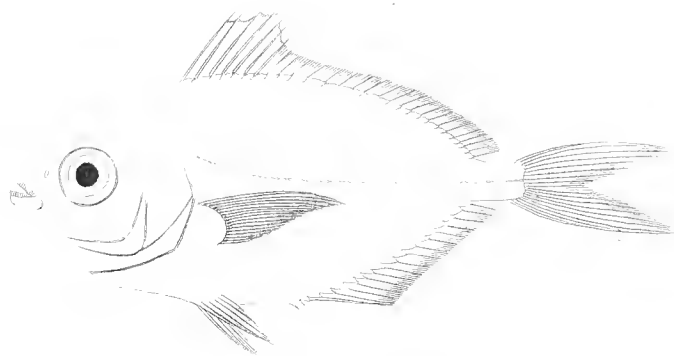
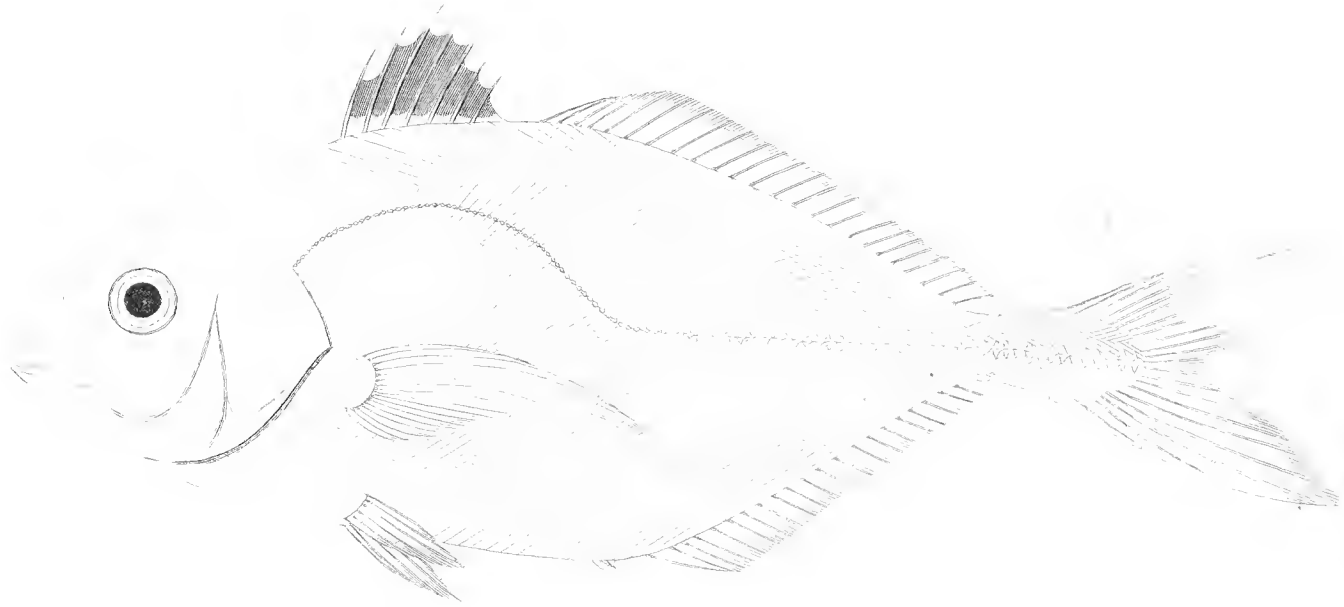
PEDDA MOTTAL





MOOKALEE PARAH



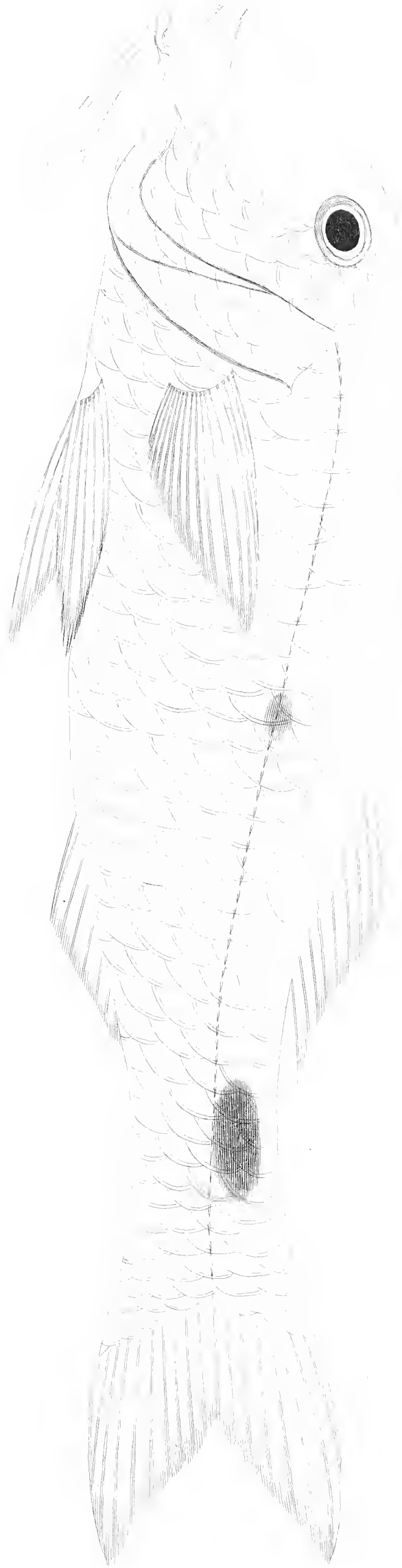


WORI PARAH

MITTA PARAH

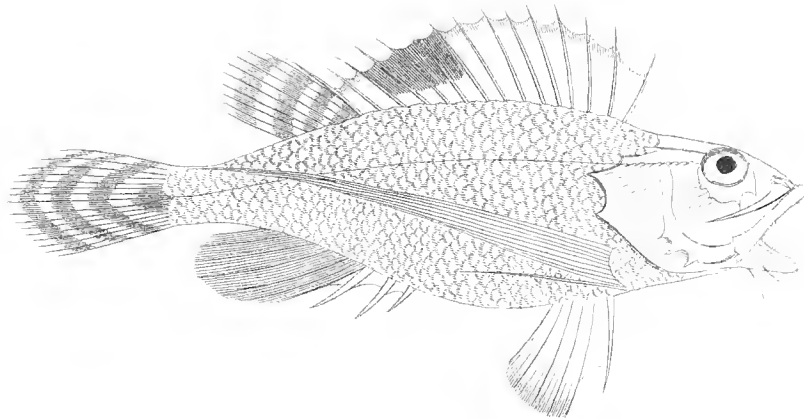
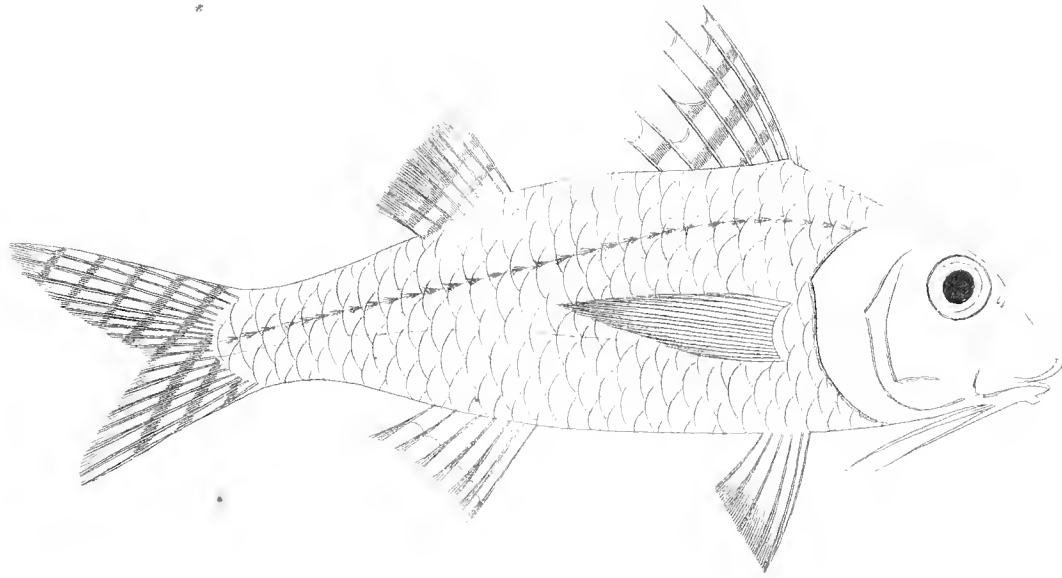




