XLV.—*On the Skull of* Gonorhynchus Greyi.

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[Plate XVI.]

Gonorhynchus, the sole existing genus of the family Gonorhynchidæ, is an aberrant Teleostean fish whose affinities have often been the subject of debate and are not even now definitely known. Having been recently engaged upon an investigation on the cranial osteology of the fishes of the families Elopidæ and Albulidæ (Proc. Zool. Soc. 1904, ii. pp. 35–81), Mormyridæ, Notopteridæ, and Hyodontidæ (Journ. Linn. Soc., Zool. xxix. 1904, pp. 188–217), Clupeidæ (Proc. Zool. Soc., in the press), and Osteoglossidæ (Journ. Linn. Soc., Zool., in the press), I took up the study of the skull of *Gonorhynchus* with no little interest, since there was every hope for believing that in the characters of so complex a structure evidence might be forthcoming as to the relationship existing between the Gonorhynchidæ and the other families of the Malacopterygii.

The material available consisted of three skulls of *Gonorhynchus Greyi* at the British Museum, two of them being prepared specially for the investigation. My thanks are due to Mr. G. A. Boulenger, F.R.S., for facilities offered for the examination of these specimens.

The genus *Gonorhynchus* was established in 1763 by Gronovius (Zoophyl. Gronov. fasc. i. 1763, genus 199, p. 55, pl. x. fig. 2), who placed it immediately before the genus *Cobitis*, with which he must have thought it closely related, because in Gray's British Museum Catalogue, printed in 1854 from the manuscript of Gronovius, the fish appears on p. 41 under the name *Cobitis gonorhynchus*.

Gonorhynchus was placed among the carps by Gmelin (Syst. Nat. Linn. i. 3, 1788, p. 1422), Schneider (Bloch and Schneider, Syst. Ichthyol. 1801, p. 443), Lacepède (Hist. Nat. Poiss. v. 1803, p. 570), and Cuvier (Règne Anim. ii. 1817, p. 196); but Valenciennes (Hist. Nat. Poiss. xix. 1846, pp. 203, 204, and 208) objected on the ground of its numerous (nine) pyloric cæca and because the maxillæ shared with the premaxillæ the bounding of the upper border of the mouth. Valenciennes (*l. c.* p. 179) associated it with *Chanos* by reason of the large size of the branchiostegal membrane and the absence of teeth from the jaws. He pointed out further that *Gonorhynchus*, like *Chanos* and *Albula*, has a

conical head, with snout projecting above the reduced mouth (*l. c.* p. 204).

Gonorhynchus was obtained on the 'Erebus' and 'Terror' Expedition, and Richardson (Zool. Voy. 'Erebus' and 'Terror,' ii. Fishes, part 7, 1845, p. 44), thinking it a new genus, named it *Rhynchæna*, because of its projecting muzzle, and placed it among the Cyprinoids.

Schlegel (Siebold's 'Fauna Japonica,' Pisces, 1850, p. 217) placed the genus *Gonorhynchus* between *Leuciscus* and *Cobitis*. In Günther's 'Catalogue of Fishes in the British Museum' (vii. 1868) the family Gonorhynchidæ follows the Cyprinidæ and precedes the Hyodontidæ, Osteoglossidæ, and Clupeidæ; in the 'Study of Fishes,' 1880, by the same author, the family comes after the Salmonidæ, Percopsidæ, and Haplochitonidæ, and before the Hyodontidæ, Pantodontidæ, Osteoglossidæ, and Clupeidæ.

Kner (Reise der Fregatte 'Novara,' Zool. i. 1869, Fische) placed the family Rhynchænæ, containing the genus *Gonorhynchus*, between the Elopidæ, Chirocentridæ, and Lutodeiræ on the one hand and the Cyprinodontes and Cyprinoidæ on the other. On page 342 he notes that the form of the accessory branchial organ of *Gonorhynchus* testifies to the relation which this fish bears to *Chanos* and the true Clupeids.

By Cope ("Ichth. Lesser Antilles," Trans. Amer. Phil. Soc. n. s. xiv. 1871, p. 455) the Gonorhynchidæ are bracketed with the Sauridæ, because they have the "parietals united" and "no tail vertebræ." (As is shown below, the parietals of *Gonorhynchus* are separated.)

