NOTES ON FISHES IN THE INDIAN MUSEUM, XLII, XLIII.

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XLII. ON THE SYSTEMATIC POSITION OF THE INDIAN SPECIES OF *SCAPHIODON* HECKEL.

Day[1] described five species from India in the genus *Scaphiodon* Heckel, and divided them into two groups on the presence or absence of barbels. The first group comprising two species—*S. watsoni* Day and *S. irregularis* Day—from the Sind Hills and the Salt Range, Punjab, is characterized by the possession of " A pair of maxillary barbels. Last undivided dorsal ray osseous, serrated " From their descriptions, it is also clear that they possess 7 branched rays in the anal fin, as is characteristic of other species of the genus known from Baluchistan, Southern Persia, Mesopotamia and Syria. The second group comprises three species—*S. thomassi* Day, *S. nashii* (Day) and *S. brevidorsalis* (Day)—which are found in the Western Ghats as low as the Nilgiri Hills. In these forms the barbels are absent, the last undivided ray of the dorsal fin is smooth and the anal fin is generally provided with 5 branched rays. The distinguishing features of the two groups make it abundantly clear that they are not congeneric and that *Scaphiodon*, as recognised by Day, is a heterogeneous assemblage of diverse forms.

In his note on *Cirrhina afghana* Günther, Berg[2] showed that the Sind and Punjab species of *Scaphiodon* belong to *Cyprinion* Heckel which is characterized by the following salient features :—

i. Seven branched rays in the anal fin.
ii. A more or less developed scaleless furrow between the occiput and the origin of the dorsal fin.
iii. Dorsal with an osseous ray serrated behind and with 9-16 branched rays.
iv. Scales subcircular.
v. Barbels 2, angular.
vi. Intestinal canal very long, with many convolutions.
vii. Posterior chamber of the air-bladder long and narrow.

Berg also gave a preliminary list of all the species of *Cyprinion* belonging to the *watsoni*-group [small forms with (9) 10-11, mostly 10, branched rays in the dorsal and occurring in Southern Persia, Baluchistan, Sind and the Salt Range], with their respective synonyms and range of distribution. There would thus seem to be no uncertainty about the systematic position of the Indian species belonging to *Cyprinion* Heckel. For a general account and good figures of this type reference may be made to my[3] account of *Scaphiodon readingi*, which, according to Berg, is synonymous with *Cyprinion irregulare* (Day).