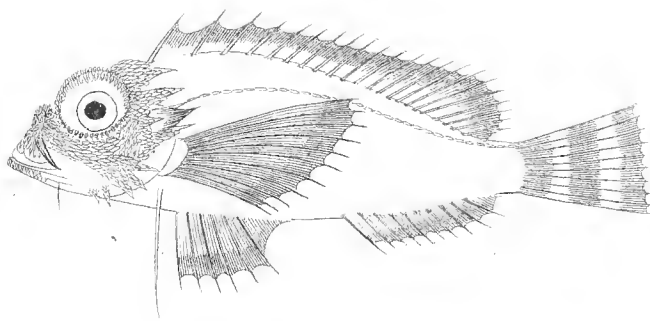


RAHTEE GOOLIVINDA





B

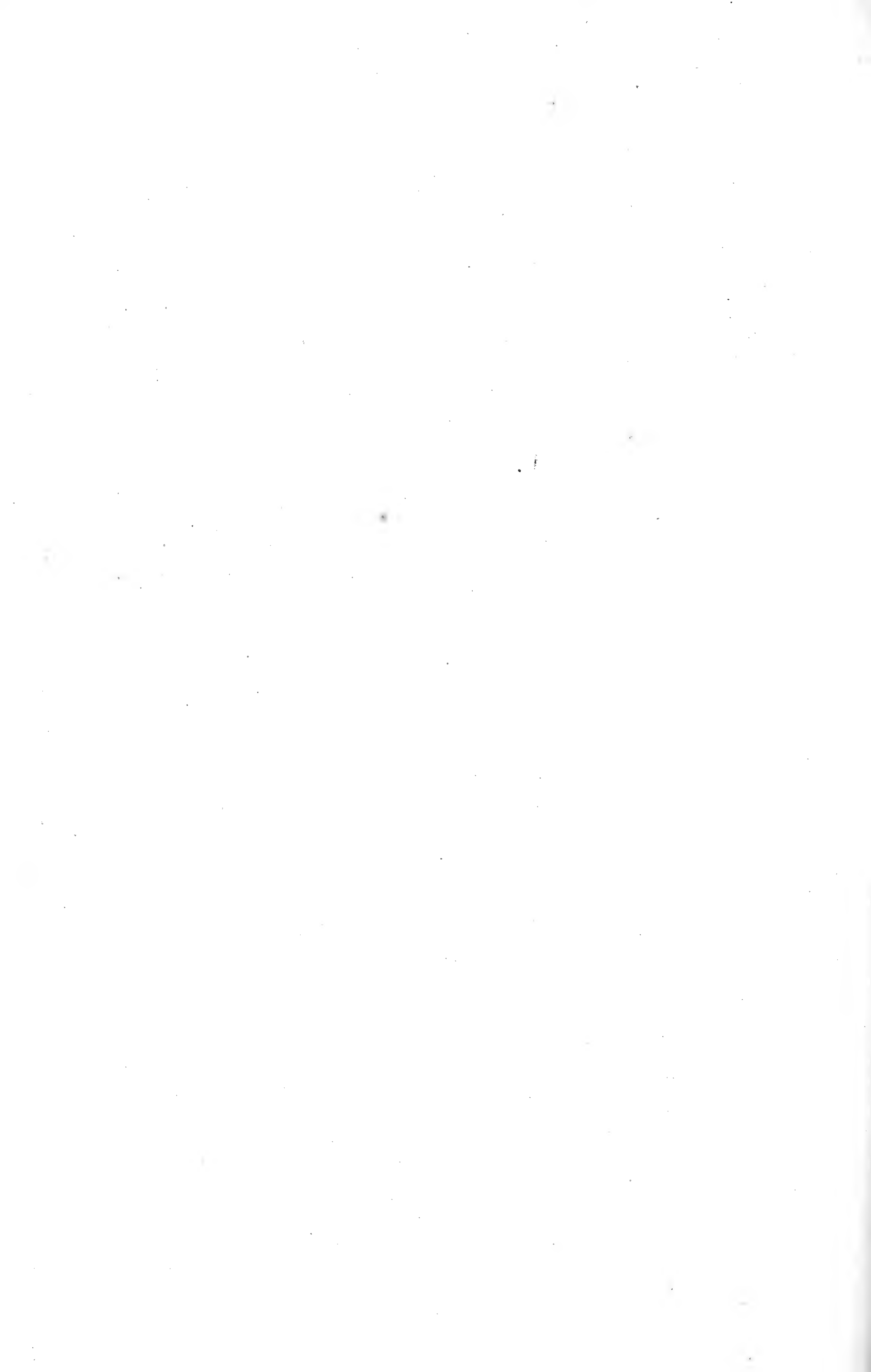


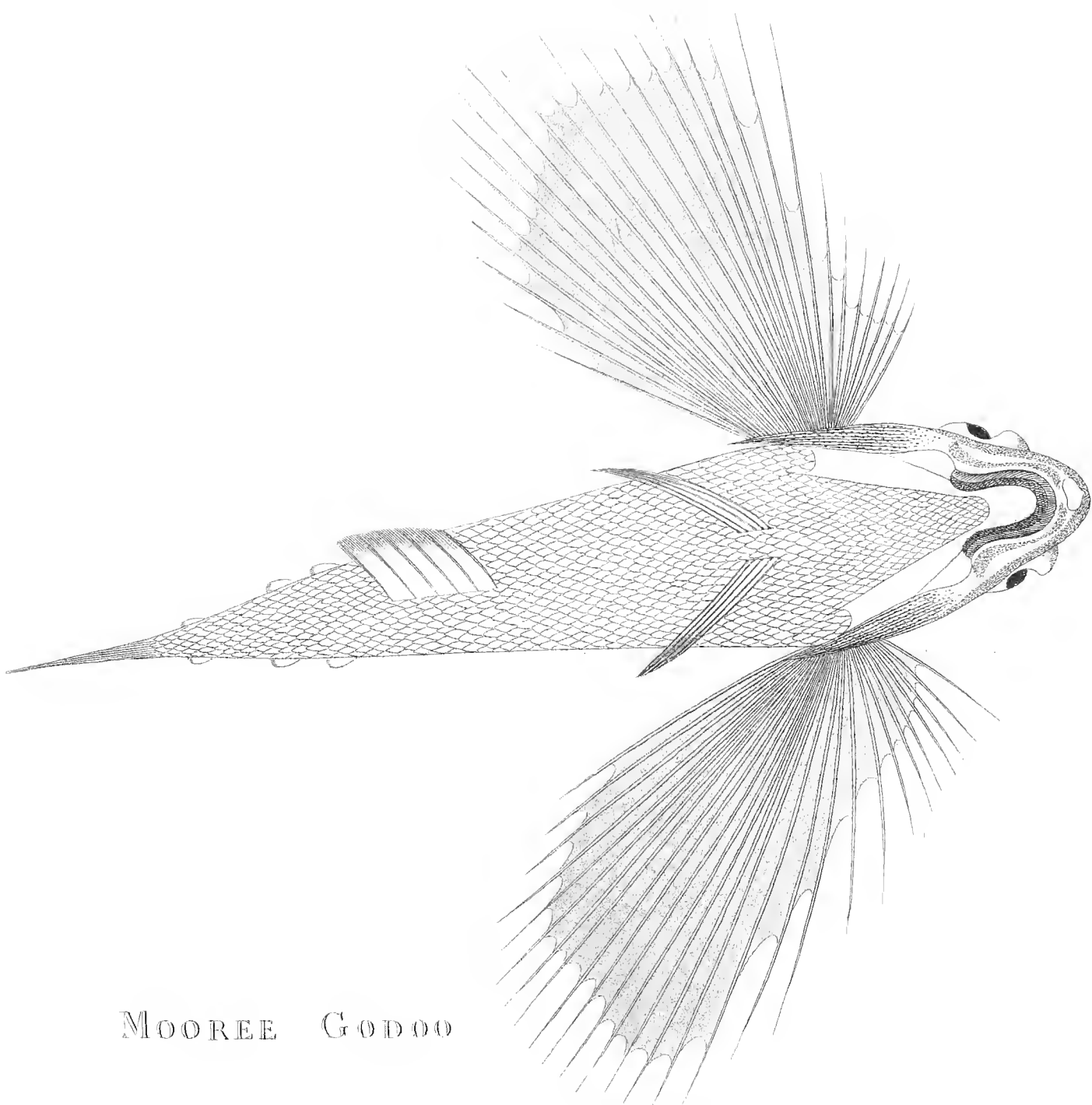
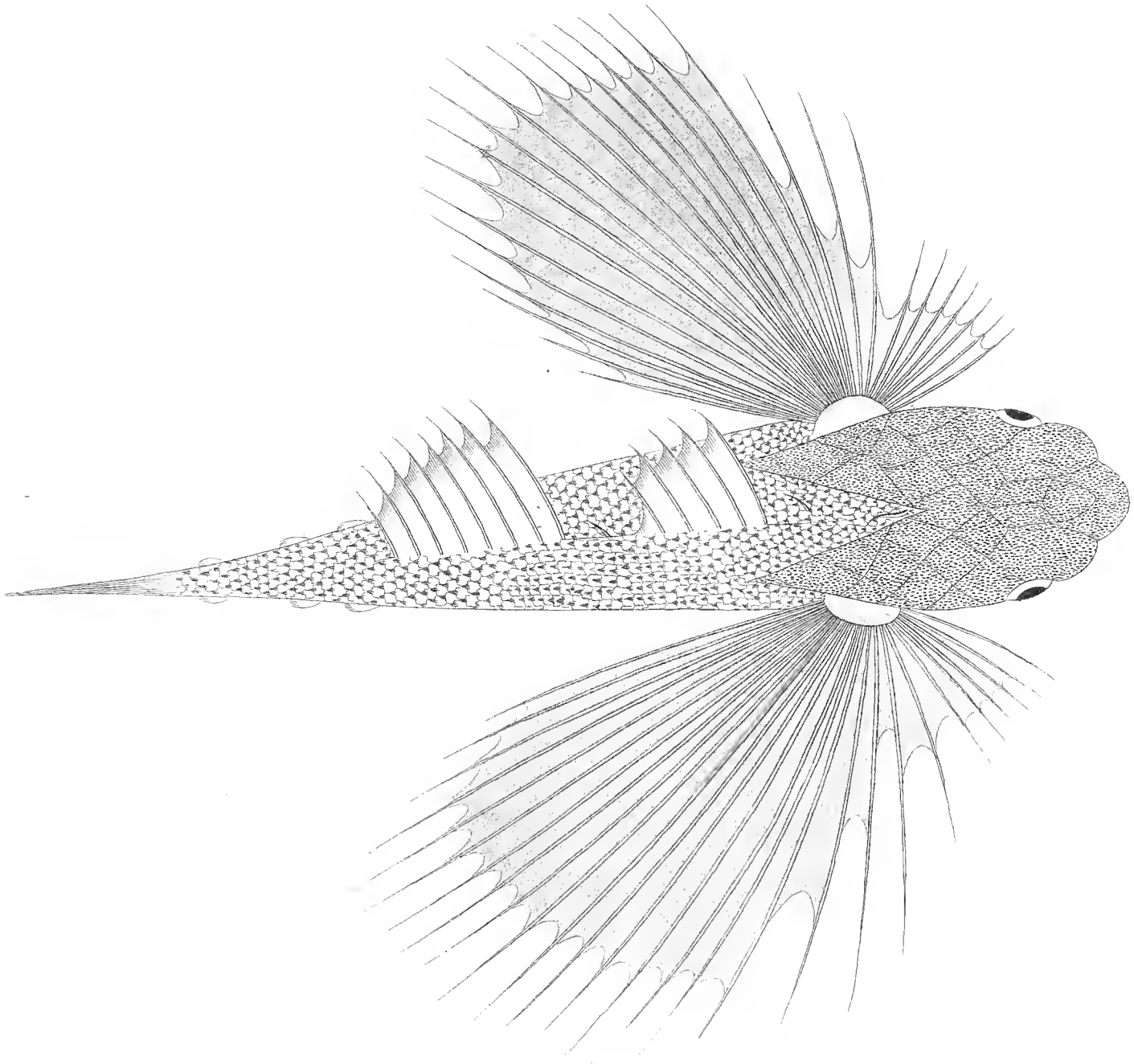
A

BANDI GOOLIVINDA

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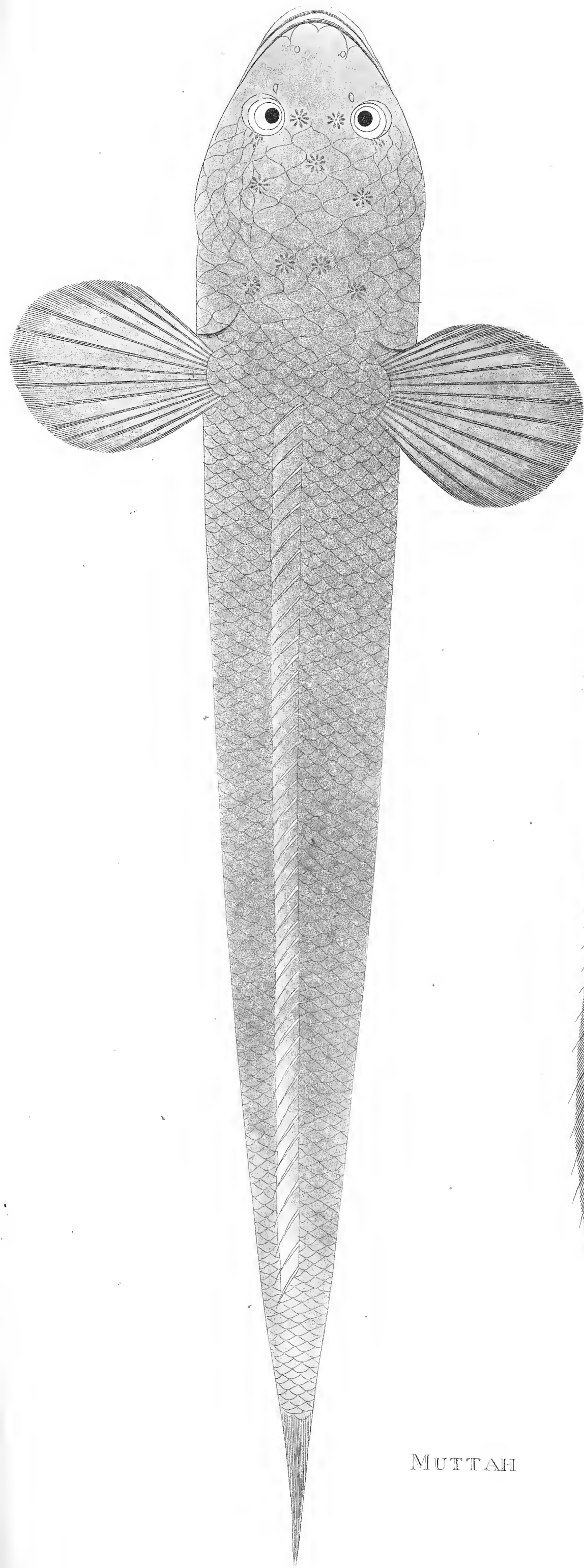
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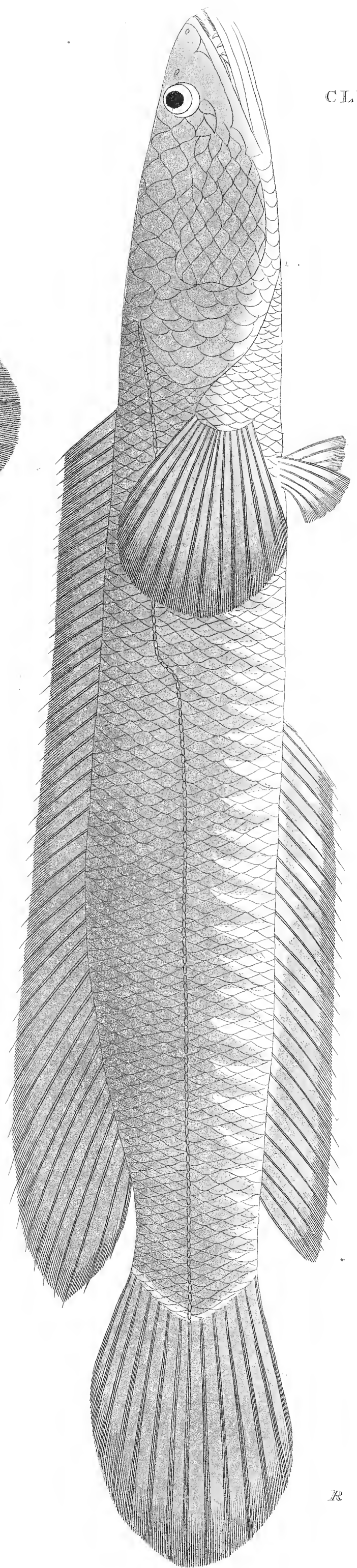