Gill ("Families of Fishes," Smithsonian Miscell. Coll. 1872, p. 16) placed the family Gonorhynchidæ between the Salmonoids, Scopelids, and Alepocephalidæ on the one hand and the Hyodontidæ and Clupeidæ on the other.

According to Smith Woodward (Brit. Mus. Cat. Foss. Fishes, iv. 1901, p. ix) the Gonorhynchidæ are but slightly modified Scopelids; but Boulenger declines to admit any close affinity between the Gonorhynchidæ and the Haplomi (Scopelidæ, Esocidæ, &c.), and lays stress on the presence of a mesocoracoid element in the shoulder-girdle of *Gonorhynchus* and its absence from that of the Haplomi. He places the family Gonorhynchidæ at the end of the suborder Malacopterygii, following the Salmonidæ, Alepocephalidæ, and Stomiatidæ, and preceding the Cromeriidæ (Ann. & Mag. Nat. Hist. (7) xiii. 1904, p. 165).

For a highly specialized family the Gonorhynchidæ are of great antiquity; they date back to the Cretaceous period,

when all the characteristic features of *Gonorhynchus* except the extension of scales over the head had already been acquired. The genus *Notogoneus* of the freshwater Eocene deposits of North America and Europe differs from the recent *Gonorhynchus* only in the absence of pterygoid and lingual teeth, the shape of the subopercular bone, and the position of the dorsal fin (see Smith Woodward, Proc. Zool. Soc. 1896, pp. 500-504, and B. M. Cat. Foss. Fishes, iv. p. ix).

The cranium of *Gonorhynchus Greyi* (Pl. XVI. figs. 2, 3, and 4) is long and flattened, and in the ethmoid and orbital regions rather slender. The frontals form nearly the whole of the roof of the cranium and exhibit no median suture. The parietals are separated by the supraoccipital, and extend back to cover the epiotic prominences; the tubular scales of the transverse commissure of the sensory-canal system are readily removable from the parietal and supraoccipital bones, upon which they are set. The exoccipitals fail to meet above the basioccipital, so that the foramen magnum is not bounded by the exoccipitals alone. The foramen for the passage of the vagus nerve is remarkably large.

The cranium articulates with the vertebral column by a hemispherical head, which is not removable, and consists of a portion of a vertebral centrum fused with the basioccipital and lower parts of the exoccipitals. This convexity of the occipital articulation is not peculiar to *Gonorhynchus*, for Owen and Klein have recorded it in *Fistularia* (Anat. of Vert. i. 1866, p. 107, and Jahresh. Württ. 1881, p. 325), and Klein in *Syngnathus*, *Phyllopteryx*, *Gastrotokeus*, and *Ostracion* (Jahresh. Württ. 1885, p. 108). The most recent observations are those of Starks, who states that the basioccipital condyle is a round knob in the families Fistulariidæ and Aulostomidæ (Proc. U.S. Nat. Mus. xxv. 1902, pp. 619–634).

The ascending wings of the parasphenoid rise high; they pass up in front of the pro-otic and come into contact with the alisphenoid and postfrontal of each side. The parasphenoid fails to reach as far back as the posterior end of the basioccipital; the eye-muscle canal does not open posteriorly; neither the parasphenoid nor the vomer bears teeth. The alisphenoids are widely separated, and there is no orbitosphenoid nor basisphenoid. The ethmoidal region is long, and the mesethmoid, which is small and flat, is separated

from the prefrontals by a considerable tract of ethmoid cartilage.

The post-temporal consists almost entirely of its epiotic limb, the only other part being a delicate sensory-canal scale of tubular shape and horizontal disposition. The anterior end of this tube is in contact with another tubular scale, which represents the supratemporal, but has not the triradiate form characteristic of the supratemporal bone in Malacopterygian fishes generally, since the forking of the horizontal sensory canal into the supraparietal commissure and the squamosal branch occurs just in front of it, and not within it.