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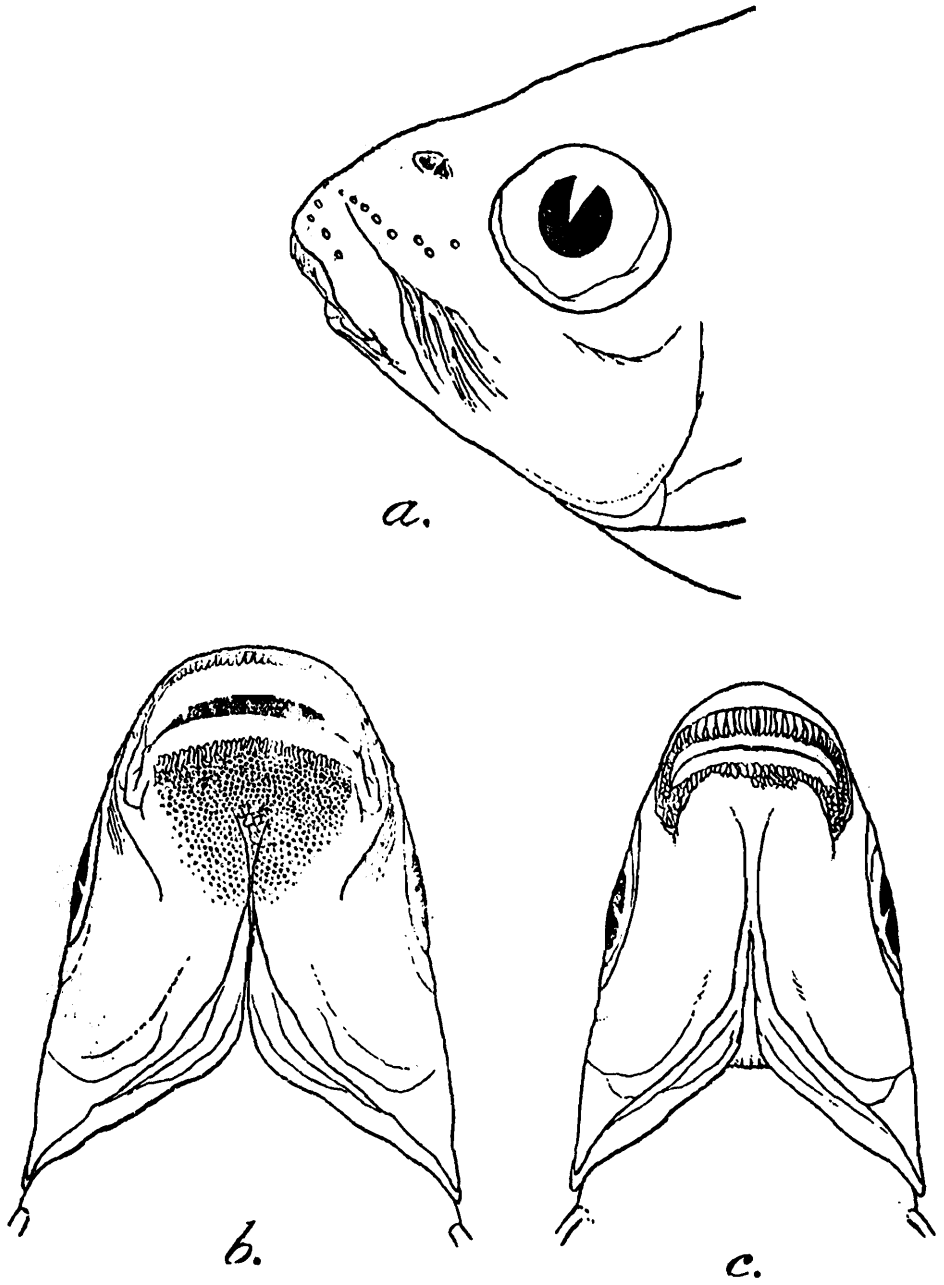
[1] Day, F., *Fish. India*, p. 551 (1877); *Faun. Brit. Ind.* Fish. I, p. 283 (1889).
[2] Berg, L. S., *Rec. Ind. Mus.* XXXV, pp. 193-196 (1933).
[3] Hora, S. L., *Rec. Ind. Mus.* XXV, p. 379, pl. viii (1923).

Though Berg has recently shown that *Cirrhina afghana* Günther is a synonym of *Cyprinion microphthalmum* (Day), it may be noted that Day[1] was already familiar with the fact that Günther's species belonged to *Scaphiodon*, for, in referring it to the synonymy of *S. irregularis*, he observed " Not only does this fish differ from those of the



TEXT-FIG. 1.—*Osteochilus* (*Osteochilichthys*) *thomassi* (Day).

a. Lateral view of head of one of Day's specimens (No. 2192): ×1⅔; *b*. Ventral surface of head of same: ×1⅔; *c*. Ventral surface of head of a young specimen (No. F12430/1): ×3½.