MOOREE GODOO



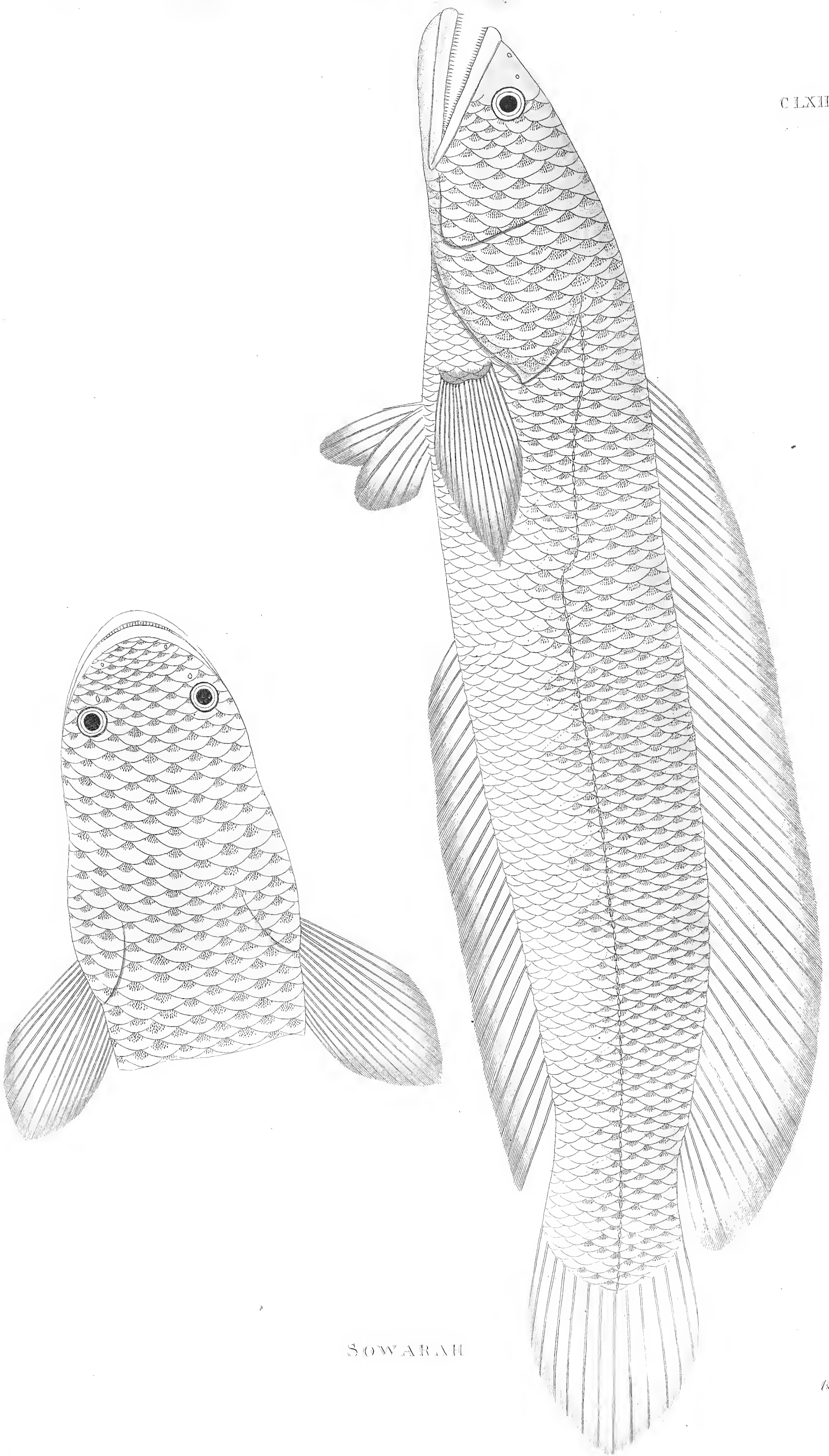


MUTTAH

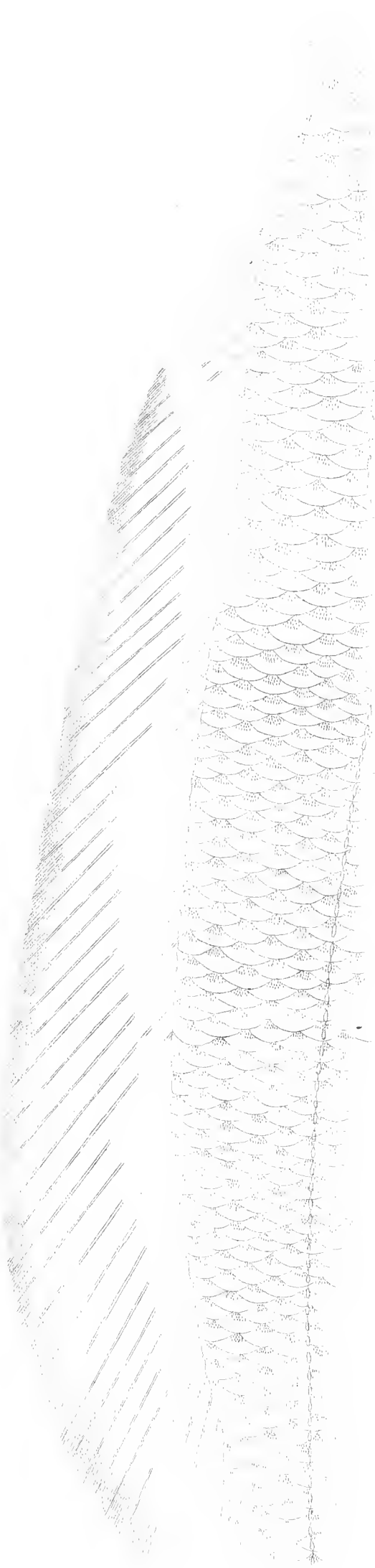


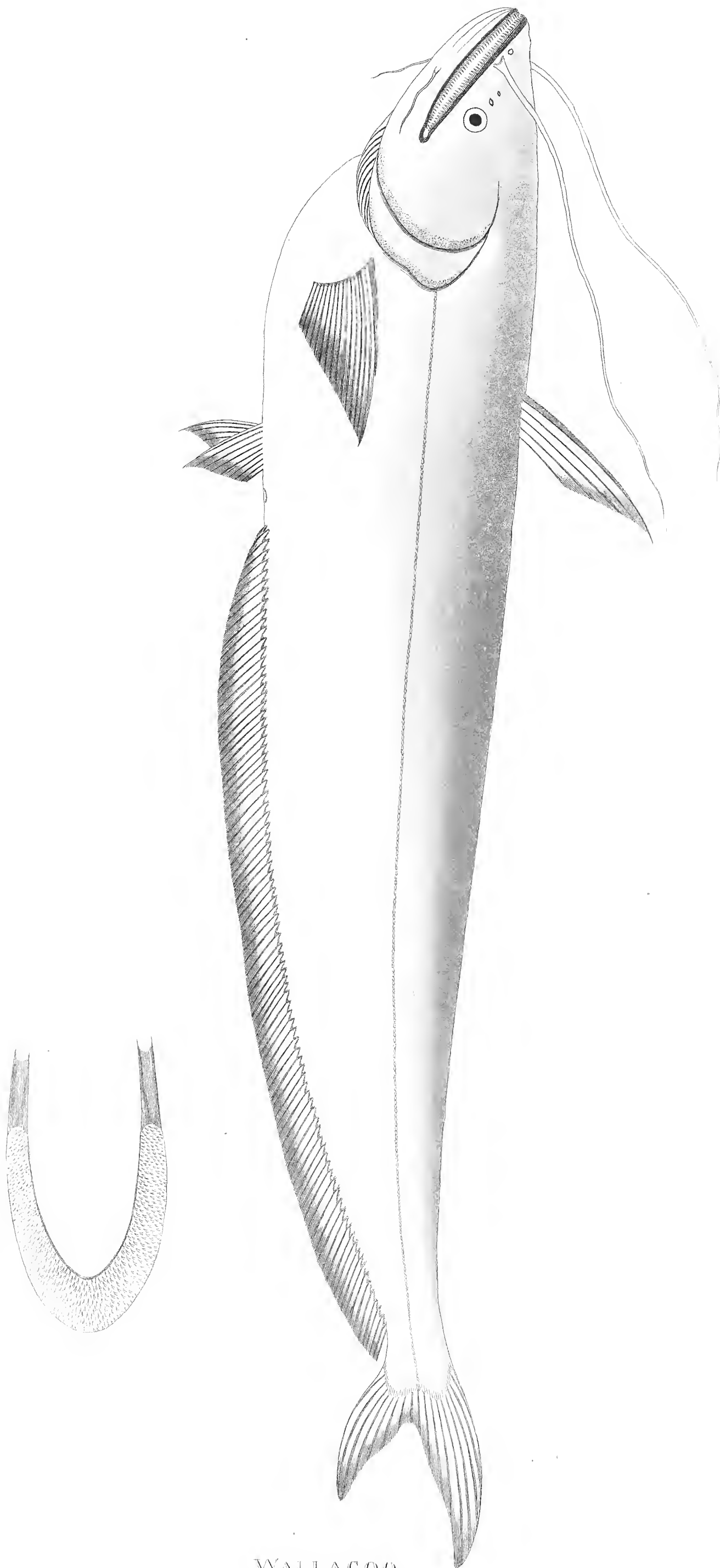






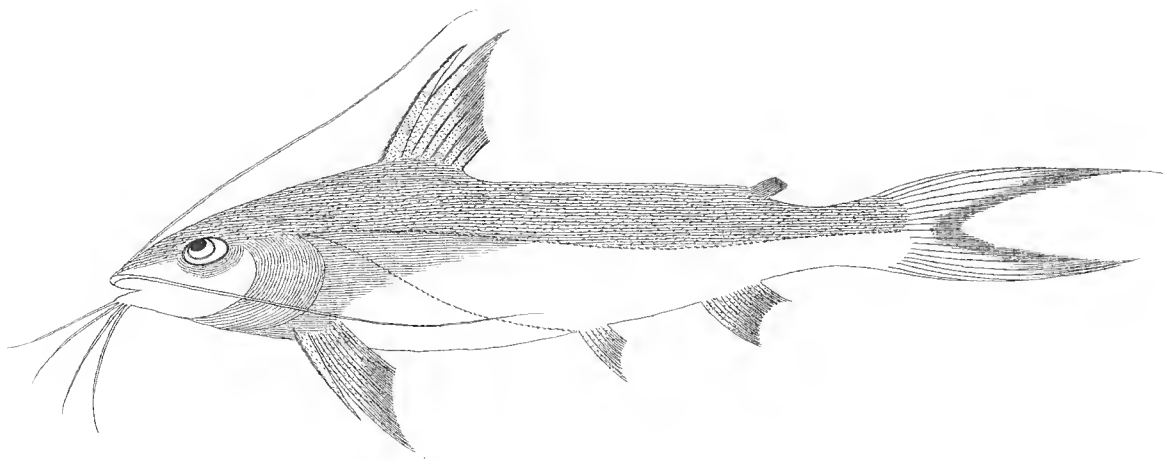
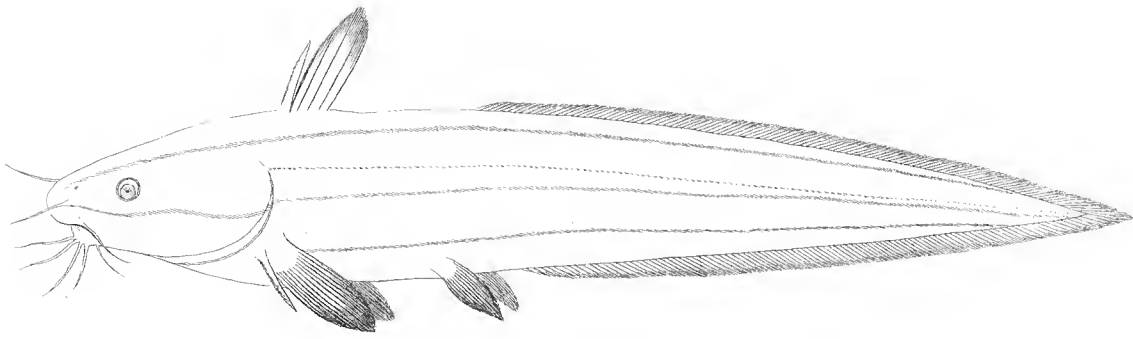
SOWARAH