From the opisthotic there extends a rod of bone, a kind of intermuscular bone, in the direction of the post-temporal, which, however, it fails to reach. Fibrous tissue intervenes between its posterior extremity and the post-temporal, and the relations between the intermuscular bone and the post-temporal are such as to open up an interesting question whether the opisthotic limb of the post-temporal has not in Teleostean fishes generally the morphological value of an ossified ligament or intermuscular bone. In view of the dermal origin of the post-temporal and the depth below the surface at which its opisthotic limb occurs it is highly probable that such is the case. In *Gonorhynchus* a second and similar intermuscular bone runs from the back of the exoccipital parallel with the above, but situated nearer to the median plane and having no connexion with the post-temporal bone. Such intermuscular bones are not uncommon in Teleostean fishes, and a comparative account of them is given in the 'Proceedings of the Zoological Society,' 1904, ii. pp. 59, 65, 66.

The nasal is a long slender bone of tubular shape, and the preorbital (fig. 5, *por*) is large and has a conspicuous keel near its lower edge, as already shown by Smith Woodward (Proc. Zool. Soc. 1896, p. 503, and fig. 5, *x*). There are no suborbital or postorbital bones.

The gape is bounded above by the premaxillæ alone, although the maxilla is about twice as long as the premaxilla, and extends more anteriorly than that bone, as well as more posteriorly. The premaxilla articulates with the ventro-external surface of the maxilla at about one third of the length of the latter from its anterior end; a short process of the premaxilla extends in front of this articulation, but the main part projects backward and downward. The extreme anterior end of the maxilla articulates with the cartilaginous anterior termination of the palatine. There is no articulation

between the ethmoid region of the cranium and the maxilla, nor between the ethmoid and the premaxilla. Neither maxilla nor premaxilla bears teeth; there is no surmaxilla.

The mandibular ramus (Pl. XVI. figs. 1 and 5) is of remarkable shape, since the articular and dentary components of the coronoid process are widely separated, the dentary component standing high and being situated near the anterior end of the jaw. The lower margin of the gape is nearly at right angles to the long axis of the mandibular ramus. The dentary is but slightly larger than the articular and bears no teeth. The angular is distinct from the articular, and there is a sesamoid articular lying on the buccal side of the articular (fig. 1, *sar*).

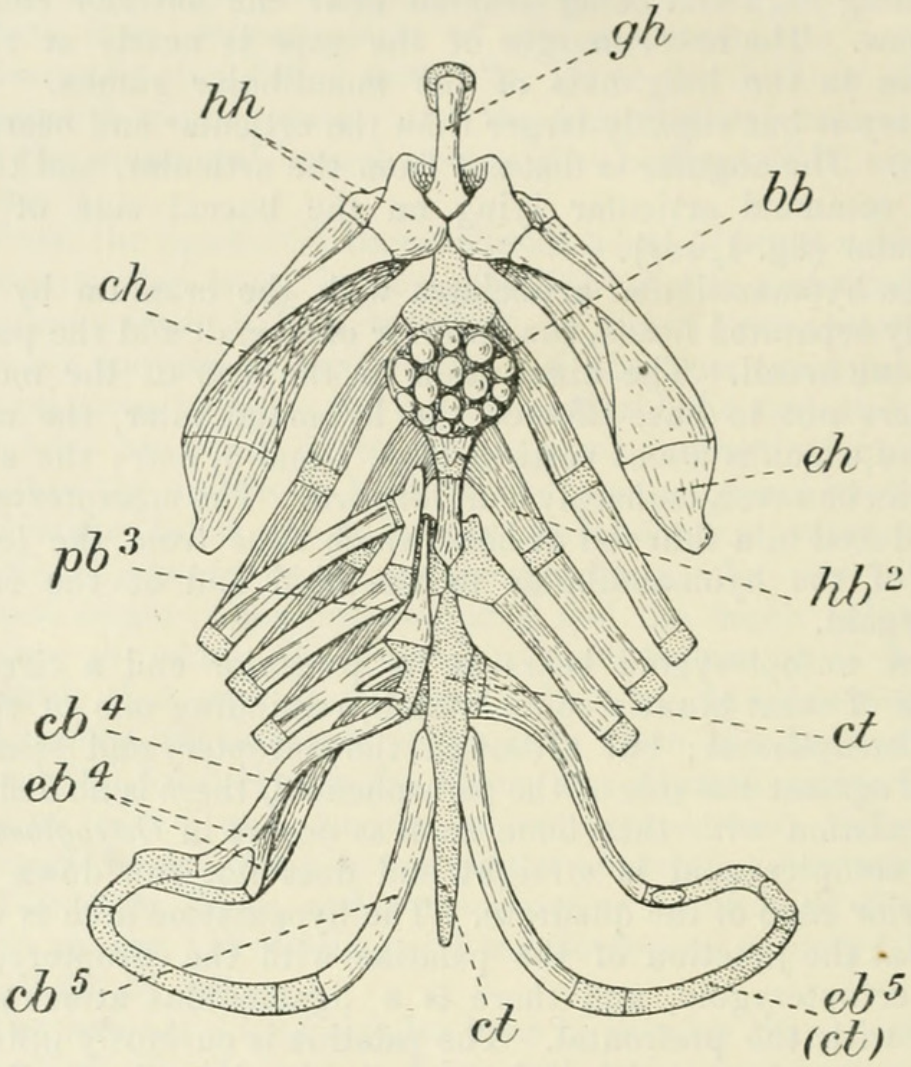
The hyomandibular articulates with the cranium by two barely separated heads, the anterior one small and the posterior one broad. The diminution in the size of the mouth appears not to have affected the hyomandibular, the main axis of which is about vertical (figs. 1 and 5, *hm*); the symplectic, however, is sharply bent forward. The metapterygoid is reduced to a thin rod of bone which runs from the lower end of the hyomandibular to the hind end of the entopterygoid.