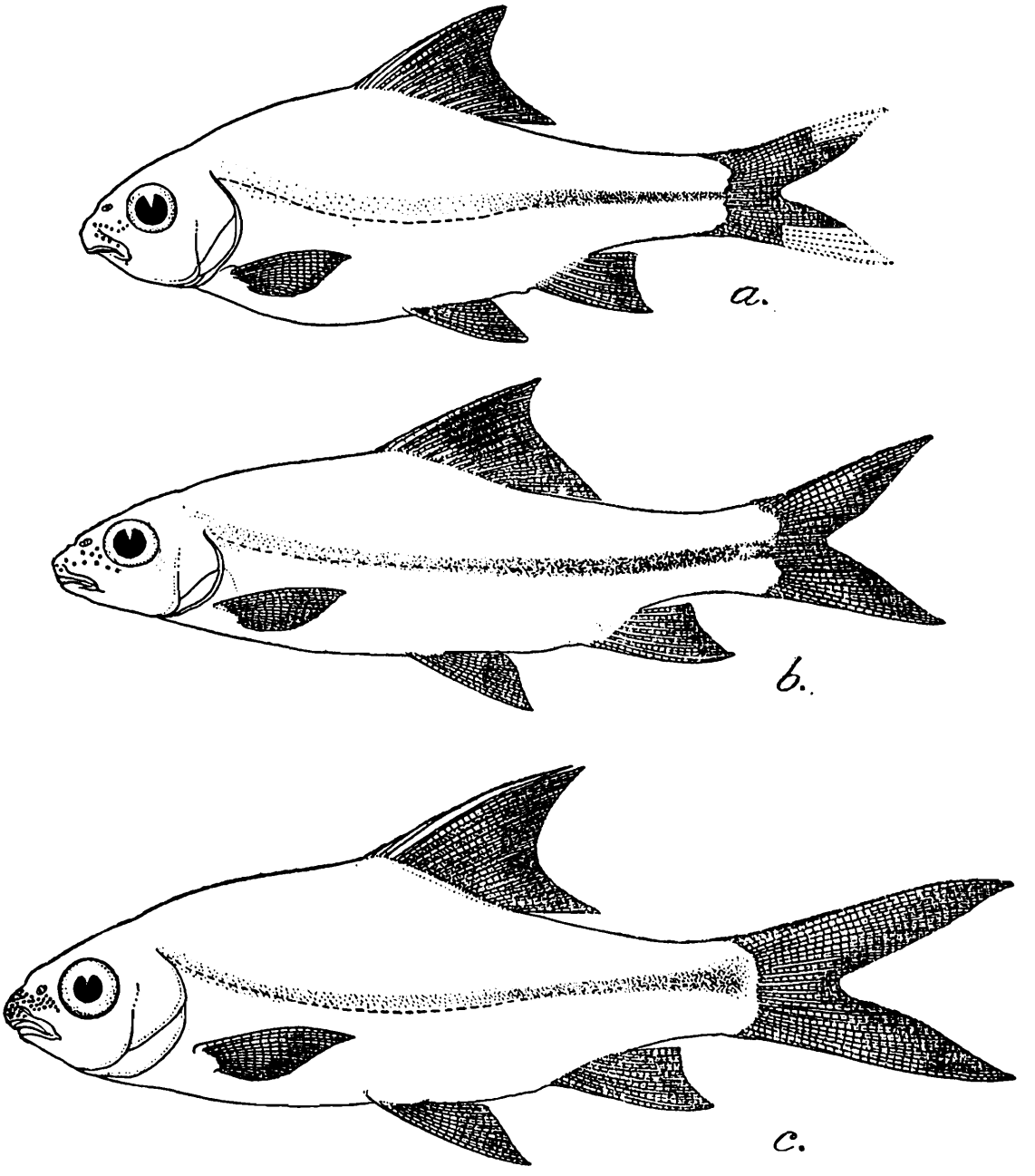
genus *Cirrhina* in the character of its mouth, but it likewise possesses a serrated osseous ray in the dorsal fin "

The position of the three South Indian species is somewhat difficult to define, for they not only differ in fundamental characters from *Cyprinion* and allied genera, but also among themselves in several important features. For instance, in *Scaphiodon thomassi* the lips are stated to be discontinuous, " the upper one fringed. Large pores on the snout and upper lip, and a line of them continued to under the eye " The

[1] Day, F., *Fish. India, Suppl.*, p. 807 (1888).

last undivided ray of the dorsal is weak and articulated. The lips of *S. nashii* are " thin, without any transverse fold across the lower one. Snout in the adult covered by papillae " In this species also the dorsal is without an osseous ray. In *S. brevidorsalis*, there are " three rows of large pores across the snout, and extending on to the preorbital bone ; knob at symphysis badly developed : a thin cartilaginous covering to both jaws. Upper lip crenulated" The last undivided ray of the dorsal fin is osseous, very strong and entire.