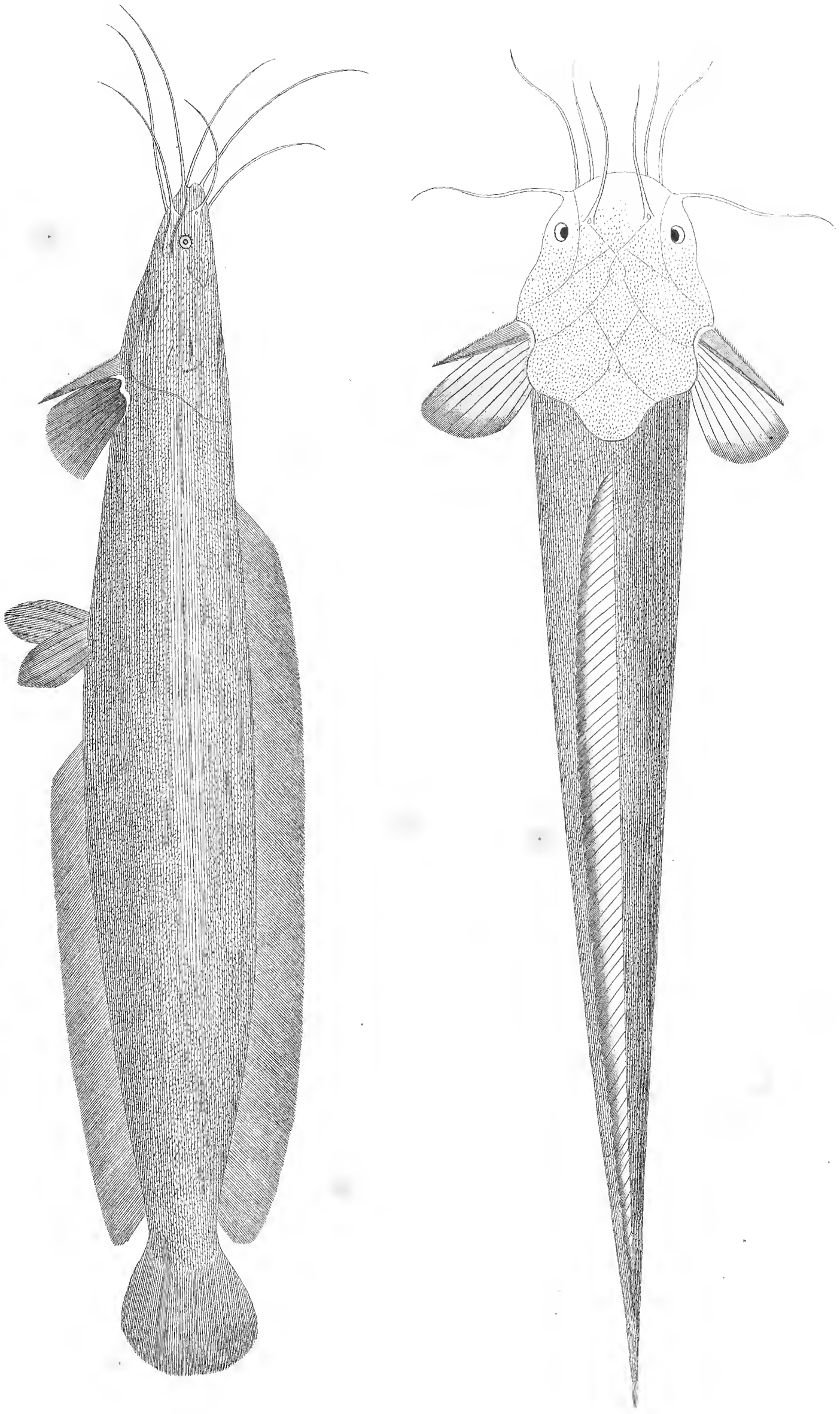


WALLAGO





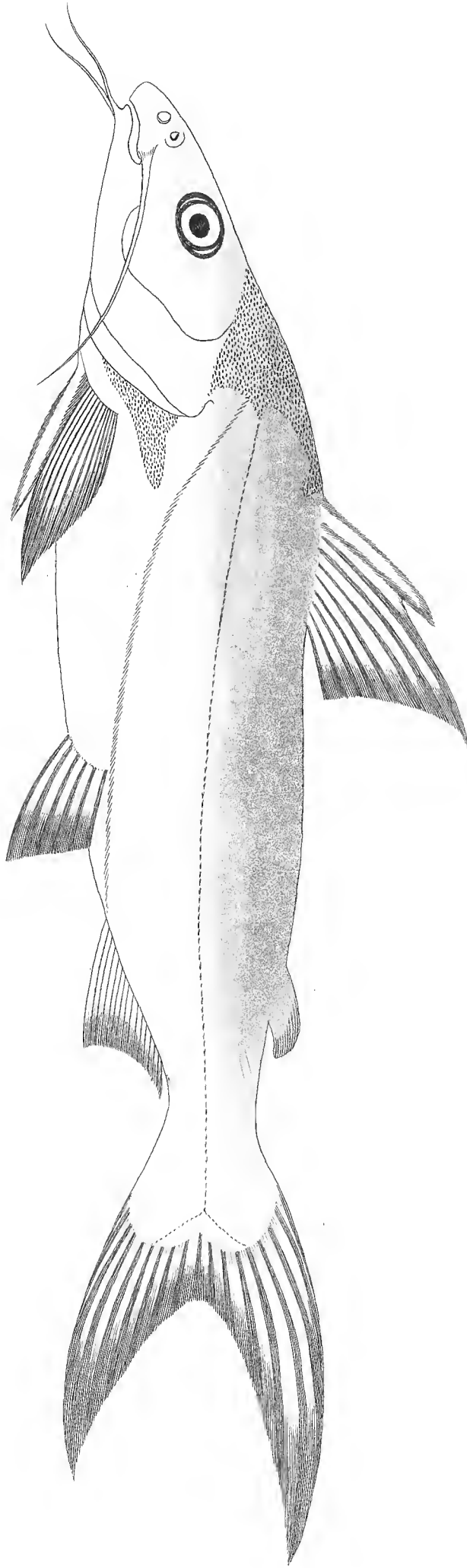




MARPOO

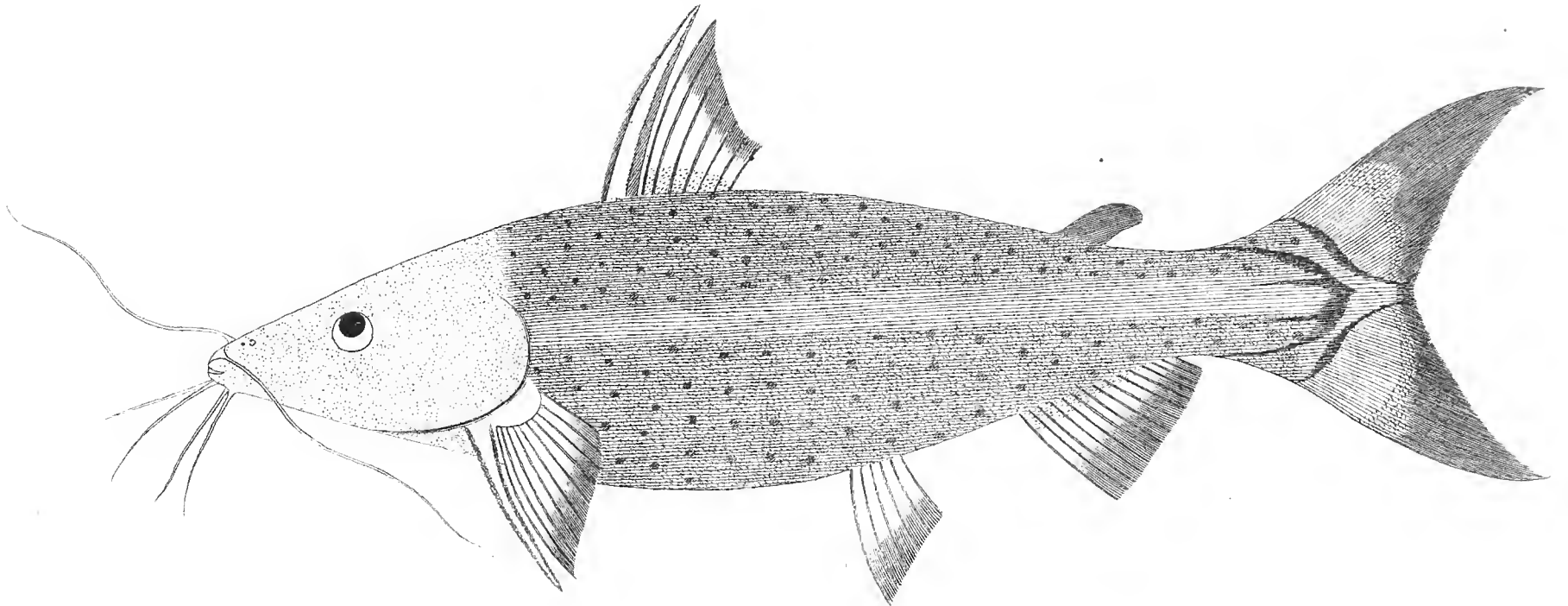




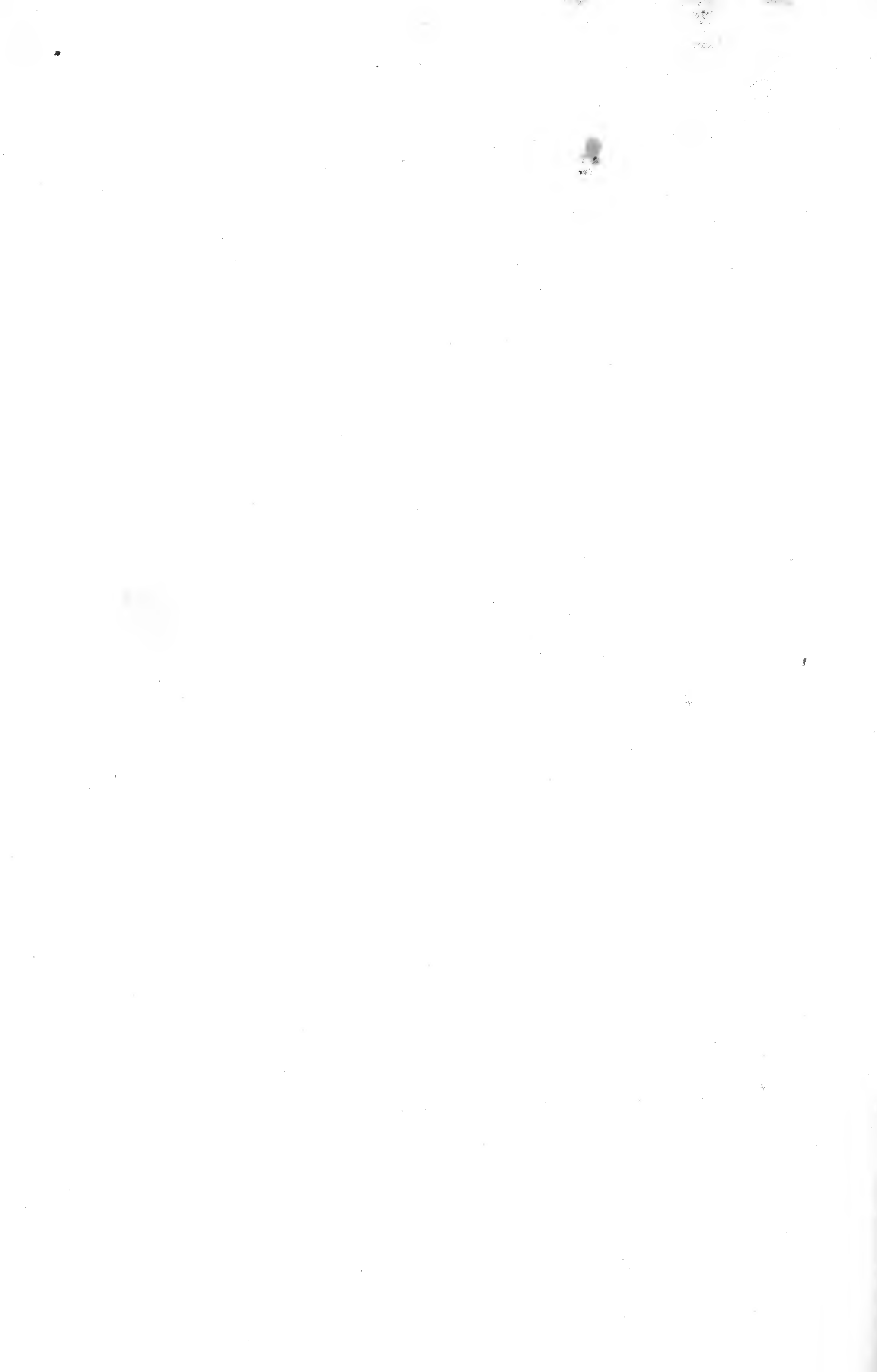


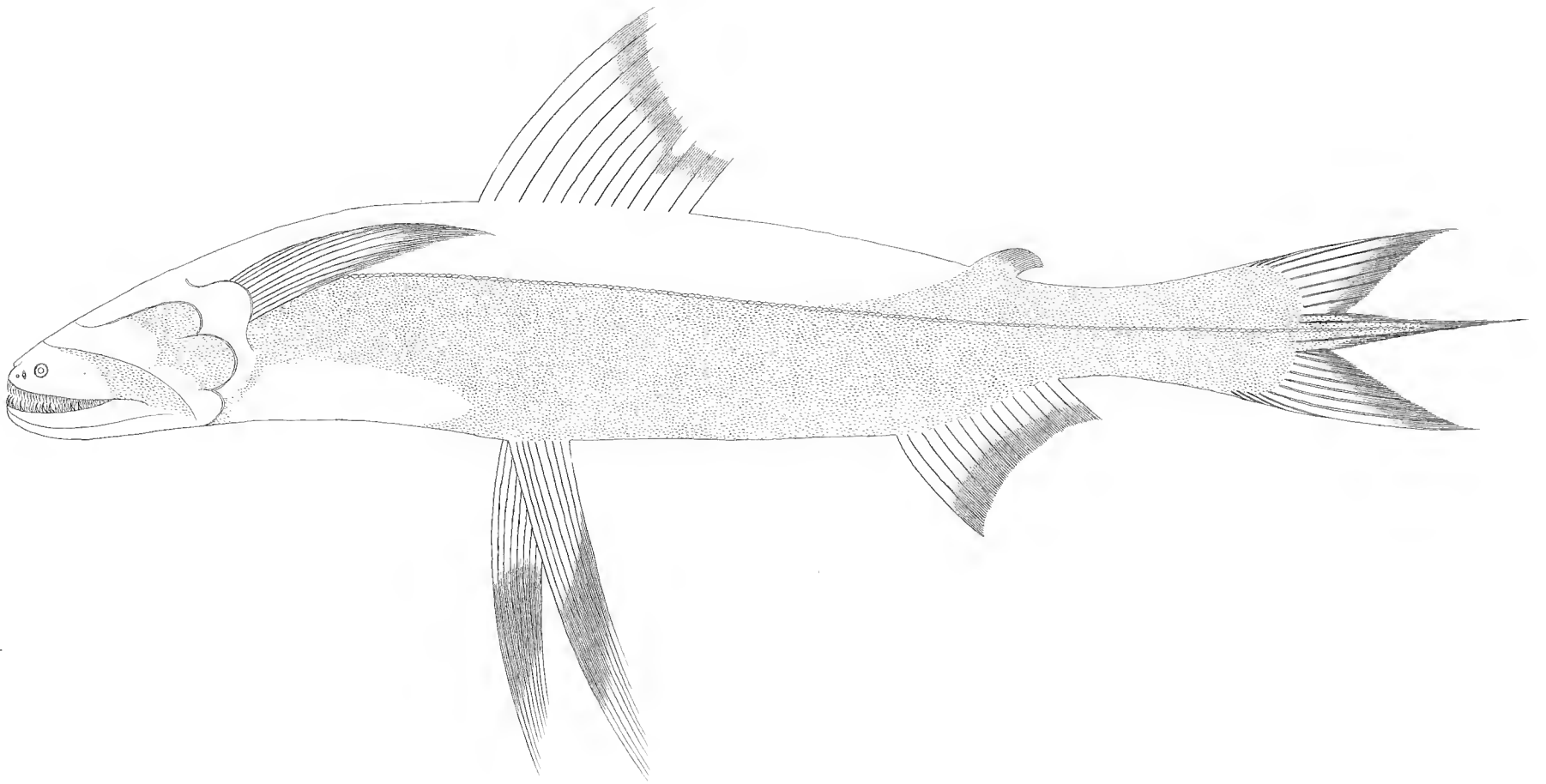
DEDDI JELLAH



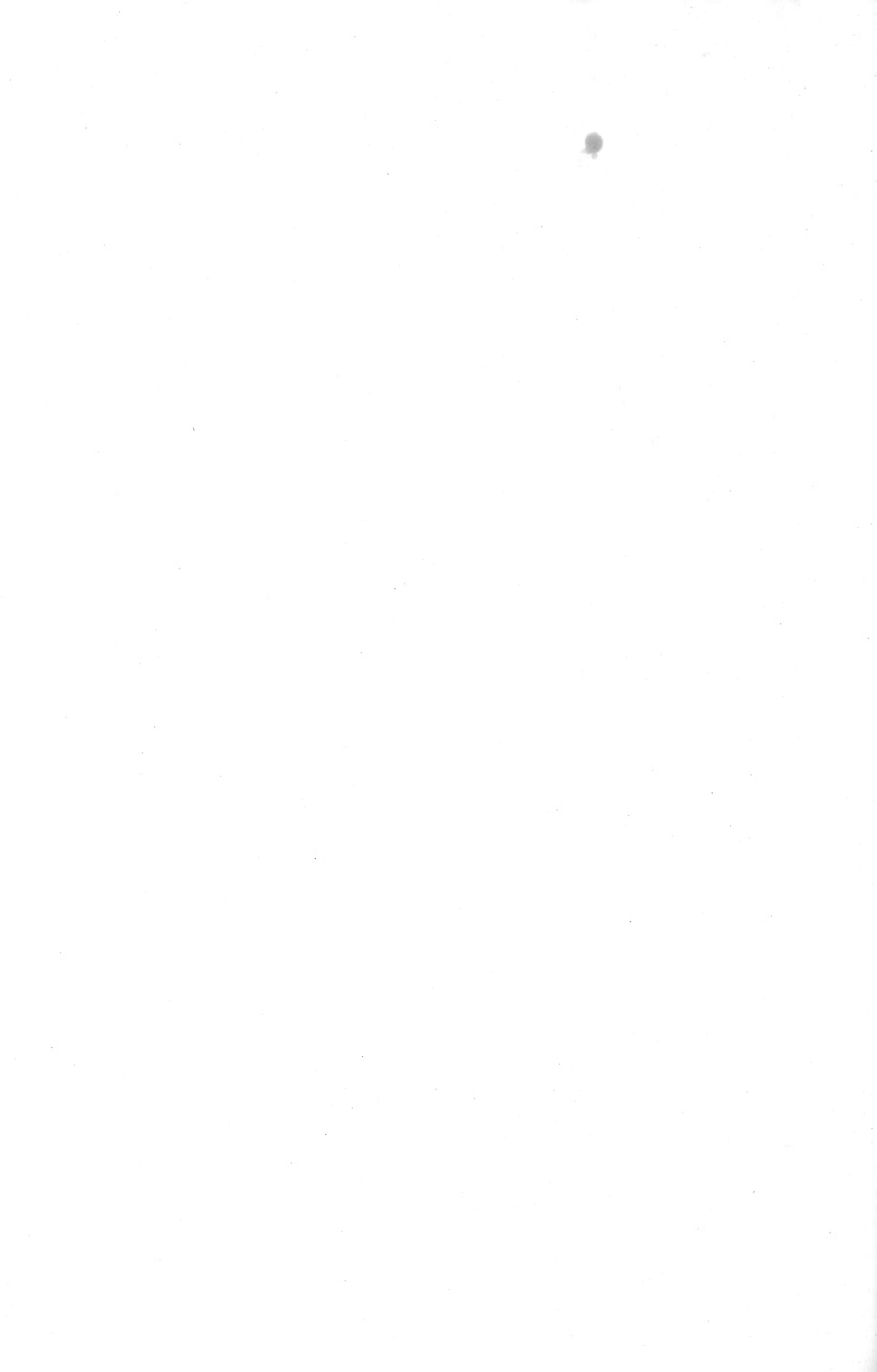


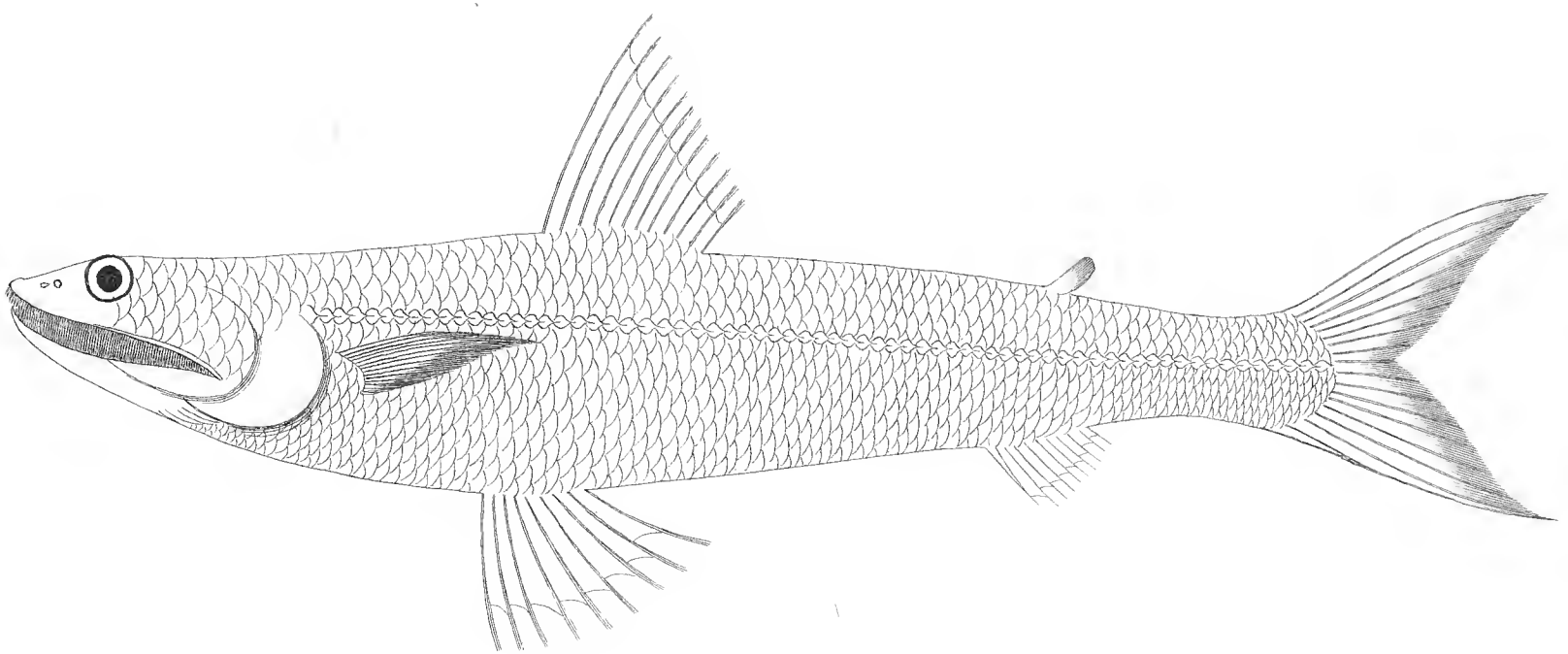
NALLA JELLANI





WANA MOTTA

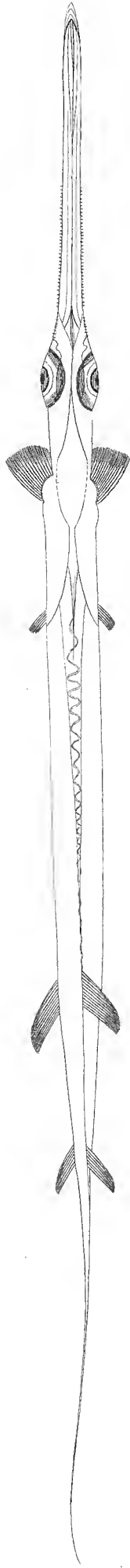




BADI MOTTAN

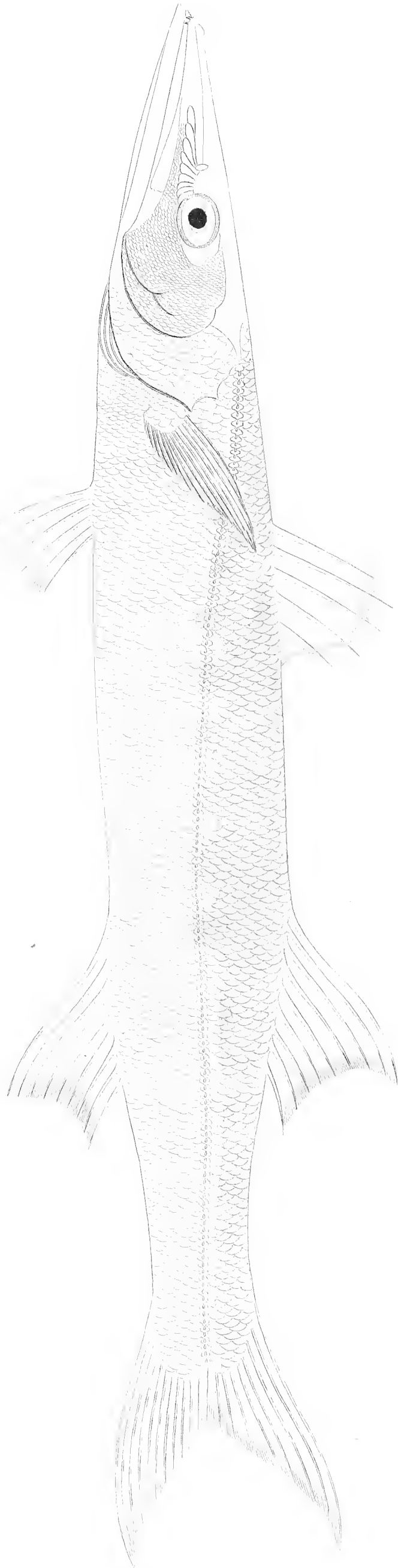






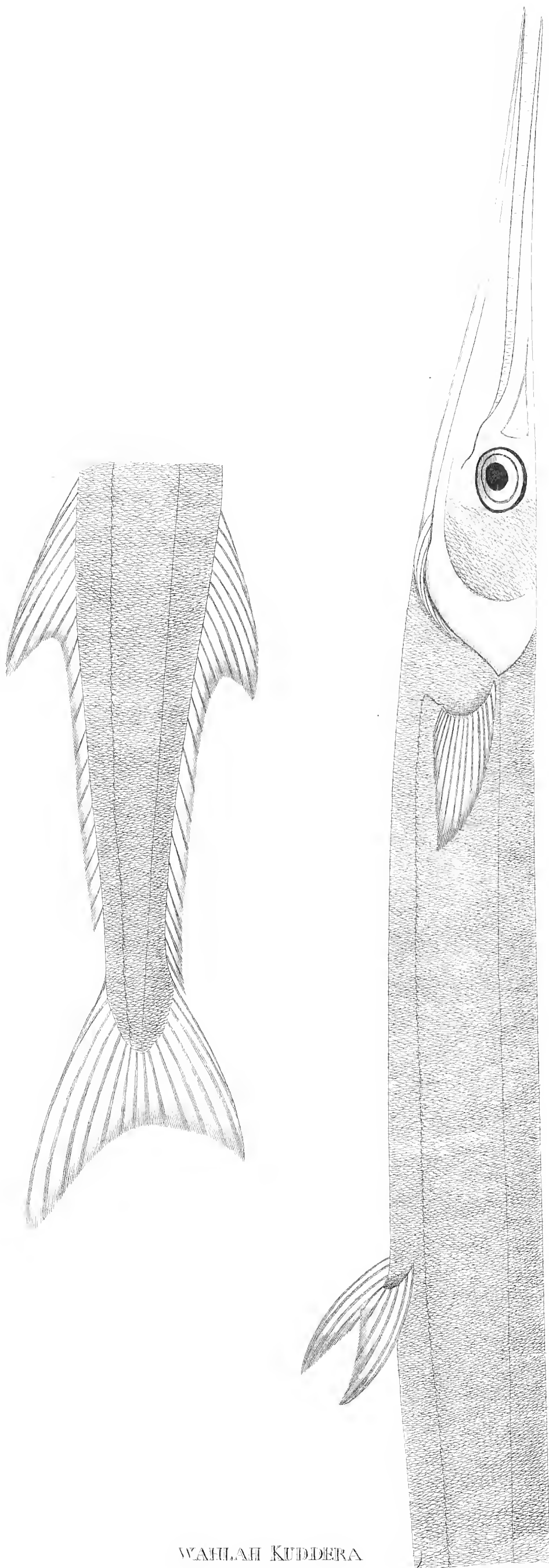
GOORUM