The entopterygoid bears at its posterior end a circular patch of stout bluntly conical teeth, reminding one of those of *Osteoglossum*; but although the entopterygoid steadies itself against the side of the parasphenoid, there is no definite articulation with that bone such as occurs in *Osteoglossum*. The ectopterygoid is straight and does not run down the anterior edge of the quadrate. The hyopalatine arch is very thin at the junction of the palatine with the entopterygoid and ectopterygoid, and there is a ligamentous attachment here with the prefrontal. The palatine is curiously inflated and comes close to the surface of the head in front of the preorbital bone in such a manner as to simulate one of the cheek-plates. The bulk of the palatine lies in advance of the dentary symphysis (figs. 1 and 5, *pl*).

The lower or horizontal part of the preopercular is larger than the upper or vertical part (fig. 5, *pop*). There are four branchiostegal rays, the two posterior ones considerably larger and flatter than the other two. They are all attached to the outer face of the epihyal.

The lower hypohyal is larger than the upper. The urohyal is moderately small, and is broadened out in front into a horizontal plate. The glossohyal is narrow and tipped by a hemispherical cartilage (text-fig., *gh*). The first basibranchial is cartilaginous; the second is large and bears on

its upper surface about twenty strong blunt teeth, which engage with the teeth on the entopterygoids, and with the latter constitute the entire dentition of the animal. The third basibranchial is a small rod-like bone, clearly distinct from the second. The fourth and fifth basibranchials are



Gonorhynchus Greyi; hyobranchial skeleton, dorsal view. The epibranchials and pharyngobranchials of the right side are not shown.

bb. Dentigerous plate covering the second basibranchial.
cb. Ceratobranchial.
ch. Ceratohyal.
ct. Cartilage.
eb. Epibranchial.
eh. Epihyal.
gh Glossohyal.
hb. Hypobranchial.
hh. Hypohyal.
pb. Pharyngobranchial.

represented by a rod of cartilage which is continued back for some little distance behind the mesial ends of the fifth ceratobranchials.

The last two branchial arches are large and slender and

support the epibranchial organ. The fourth and fifth ceratobranchials are slender curved rods of bone. A fifth epibranchial (text-fig., *eb* 5) is present in the form of a curved rod of cartilage distinct from, but in the same line with, the posterior cartilaginous epiphysis of the fifth ceratobranchial. At its upper end it meets the Y-shaped cartilage that constitutes the posterior part of the fourth epibranchial. The ossified part of the fourth epibranchial consists of a broad thin lamina of bone, vertically disposed, and therefore seen edgewise in the text-figure.

The first hypobranchial is as long as the first ceratobranchial, the second is nearly as long as the second ceratobranchial, the third hypobranchial is cartilaginous. The first pharyngobranchial is wanting and there is no spicular bone; the second and third pharyngobranchials have the normal relations.