Fortunately, specimens of all the three species are present in the collection of the Indian Museum so I am in a position to give further

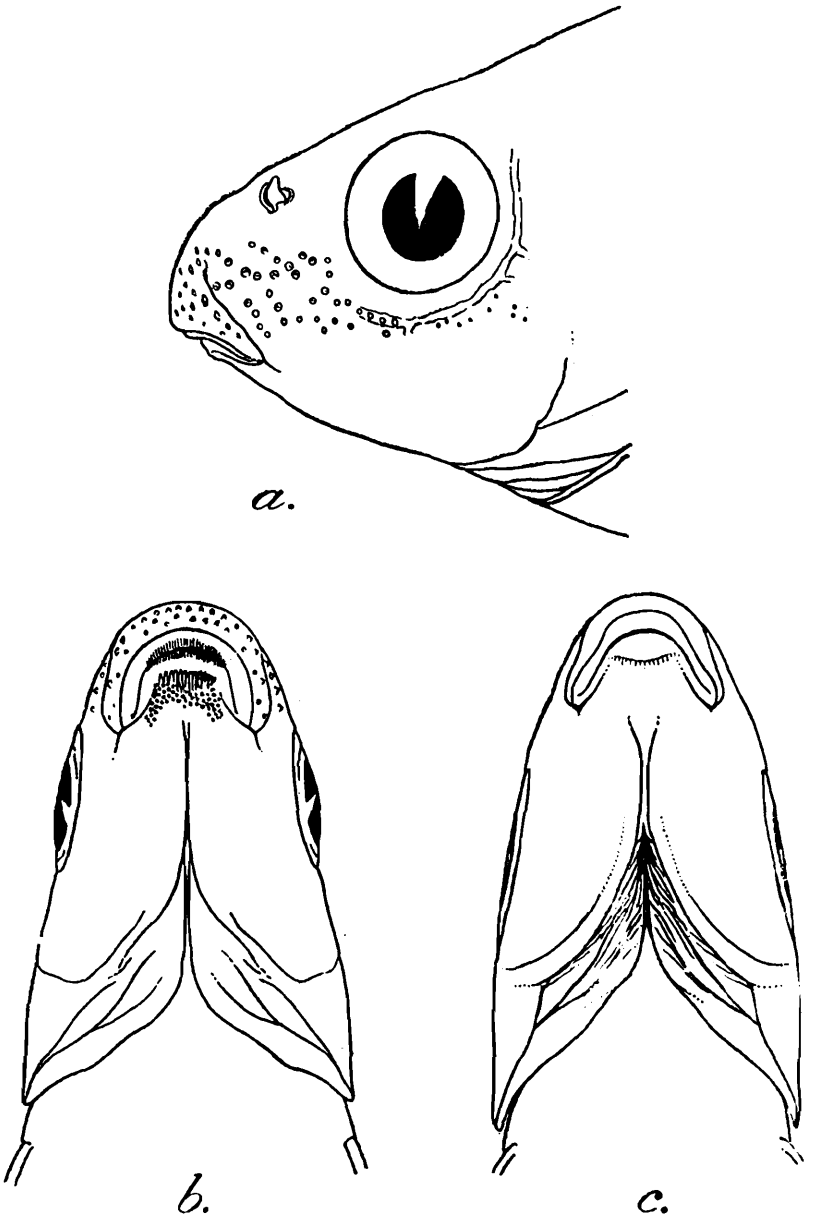


Text-fig. 2.—Species of *Osteochilus* Günther from Peninsular India : Nat. Size.

a. Osteochilus (*Osteochilichthys*) *thomassi* (Day) ; *b. Osteochilus* (*Osteochilichthys*) *nashii* (Day) ; *c. Osteochilus* (*Kantaka*) *brevidorsalis* (Day).

details regarding their salient features. Of *Scaphiodon thomassi*, Day had two examples from South Canara. One of these (No. 2192), probably the original of his figure in the *Fishes of India*, is now preserved in the collection of the Indian Museum. I find (text-fig. 1 *b*) that the lips are continuous and fleshy at the angles of the mouth, the upper lip, the basal and adnate part of which is covered by the rostral fold, has a free and

pendulous portion which is markedly fimbriated. The lower lip is transverse, does not cover the jaw and is attached to it at a short distance behind the mouth, only the lateral portions near the angles of the mouth are free and continuous with the upper lip ; it is papillated along its anterior border which is followed by a transverse series of small



TEXT-FIG. 3.—*Osteochilus* (*Osteochilichthys*) *nashii* (Day).

a. Lateral view of head of the specimen No. F11145/1 from the Bhavani river: × 2; *b*. Ventral surface of head of same: ×2; *c*. Ventral surface of head of a young specimen from Shimoga, Mysore.

pores. There are oblique grooves on the sides of the snout running to the ventral surface which are more marked when the mouth is closed. Other features are as described by Day.