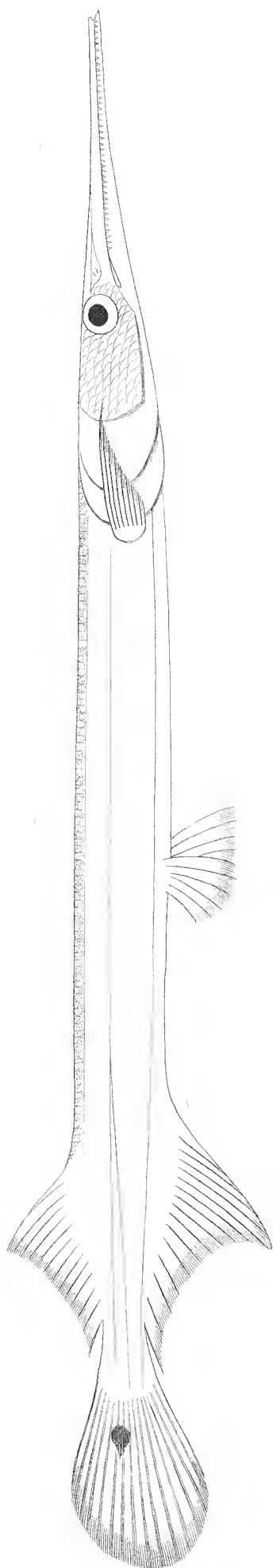
JELLOW





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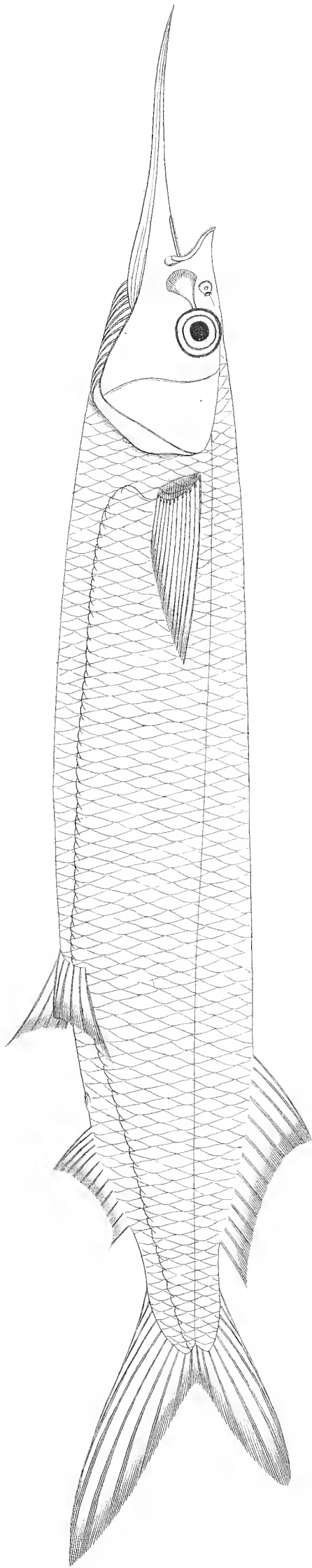




KUDDERA. A

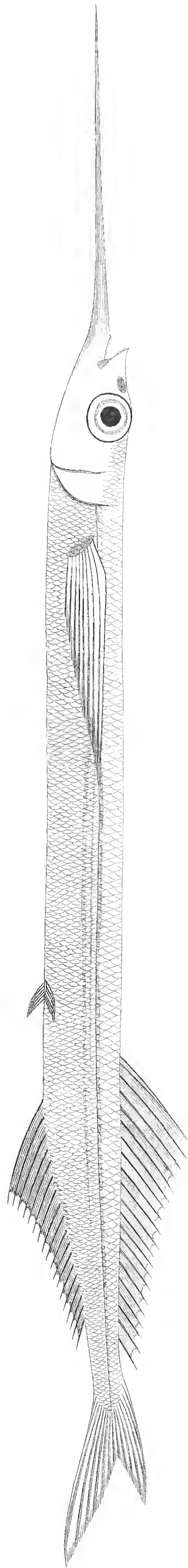






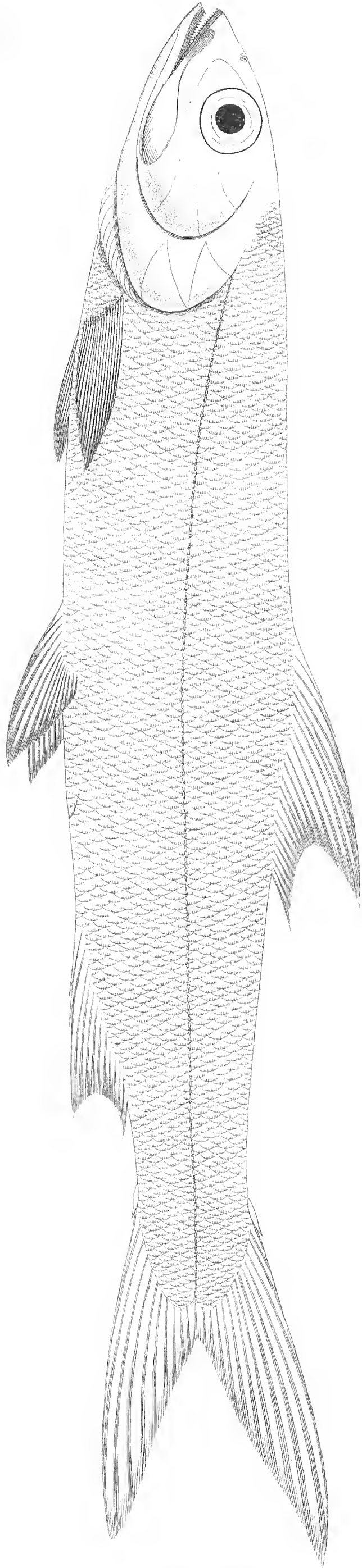
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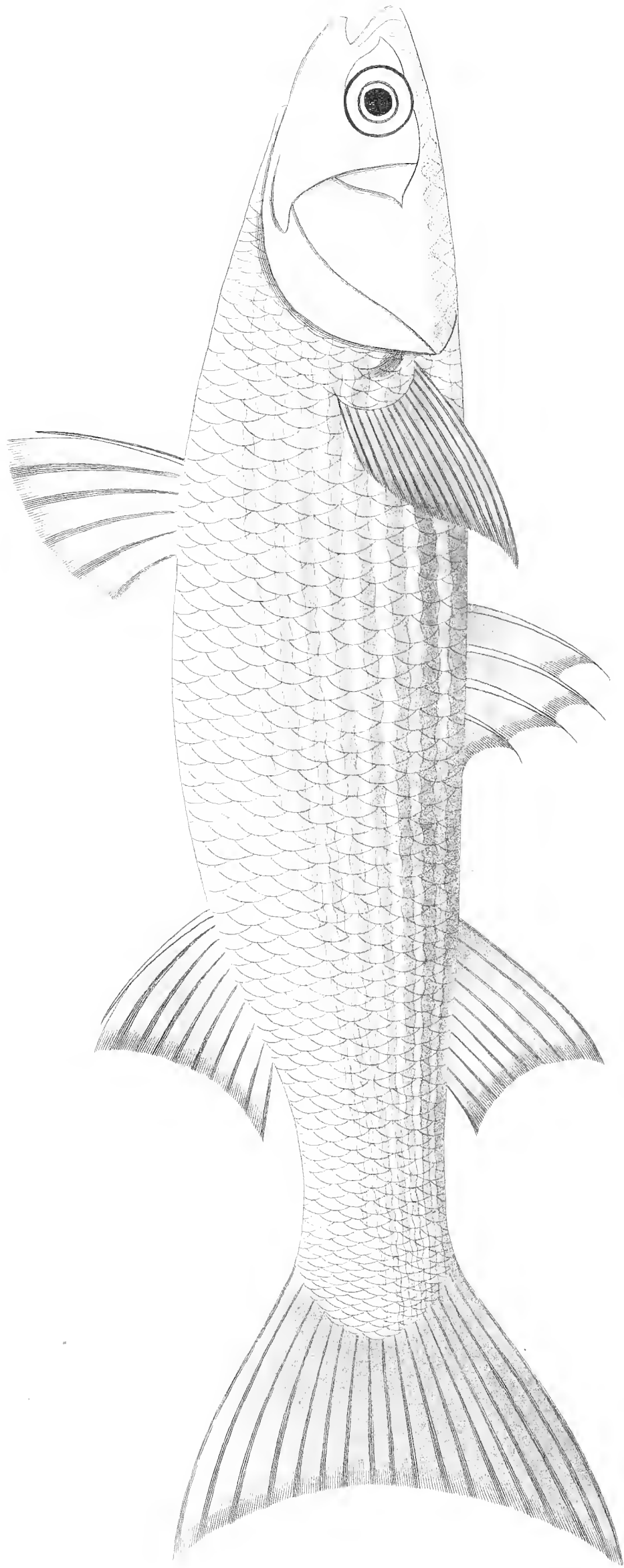
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JINAG OW

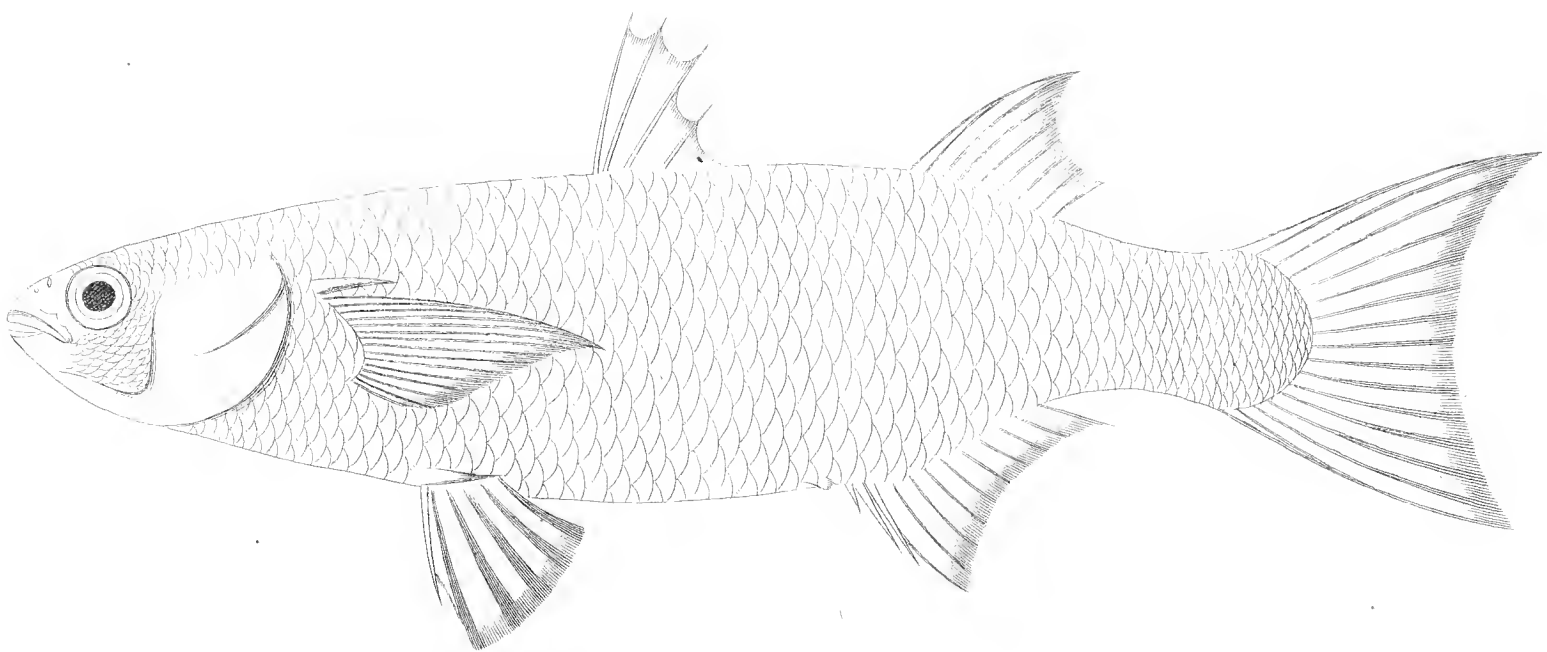




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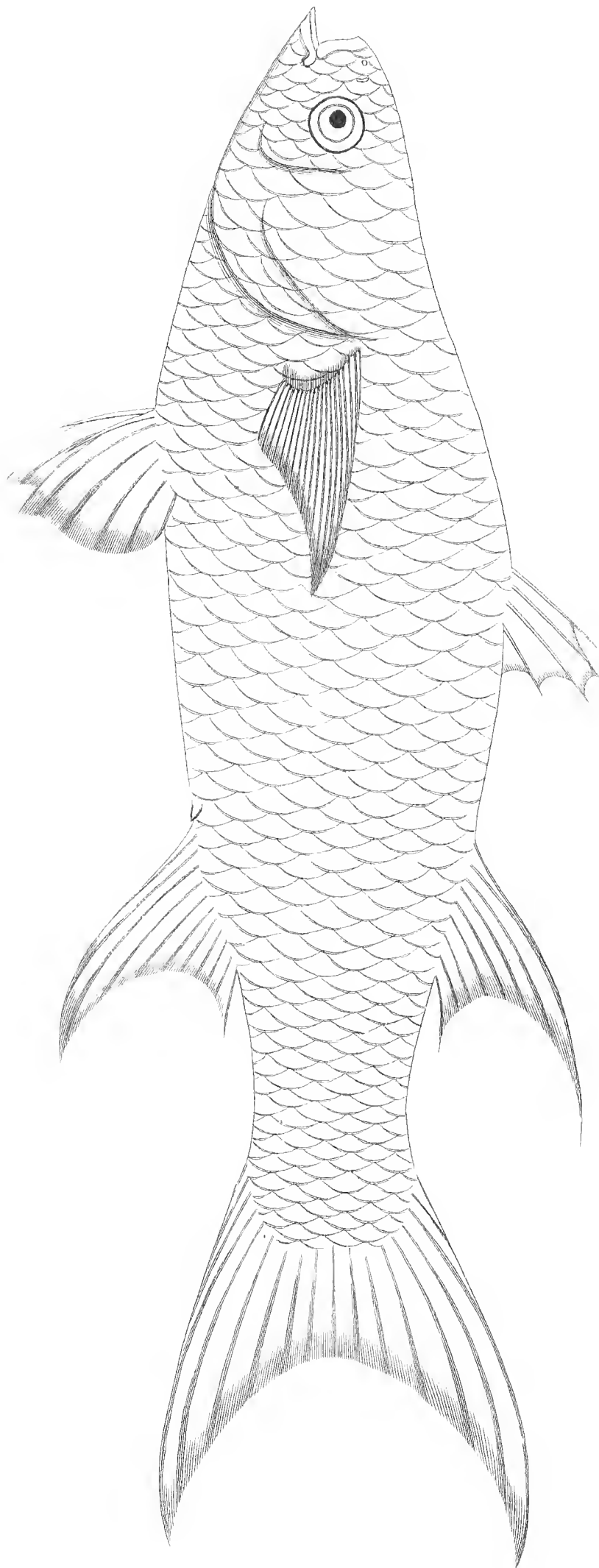