In utilizing the characters of the skull of *Gonorhynchus* as the basis for a discussion of the affinities of the genus I think it may be taken for granted that the family Gonorhynchidæ falls within the suborder Malacopterygii as defined by Boulenger (Ann. & Mag. Nat. Hist. (7) xiii. 1904, pp. 163–165), for the presence in the Gonorhynchidæ of a mesocoracoid element in the shoulder-girdle excludes the family from the Haplomi, and the absence of Weberian ossicles disposes of the hypothesis upheld by the earlier writers that the Gonorhynchidæ are allied to the Cyprinoids.

The extension in *Gonorhynchus* of the upstanding process of the parasphenoid so far as to touch the alisphenoid and postfrontal bones is paralleled in *Osteoglossum*, the process reaching the alisphenoid in *O. Leichardti* and the postfrontal in *O. bicirrhosum* and *O. formosum*; and the entopterygoid of *Gonorhynchus* bears at its posterior end a patch of stout teeth, which engage with the basibranchial teeth much as in *Osteoglossum*; and, further, the first basibranchial remains unossified, as in *Heterotis*. But the Osteoglossidæ (*Osteoglossum*, *Heterotis*, and *Arapaima*) are a sharply delimited family, distinguished by the sculpturing of the superficial bones of the skull, the meeting of the parietal bones, the sutural union of the nasal bones with one another and with the anterior ends of the frontal bones, the presence of a stout peg-like process of the parasphenoid for articulation with the entopterygoid, the smallness of the subopercular, the bounding of the upper border of the gape by the

maxilla as well as the premaxilla, and the absence of the lower hypohyal: none of these features are exhibited by *Gonorhynchus*.

The Pandodontidæ are more nearly allied to the Osteoglossidæ than to any other family of Teleostean fishes, and resemble them in the presence of a paired peg of the parasphenoid for articulation with the entopterygoid, in the large size of the nasal bones and their incorporation into the cranium, and in the meeting of the parietal bones. In those characters in which *Pantodon* differs from the Osteoglossidæ —such, for instance, as the absence of the interopercular and the fusion of the two premaxillary bones—it does not approach the Gonorhynchidæ.

Phractolæmus, the sole genus of the family Phractolæmidæ, has a remarkably aberrant skull, only a few features of which can be found to recur in the skull of *Gonorhynchus*. Such are the failure of the first basibranchial to ossify, the small size of the mouth, the reduction of the dentition, and the forward position of the coronoid process. Of these features the first occurs in genera as remotely allied as *Heterotis*, *Notopterus*, and *Cromeria*, although not occurring in *Osteoglossum* and *Arapaima*, with which *Heterotis* has obvious relations. The second and third characters are such as have clearly been evolved independently in a number of groups of fishes, while the last appears to be connected with the reduction in the size of the mouth, and is met with (to a slighter extent) in such unrelated genera as *Leptolepis*, *Labeo*, and *Chatoëssus*.

Notopterus, as above mentioned, is a form which has a cartilaginous first basibranchial—the feature is so unaccountable that one seizes upon it as possibly affording a clue to the elucidation of the question of affinity. But the suggestion of close relationship between *Gonorhynchus* and *Notopterus* is not sustained by a closer examination of the cranial characters, for *Notopterus* has the right and left parietal bones meeting in the median line, an orbitosphenoid traversed by the cranial cavity, a lateral cranial foramen, an air-containing vesicle at the side of the occipital region of the cranium, teeth on the parasphenoid, a gape bounded above by both premaxilla and maxilla, no subopercular bone, tendon-bones projecting downward from the posterior end of the second basibranchial, a single hypohyal on each side—characters which collectively dissociate this genus from *Gonorhynchus*.

The Mormyridæ are a sharply marked family whose

nearest relations are the Notopteridæ, but they are more remote from *Gonorhynchus* than is *Notopterus* itself, and may be dismissed forthwith.