On further examination I find that the specimen from Coorg referred by me[1] to *S. thomassi* belongs to *S. nashii* and that one (No. F 12430/1) of the four specimens with broad mouth and fimbriated lips described by me[2] as *S. nashii* is referable to *S. thomassi* (text-fig. 1 *c*). The confusion had arisen owing to the fact that in the young of *S. thomassi* also the body is marked with a dark lateral band and the dorsal and anal fins are

[1] Hora, S. L., *Rec. Ind. Mus.* XXXIX, p. 19 (1937).
[2] Hora, S. L., *ibid.*, p. 9 (1937).

marked with dark bands (text-fig. 2 *a* & *b*). In spite of the common colour markings and uniformity in scale-counts and number of fin rays the two species can readily be distinguished by the structure of the mouth and associated parts and by the greater depth of body in *S. thomassi* ($3\frac{1}{2}$ in *thomassi* versus 4-5 in *nashii*).

In *S. nashii* the mouth is narrower, the lips are simple and continuous at the angles of the mouth ; the portion of the lower lip between the lateral portions of the labial groove is considerably behind the tip of the jaw, to which it is firmly attached, and is plicated. Mukerji[1] redescribed this species from a specimen from the Bhavani River in the Nilgiri Hills. Attention may here be directed to a footnote by Day[2] on variation in the form of the snout in this species. He stated :—

" The mouth in this species alters so with age, that until I had compared specimens of my *Osteochilus Malabaricus* with gradations of *Scaphiodon Nashii* since obtained, I could not have believed in their being identical. In the young the jaws are compressed, each with a cartilaginous covering : the lips at the angles are thick and continuous, not continued across the chin. As age increases the mouth widens, the cartilaginous covering becomes more horny, and the colours of the fish alter."

It has already been pointed out by Mukerji that Day's *Osteochilus malabaricus* is probably a misnomer as he seems to have described no species under this name. However, one thing is clear that Day regarded a certain fish from Malabar allied to *Osteochilus* Günther. *S. thomassi*, with fimbriated lips, has certainly great affinities with Günther's genus. I shall refer to this later.

Scaphiodon brevidorsalis (text-fig. 2 *c*) is readily distinguished from the other two species referred to above in the possession of a strong dorsal spine. In the young stage, the upper lip is feebly but distinctly fimbriated and the lower lip is papillated (text-fig. 4 *b*), but with growth the upper lip becomes crenulated (text-fig. 4 *d*) as described by Day. In the structure of the mouth and the associated parts, this species is more or less intermediate between the other two, and there can be no doubt that the three forms have much in common to be included in a single genus.

As remarked above, Day's species of *Scaphiodon* from the Western Ghats are abundantly distinct from *Cyprinion* Heckel (=*Scaphiodon* Heckel) and somewhat allied to *Osteochilus* Günther. The latter genus was established by Günther[3] to accommodate a group of Cyprinid fishes from the ' East-Indian Archipelago ' with the following characteristics :