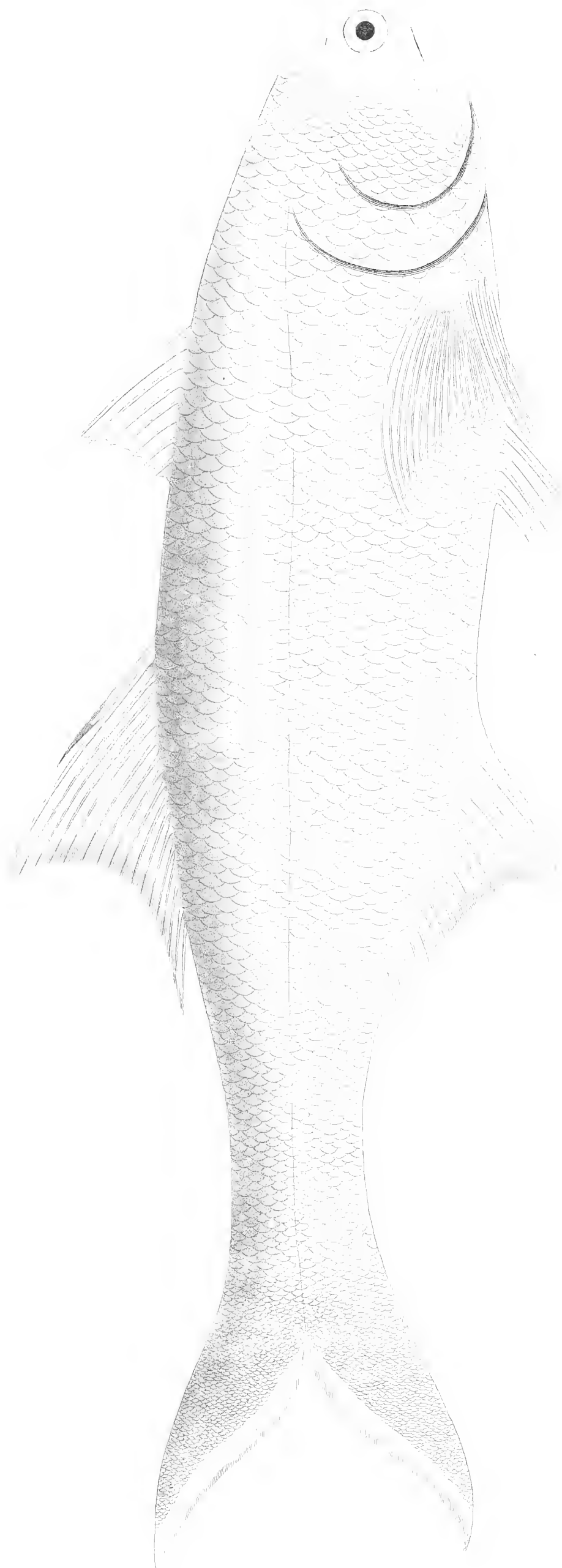
KUNNE SEE





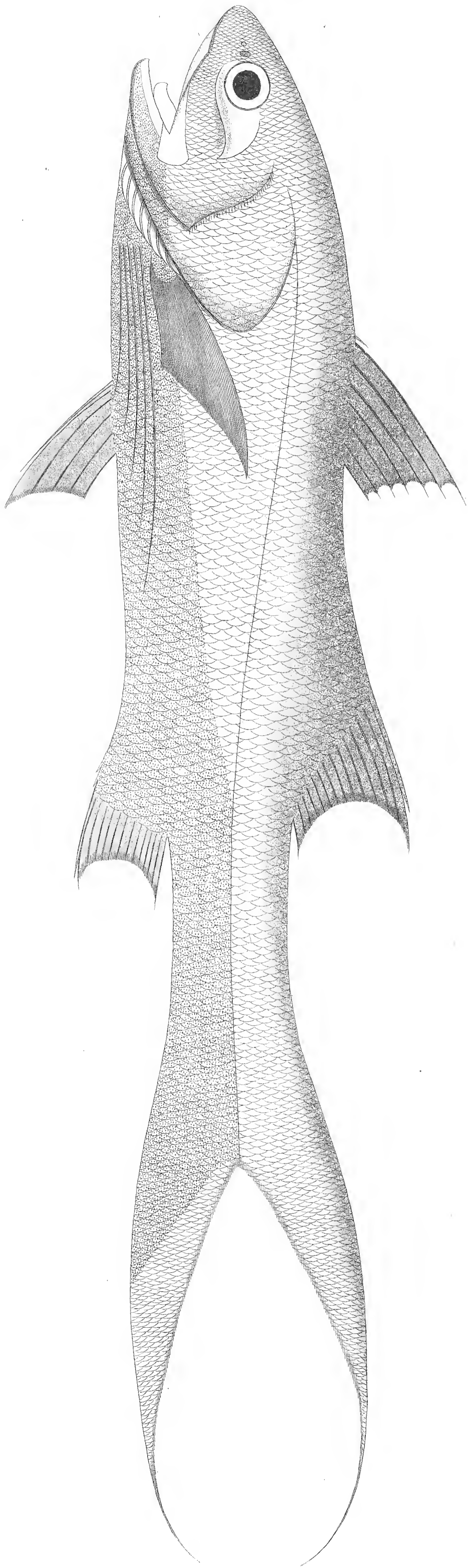
PEDDARAKI SOVERE





MAGA JELLEE





MAGA BOOSHEE

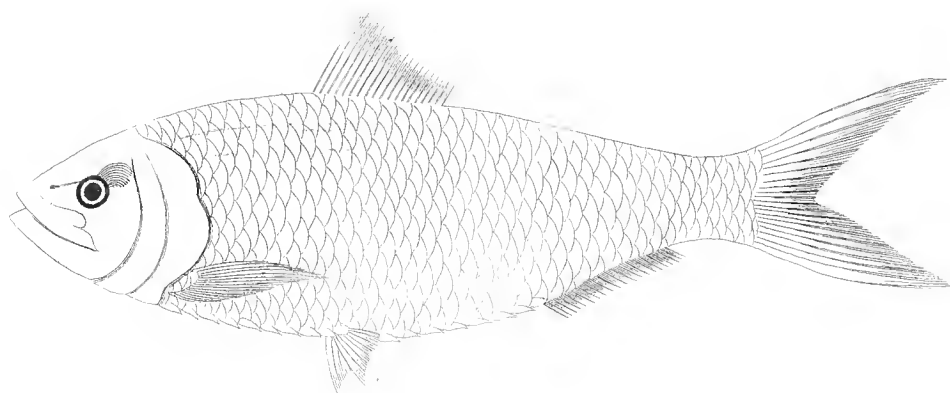






TUPSEE MUTCHEY

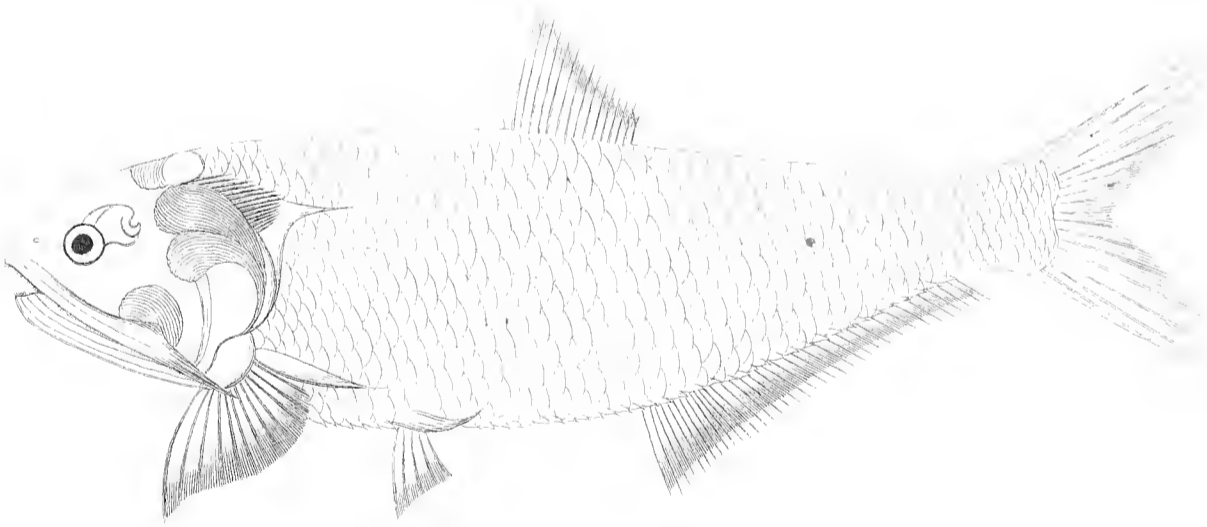
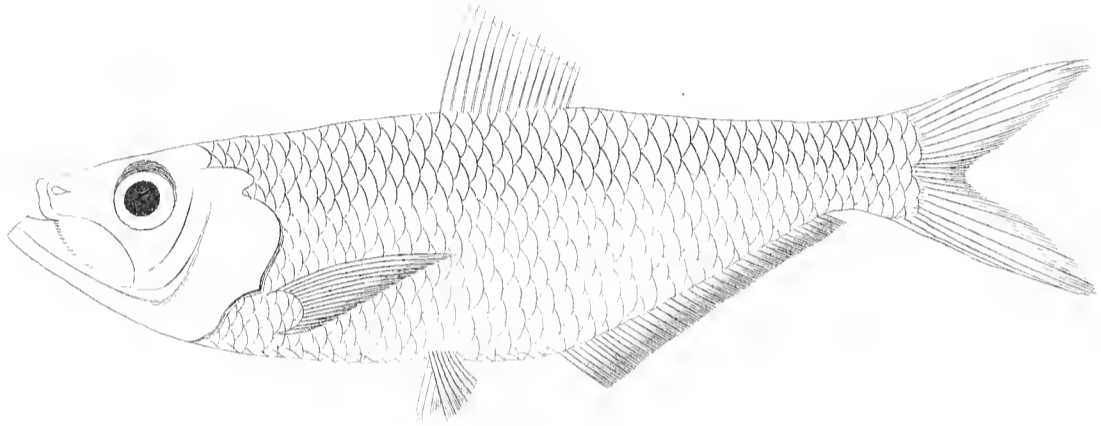




KOWAL

NATTOO

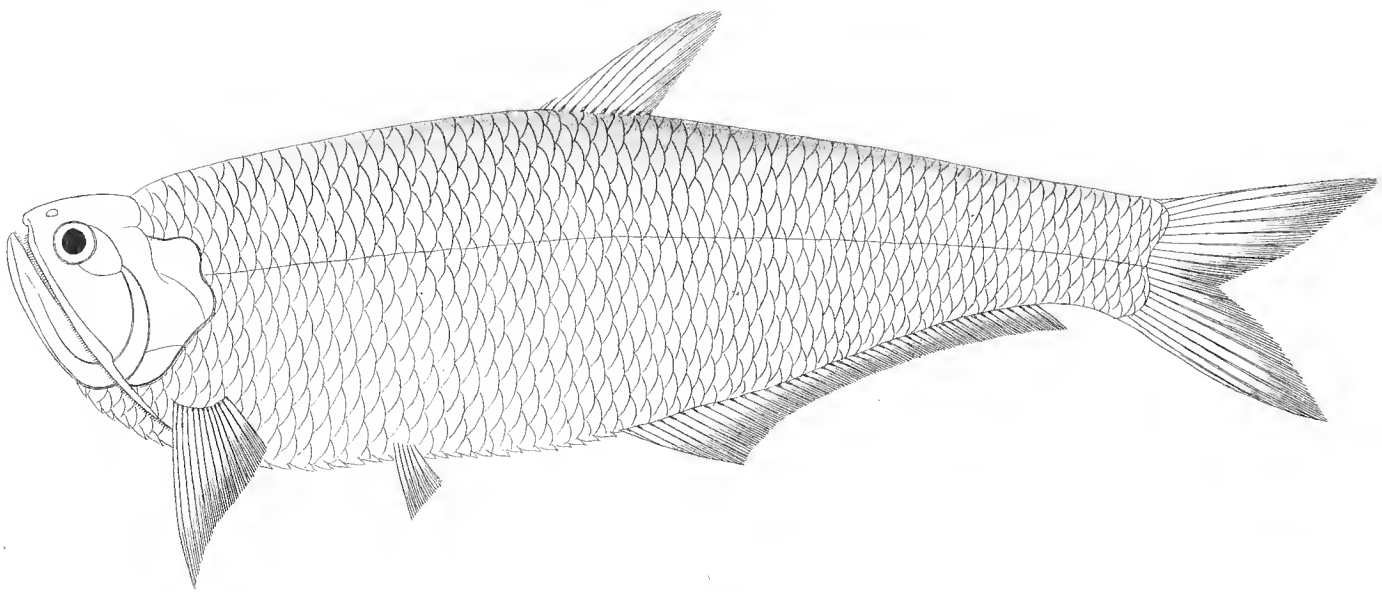




DITCHELEE

POORAWAH

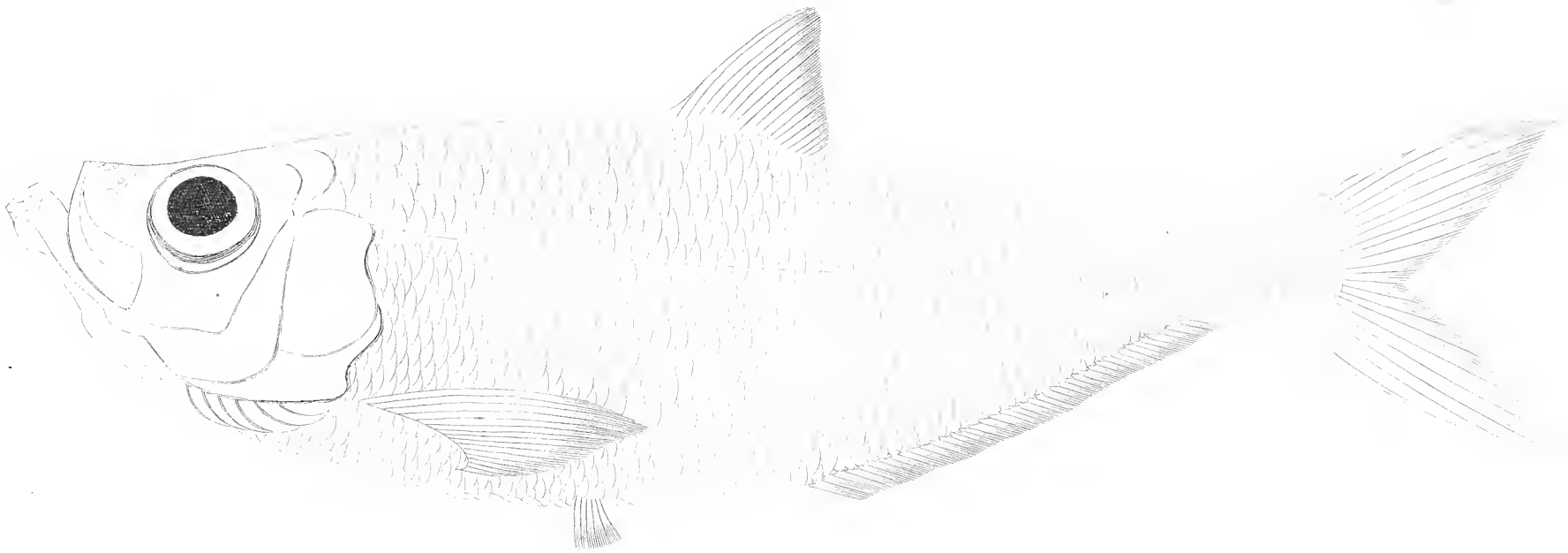




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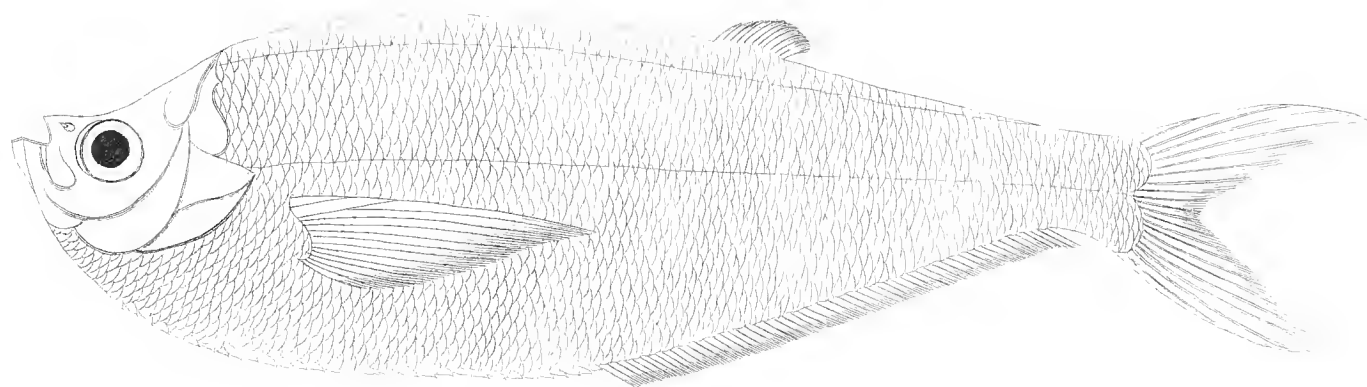
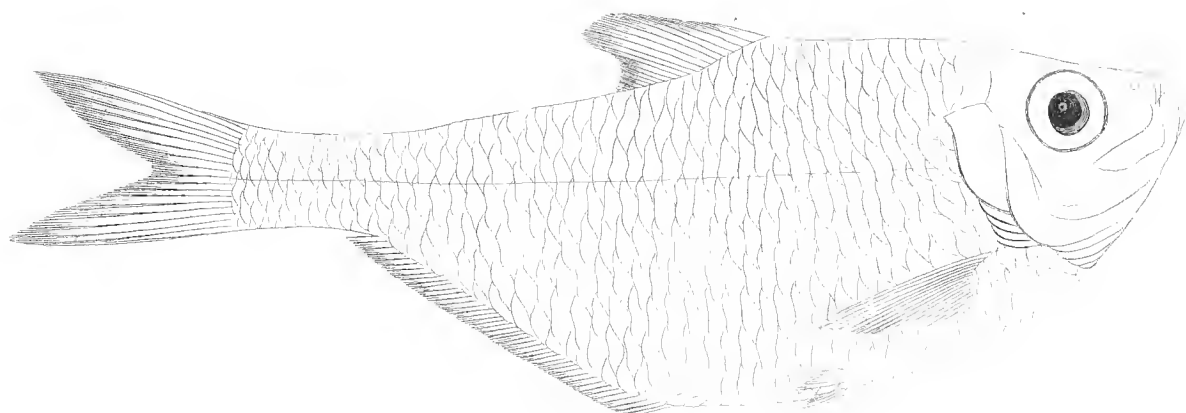