The genus *Hyodon*, while presenting no cranial characters which would negative the possibility of affinity with *Gonorhynchus*, affords no affirmative evidence. It retains certain primitive characters which have been lost in *Gonorhynchus*, such, for instance, as the bounding of the upper border of the gape by both maxilla and premaxilla, the meeting of the right and left parietal bones, the presence of teeth on the parasphenoid, the continuation of the cranial cavity through the orbitosphenoid, and the presence of a basisphenoid. So far as the evidence of the characters of the skull bears upon the question, it is not beyond the bounds of possibility that *Gonorhynchus* should have been descended from some ancestral branch of the family Hyodontidæ, differing from the modern *Hyodon* in having a smaller supratemporal, in having no air-containing vesicle by the side of the occipital region of the cranium, and in possessing an angular bone distinct from the articular.

None of the characteristic features of the Clupeoid skull are met with in *Gonorhynchus*. The most striking of such features are the presence of a posterior temporal groove, a temporal foramen, pre-epiotic fossa, auditory fenestra, right and left posterior wings of the parasphenoid, with eye-muscle canal opening between them, and bullate swellings in the squamosal and pro-otic bones for lodging vesicular diverticula of the swim-bladder. No suggestion of any of these is to be found in *Gonorhynchus*.

Gonorhynchus was by Valenciennes associated with *Chanos* because of the large size of the branchiostegal membrane and the absence of teeth. It is true that there are several respects in which *Chanos* differs from the Clupeidæ proper and approaches *Gonorhynchus*—such, for instance, as the want of teeth in the jaws, the want of a temporal foramen, pre-epiotic fossa, auditory fenestra, posterior wings of the parasphenoid, and orbitosphenoid and basisphenoid bones, the reduction in size of the mouth, so that the maxilla fails to form part of the boundary of the gape, the absence of surmaxillæ, the separation of the quadrate from the metapterygoid, and the reduction in the number of the branchiostegal rays. But the large size of the posterior temporal fossa and the completeness of its roof are distinctly against the supposition of Valenciennes.

This last objection applies also to the families Elopidæ

and Albulidæ. They are undoubtedly primitive families, and must have separated early from the common stock of the Teleostean fishes, but one cannot regard the forward intrusion of the trunk-muscles as anything but a character of specialization which has been generated subsequently to the severance of these families from the common stem. The ancestral Elopids and Albulids were, of course, upon the line of descent of the Gonorhynchids, but the relationship is not nearer.

The Stomiatidæ, in so far as they depart from the primitive type, are specialized in a direction contrary to that along which *Gonorhynchus* has become modified; the well-developed maxilla, formidable dentition, wide gill-opening, reduction of opercular skeleton, and presence of a hyoid barbule in the Stomiatidæ indicate how futile it would be to search for any evidence of close affinity between them and the Gonorhynchidæ.

On comparing the skull of *Gonorhynchus* with that of *Cromeria* there is to be noted a similarity in respect of the rod-like form of the metapterygoid and of the palatine (in *Gonorhynchus* the posterior portion only), the distinctness of the angular from the articular bone, the failure of the first basibranchial to ossify, the smallness of the number of the branchiostegal rays, and the narrowness of the gill-opening. But against these resemblances there has to be set such a large number of differences as suggests that the allies of *Gonorhynchus* are not to be sought in the direction of the Cromeriidæ. *Cromeria*, for instance, has the frontal bones widely separated, whereas in *Gonorhynchus* they are so closely united that the interfrontal suture is obliterated, it has no ectopterygoid, no symplectic, no ascending process of the parasphenoid, no projecting snout, a single hypohyal on each side, no epibranchial organ, a cartilaginous glossohyal, an ossified fourth pharyngobranchial, and ossified fourth and fifth basibranchials (see Swinnerton, Zool. Jahrb., Abth. Anat. xviii. 1903, pp. 58–70).

Of the two remaining families which I propose to consider —the Alepocephalidæ and Salmonidæ—the former is to a certain extent specialized in relation with its deep-sea habits, but in some respects remains more primitive than the latter. It has no opisthotic, no teeth on the maxilla, an eye-muscle canal closed behind *, and an opercular bone very narrow in

* In a comparison involving the Salmonidæ this character cannot be allowed to carry much weight, since although the canal is open in such

front; but, on the other hand, it possesses two surmaxillæ and an ossified first pharyngobranchial in addition to the spicular. *Alepocephalus* resembles *Gonorhynchus* in possessing an epibranchial organ, borne by the fourth and fifth arches, and in possessing a cartilage which may be identified as the fifth epibranchial; but the list of resemblances is soon exhausted.