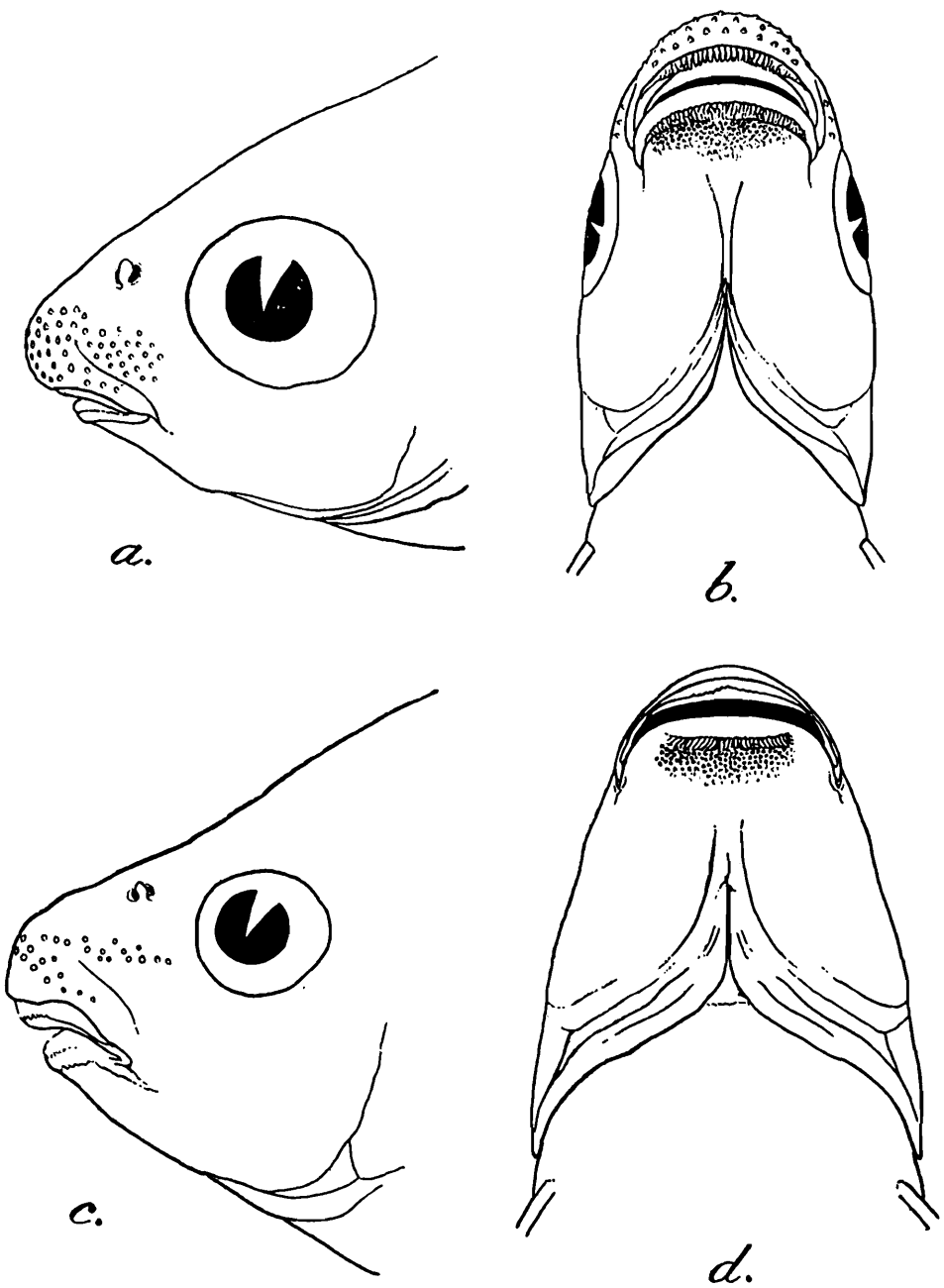
" Scales rather large. Dorsal fin without osseous ray, with from thirteen to twenty-one rays, commencing in advance of the ventrals. Snout obtusely rounded, maxillary region scarcely thickened, and but slightly projecting beyond the mouth. Mouth transverse, inferior or subinferior, with the lips more or less thickened, fringed or crenulated ; instead of the inner fold, as described in *Labeo*, the osseous part of the mandible forms a hard sharp transverse prominence ; no symphysial tubercle. Barbels small, nearly always four. Anal scales not enlarged. Anal fin very short. Pharyngeal teeth 5.4.2—2.4.5. "

" Snout sometimes with horny tubercles which periodically fall off, leaving their former bases as shallow round depressions (pores)."

Day[4] included three species from Burma under *Osteochilus*, but on an examination of the specimens in the collection of the Indian Museum I find that Day's specimens of *O. chalybeatus* (Cuv. & Val.) do not belong

[1] Mukerji, D. D., *Journ. Bombay Nat. Hist. Soc.* XXXV, p. 169 (1931).
[2] Day, F., *Fish. India*, p. 552 (1877).
[3] Günther, A., *Cat. Fish. Brit. Mus.* VII, p. 40 (1868).
[4] Day, F., *Fish. India*, p. 545 (1877).

to this genus, but are referable to *Labeo* Cuvier. In fact, the two specimens of *O. chalybeatus* in the collection (Nos. 1527 and 1528) were,