IANGARLO O

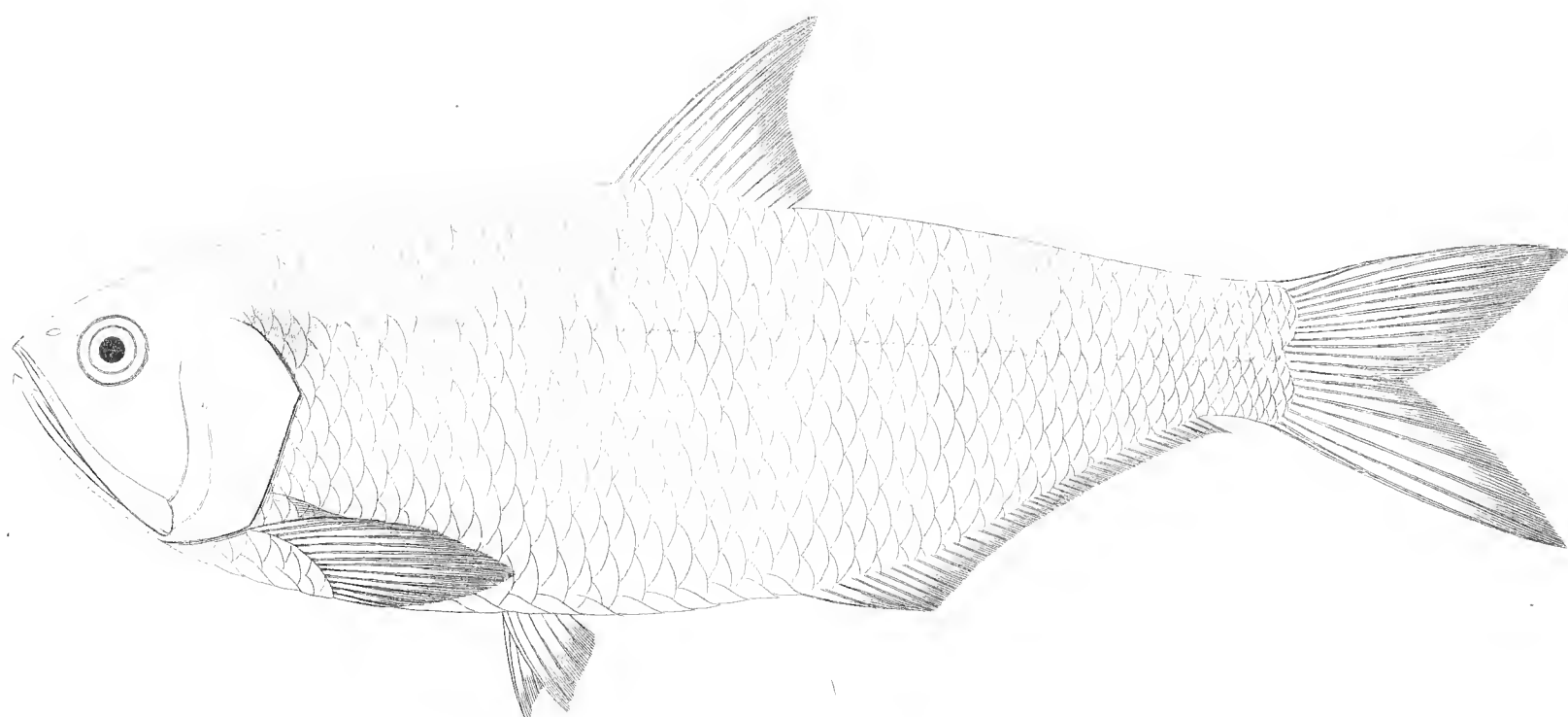




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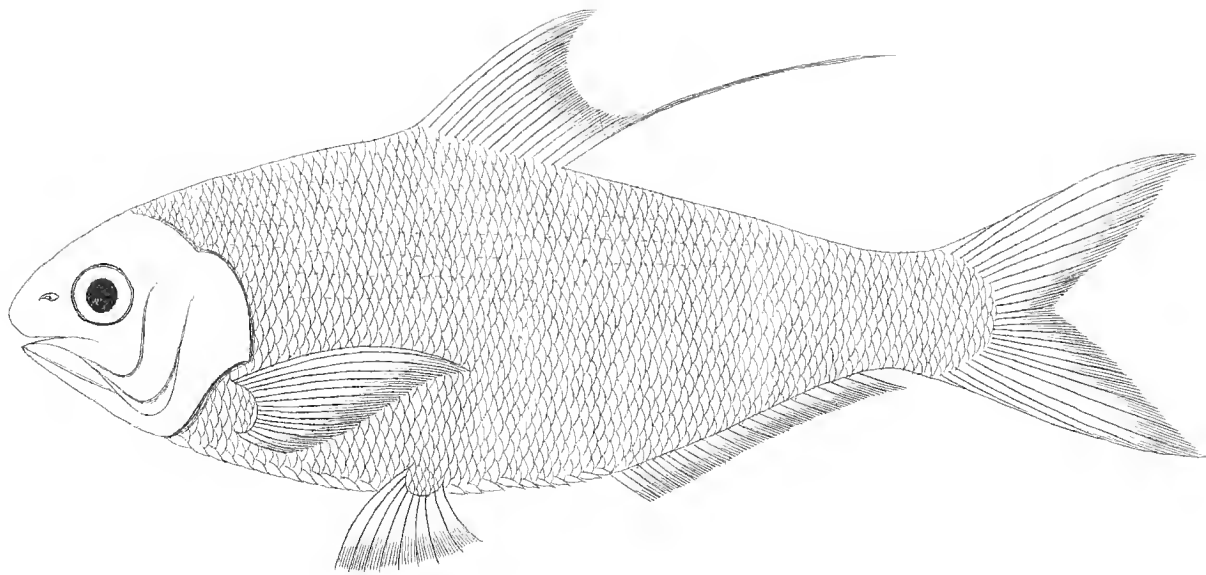
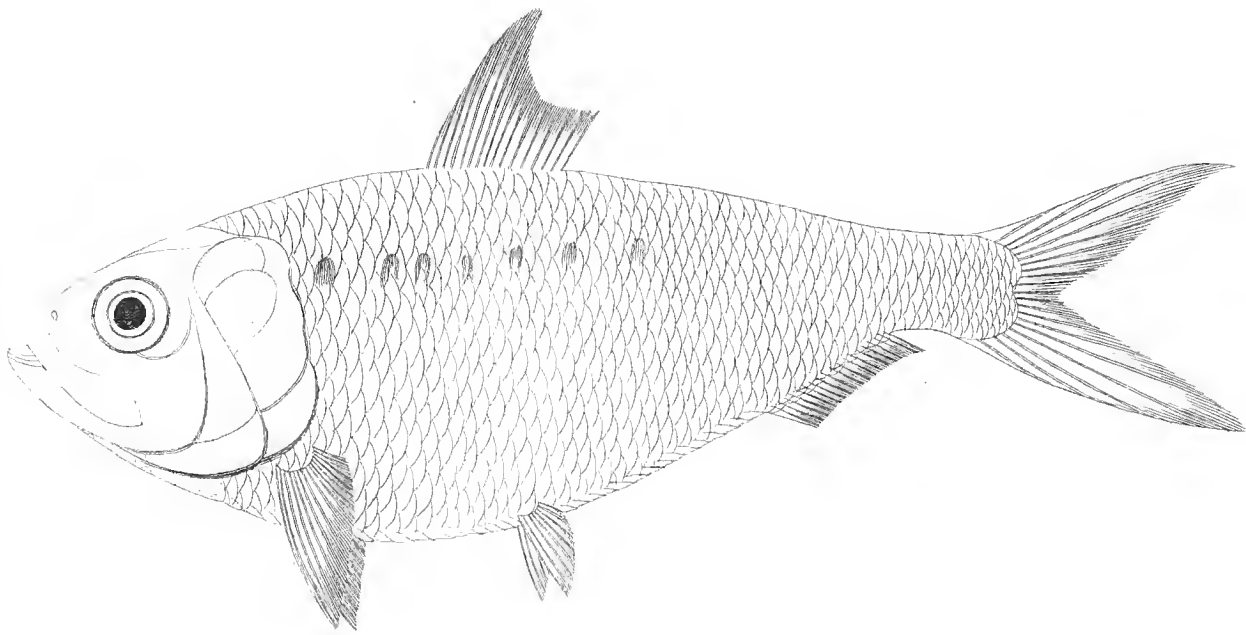
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POORWA