On the other hand, the Salmonidæ, though offering no close resemblances to the Gonorhynchidæ, consist of a variety of forms but little specialized and highly plastic. For the purposes of comparison the genus *Salmo* is less suitable than such a form as *Coregonus*, for the Salmons have an excess of cartilage, presumably of secondary origin, in the cranium, and no membranous interorbital septum such as *Coregonus* has. It may be pointed out that within the family Salmonidæ there are forms, such as *Coregonus oxyrhynchus*, with prominent snout and reduced mouth with no teeth.

Although a study of the cranial osteology of the Gonorhynchidæ and Salmonidæ cannot bring forward direct evidence of affinity between these families, the hypothesis of the descent of the Gonorhynchidæ from the Salmonoid stock is open to little objection of any serious import. The Salmonidæ have an ossified first basibranchial, whereas this element of the copular skeleton fails to ossify in *Gonorhynchus*; but, as already shown, this basibranchial behaves in its ossification in a most capricious manner in admittedly closely allied genera. The Salmonidæ have no epibranchial organ; but this organ, as I have indicated in a former paper (Proc. Zool. Soc. 1904, ii. p. 81), has certainly been evolved independently in a number of different groups of fishes, and in these exhibits such differences in structure and position with regard to the parts of the branchial skeleton that one may reasonably allow that the Gonorhynchidæ have developed their epibranchial organ since their separation from the ancestral stock of the Malacopterygii.

EXPLANATION OF PLATE XVI.

Fig. 1. *Gonorhynchus Greyi*; hyopalatine arch of the left side, with preopercular bone and mandible, mesial aspect.
Fig. 2. Cranium, seen from left side.
Fig. 3. Back view of cranium.
Fig. 4. Dorsal view of cranium.
Fig. 5. Complete skull, right side.

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species of *Coregonus* as I have been able to examine, and also in *Salmo Rappii*, it is closed posteriorly in *Salmo hucho*.

Abbreviations employed.

al. Alisphenoid.
an. Angular.
ar. Articular.
bo. Basioccipital.
cm. Commissural sensory-canal bones.
d. Dentary.
ecp. Ectopterygoid.
enp. Entopterygoid.
eo. Exoccipital.
ep. Epiotic.
f. Frontal.
hm. Hyomandibular.
iop. Interopercular.
me. Mesethmoid.
mpt. Metapterygoid.
mx. Maxilla.
n. Nasal.
op. Opisthotic.
opc. Opercular.
p. Parietal.
pl. Palatine.
pm. Premaxilla.
pof. Postfrontal.
pop. Preopercular.
por. Preorbital.
prf. Prefrontal.
pro. Pro-otic.
ps. Parasphenoid.
pt. Post-temporal.
q. Quadrate.
sar. Sesamoid articular.
soc. Supraoccipital.
sop. Subopercular.
sq. Squamosal.
st. Supratemporal.
sy. Symplectic.
v. Vomer.

XLVI.—*Descriptions of some new Species of* Noctuidæ *from Tropical South America.* By Herbert Druce, F.L.S. &c.

Lycophotia tetraonis, sp. n.

Female.—Head, collar, tegulæ, and thorax greyish brown; abdomen and legs paler brown. Primaries dark brown, the base and costal margin irrorated with greyish scales; a submarginal greyish line extends from near the apex to the anal angle, the fringe alternately light and dark brown: secondaries hyaline white, the outer margin near the apex with a row of fine small black dots. Underside: primaries grey-brown, with a marginal row of black dots: secondaries as above, the costal margin irrorated with brown scales.

Expanse $1\frac{1}{2}$ inch.

Hab. N. Peru. Huancabamba, 6000-10,000 feet (*Mus. Druce*).

Mamestra albifluviata, sp. n.

Male.—Front of head black; top of the head and the collar greyish; tegulæ and thorax black; antennæ and abdomen black, the base of the abdomen greyish; legs black, banded with white. Primaries white, the inner half black, with a white mark just below the middle, a large y-shaped black mark on the costal margin close to the apex, a black spot