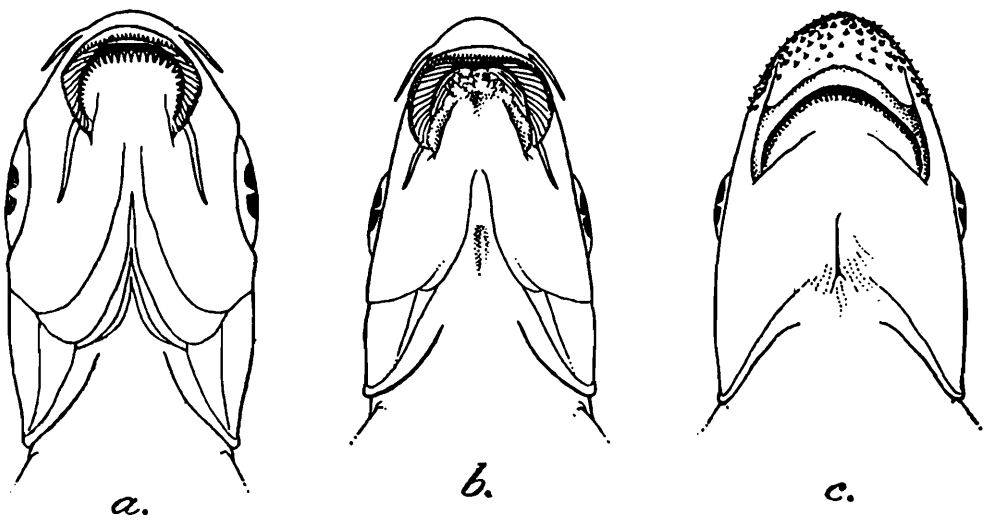
TEXT-FIG. 4.—*Osteochilus* (*Kantaka*) *brevidorsalis* (Day).

a. Lateral view of head of a young specimen from the Bhavani river: ×2⅔; *b*. Ventral surface of head of same: ×2⅔; *c*. Lateral view of head of an adult specimen from Mysore: ×1⅙; *d*. Ventral surface of head of same: ×1⅙.

entered in the Register on 21st May, 1879, as *Labeo*; they had been collected at Moulmein. One of these specimens (No. 1527) is probably the original of Day's description and figure, while the other has only 39 scales along the lateral line and 9 branched rays in the dorsal fin. The snout is covered with large well developed pores. This specimen seems to belong to *Labeo boga* (Hamilton). There are four specimens (Cat. Nos. 667-669) of *Osteochilus neilli* (Day) from Mandalay and Sittang but there is no specimen of *O. cephalus* (Cuv. & Val.). The last species was described by Cuvier and Valenciennes[1] as a *Labeo* and Vinciguerra[2] also showed that it is not referable to *Osteochilus*. It would thus appear

[1] Cuvier, G., and Valenciennes, A., *Hist. Nat. Poiss.* XVI, p. 374 (1842).
[2] Vinciguerra, D., *Ann. Mus. Civ. Stor. Nat. Genova* (2) IX, p. 265 (1890).

that Day had only one species of *Osteochilus* from Burma which is very similar to the large number of species known from the East Indies. Since



TEXT-FIG. 5.—Ventral surface of head and anterior part of body of three species of *Osteochilus* Günther from Burma.

a. Osteochilus (*Osteochilus*) *neilli* Day : ×2⅓ ; *b. Osteochilus* (*Osteochilus*) *vittatus* (Cuv. & Val.) : ×1⅓ ; *c. Osteochilus* (*Altigena*) *sondhii* Hora and Mukerji : ×1⅓.

then Mukerji[1] recorded *O. vittatus* (Cuv. & Val.) from the Mergui District, Lower Burma, and Mukerji and I[2] described *O. sondhii* from the Salween River at Takaw in the Kengtung State, Burma. The last species possesses only two short maxillary barbels and the lips are only slightly fimbriated, but the lower lip, though free, still covers the jaw and is finely striated along its entire inner surface.