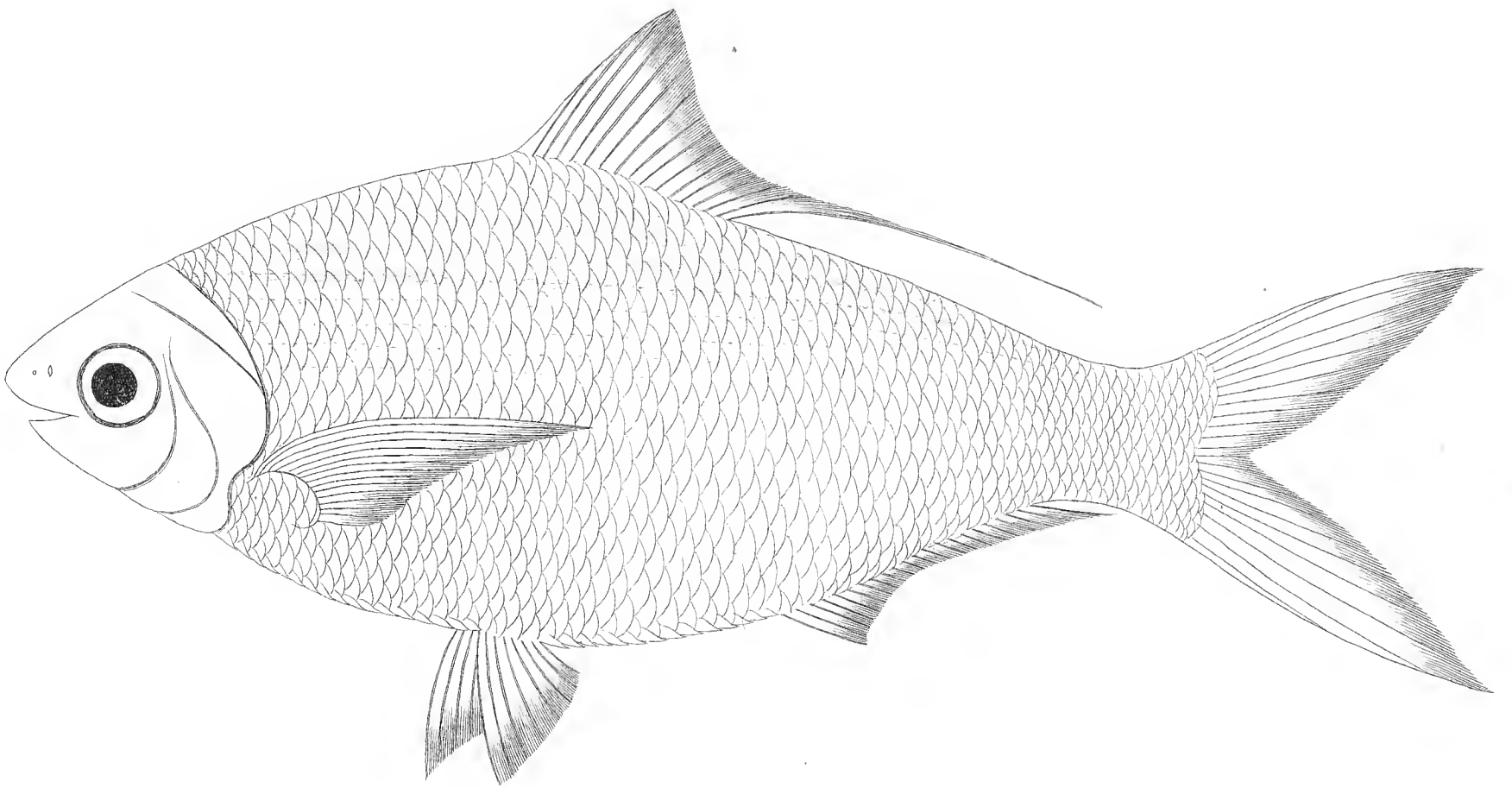


KEELEE

KOME

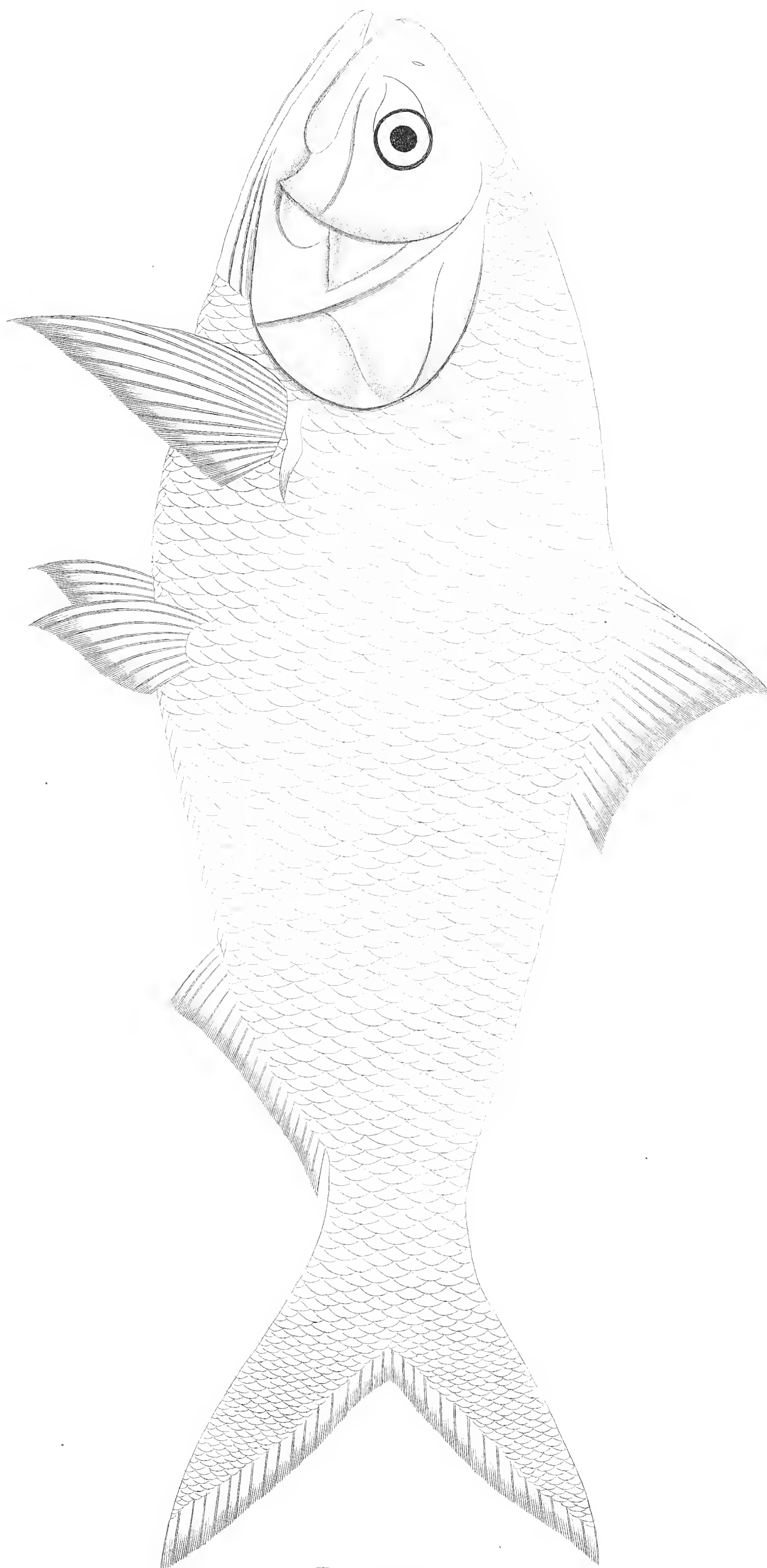






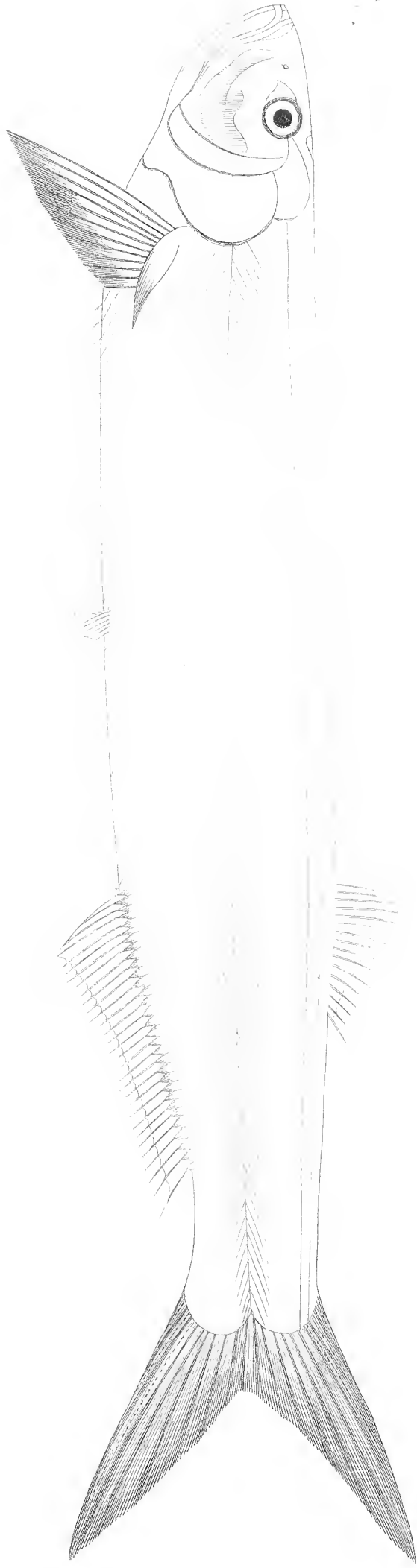
PEDDA KONE





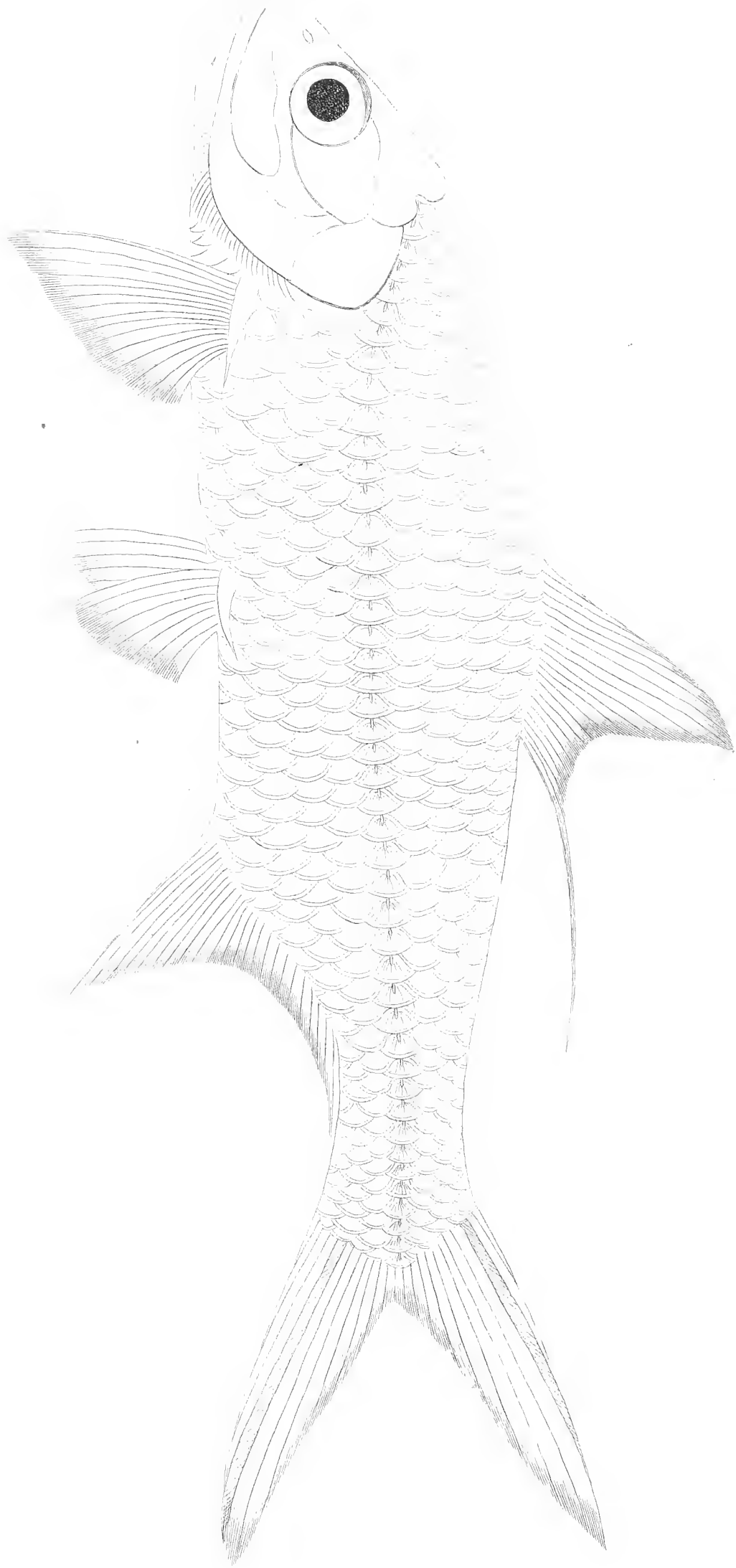
PALASAH





WAHLAH

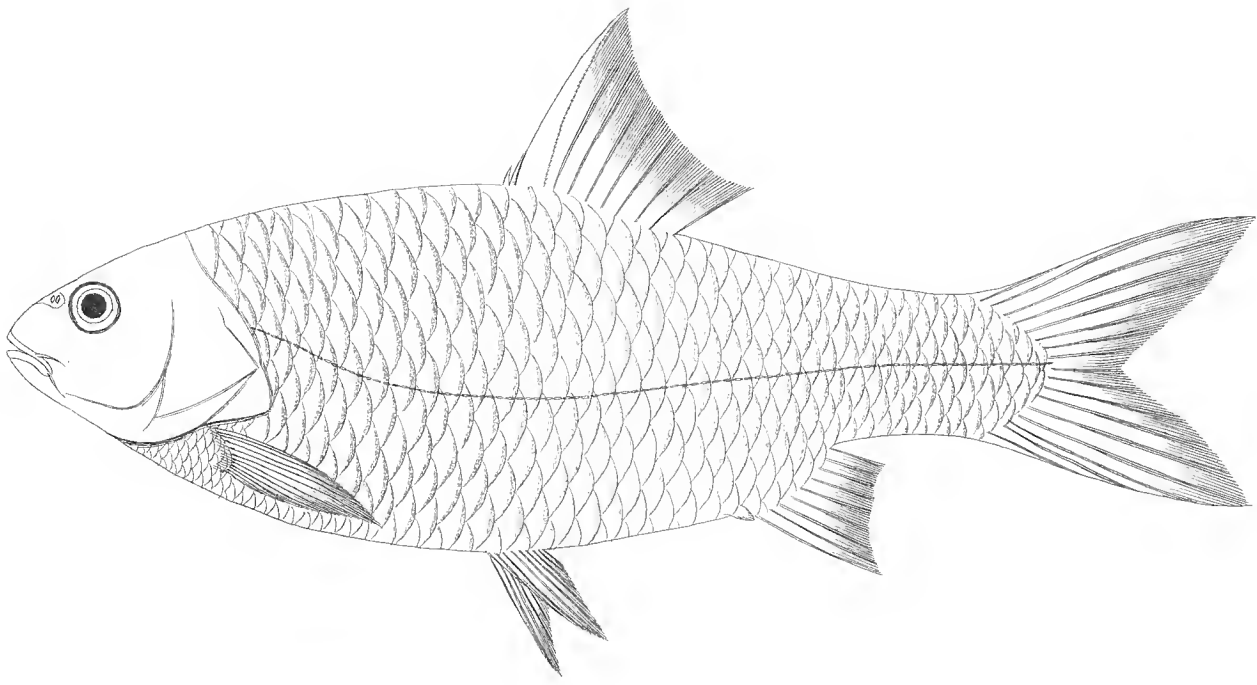




KUNDINGA

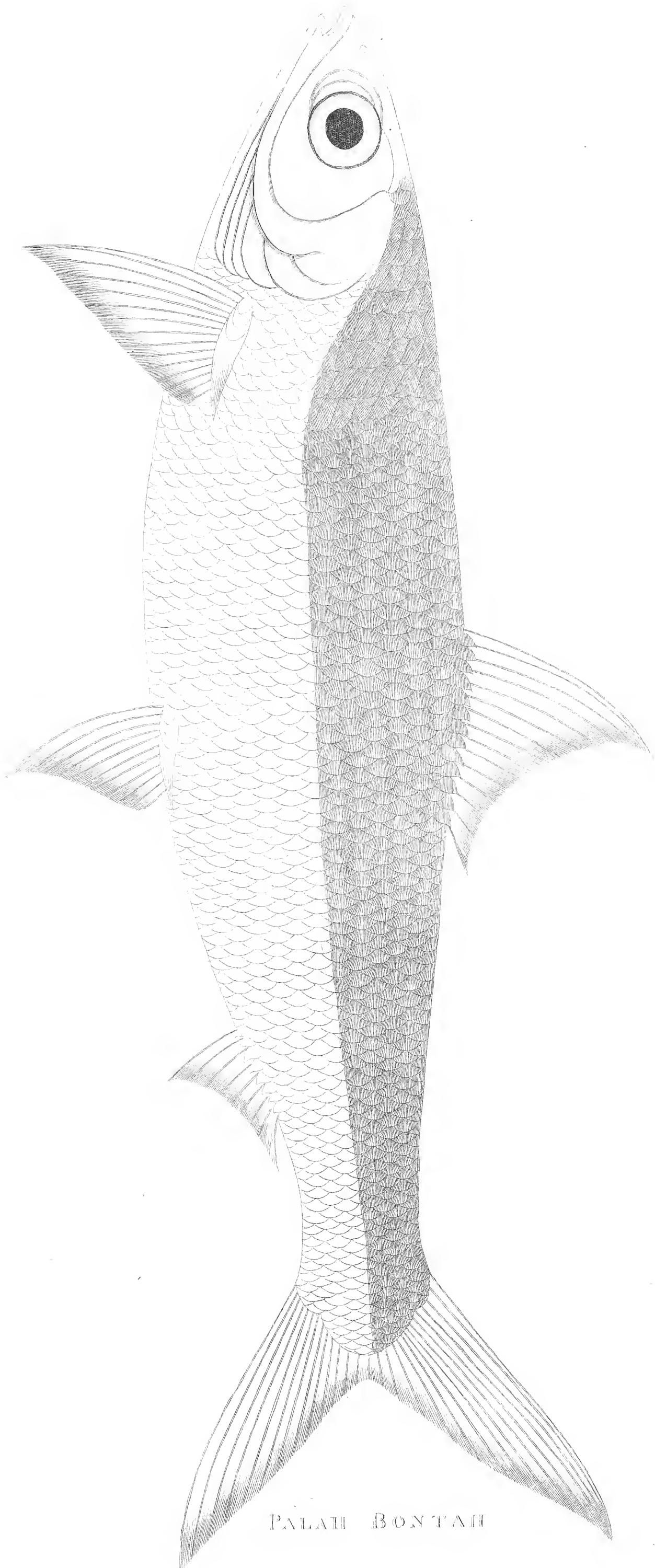






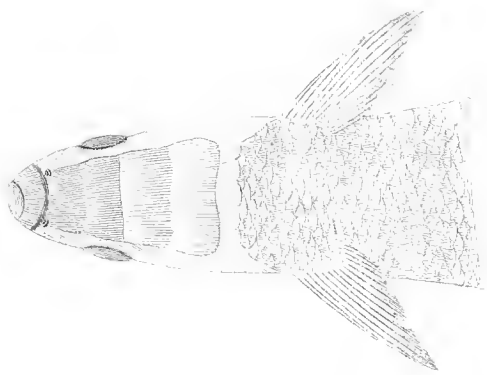
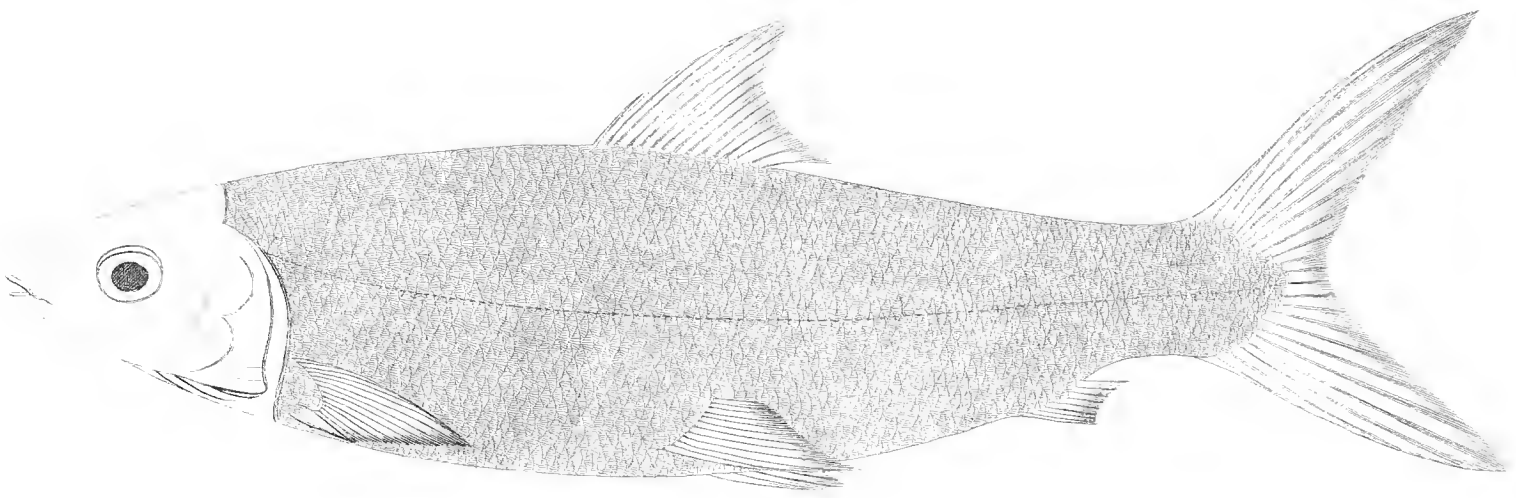
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PALAH BONTAH





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