In recent years several new species of *Osteochilus*, with considerable variation in structure and form, have been described from Southern China and Siam, and it appears that the genus is widely distributed in south-eastern Asia with its range extending as far west as Burma. Two attempts have been made to group the species into subgenera. Lin[3] in his account of the Chinese species of *Osteochilus* observed that :

" The Chinese species of this genus show some notable variations from those of the Indo-Australian Archipelago and the mainland of India. The small, superior eye, and the striate or smooth upper lip of *O. tungting* and *O. brevis*, for example, are characters not known to be present in Indian species. But variations of this sort are quite common among the closely allied species of *Cyprinidae* and can not be of generic significance. In my description, therefore, I have taken the liberty to add these two characters and other small points to the original diagnosis of *Osteochilus* by Günther."

Lin recognised two sub-genera in the genus *Osteochilus*, which he defined as follows :—

A. Eye moderate or large, less than 5 in head ; cheek narrow ; skin of head not thickened. Lips thick, the upper one strongly striate, usually dilated laterally, continuous. Lower lip more or less papillate or fimbriate. Mandibular margin with transverse, hard, sharp, horny sheath. Barbels 4, or 2 maxillary ones only *Osteochilus.*

AA. Eye small, its diameter more than 5½ in head, immediately below upper profile of head. Cheek deep. Skin of head thickened. Mouth distinctly inferior ; lips thick, papillose, not fimbriate. Mandible with transverse, sharp horny edge. 2 minute maxillary barbels or none *Altigena.*

[1] Mukerji, D. D., *Rec. Ind. Mus.* XXXIV, p. 286 (1932).
[2] Hora, S. L., and Mukerji, D. D., *Rec. Ind. Mus.* XXXVI, p. 359 (1934).
[3] Lin, S. Y., *Lingnan Sci. Journ. Canton* XII, p. 340 (1933).

Fowler[1] distinguished two subgenera among the species from Siam and the East Indies, *Osteochilus* and *Neorohita*, on the size of scales (small, 45 to 55 in lateral line in *Osteochilus* while moderate or large, 30 to 40 in lateral line in *Neorohita*) and general physiognomy—the eyes being more elevated and snout short in *Neorohita*.

It will be clear from the above that though Day's three species of *Scaphiodon* from the Western Ghats cannot be assigned to *Osteochilus* Günther (*sensu stricto*), they are very closely related to *Altigena* Lin in the structure of the mouth and associated parts though the eyes are relatively much larger. Relying on the number of scales, their position would appear to be among *Neorohita* Fowler, but the structure of the mouth parts is very different. I am, therefore, obliged to separate them from the large number of species that have hitherto been described under *Osteochilus*. For the two species without an osseous ray in the dorsal fin, *Scaphiodon thomassi* and *S. nashii*, I propose the subgenus *Osteochilichthys* ; while for the unique species with a strong dorsal spine in the dorsal fin, *S. brevidorsalis*, *Kantaka*[2]. Of the species of *Osteochilus* known from Burma, *O. neilli* Day, with 34 scales along the lateral line, four barbels, fimbriated lips and eye $3\frac{1}{2}$ times in length of head is referable to the subgenus *Osteochilus* Lin. *O. vittatus* (Cuv. & Val.), with 33-34 scales along the lateral line, four barbels, fimbriated lips and eye 3-4 times in length of head also pertains to the same subgenus. As regards general physiognomy, however, *O. neilli* is allied to *O. melanopleura* (Bleeker), the type of Fowler's subgenus *Osteochilus*, though its scales are of a moderate size. The third Burmese species, *O. sondhii* possesses 39-40 scales along the lateral line, two short maxillary barbels which are hidden in deep grooves, lips are slightly fimbriated or papillated (the lower lip, though free from the jaw, covers it entirely) and the eye is contained from 3·5—3·9 times in the length of the head. On the number of scales, therefore, all the three Burmese species should be included in the subgenus *Neorohita* Fowler, which is the commonest type in south-eastern Asia. It seems, however, that the species of *Osteochilus* from Southern China, Indo-China, Siam, Malay Peninsula and the Indo-Australian Archipelago are greatly in need of revision and regrouping.

Genus **Osteochilus** Günther.

Subgenus **Osteochilichthys,** nov.

The members of this subgenus differ from the other subgenera of *Osteochilus* in having the lower lip attached to the lower jaw at some distance from the mouth, with the result that the lower jaw is not covered by the lip as is also the case in *Scaphiodon* Heckel. The eye is of a moderate size ($3\text{-}4\frac{1}{3}$ in length of head) and the number of scales along the lateral line varies from 39 to 43.

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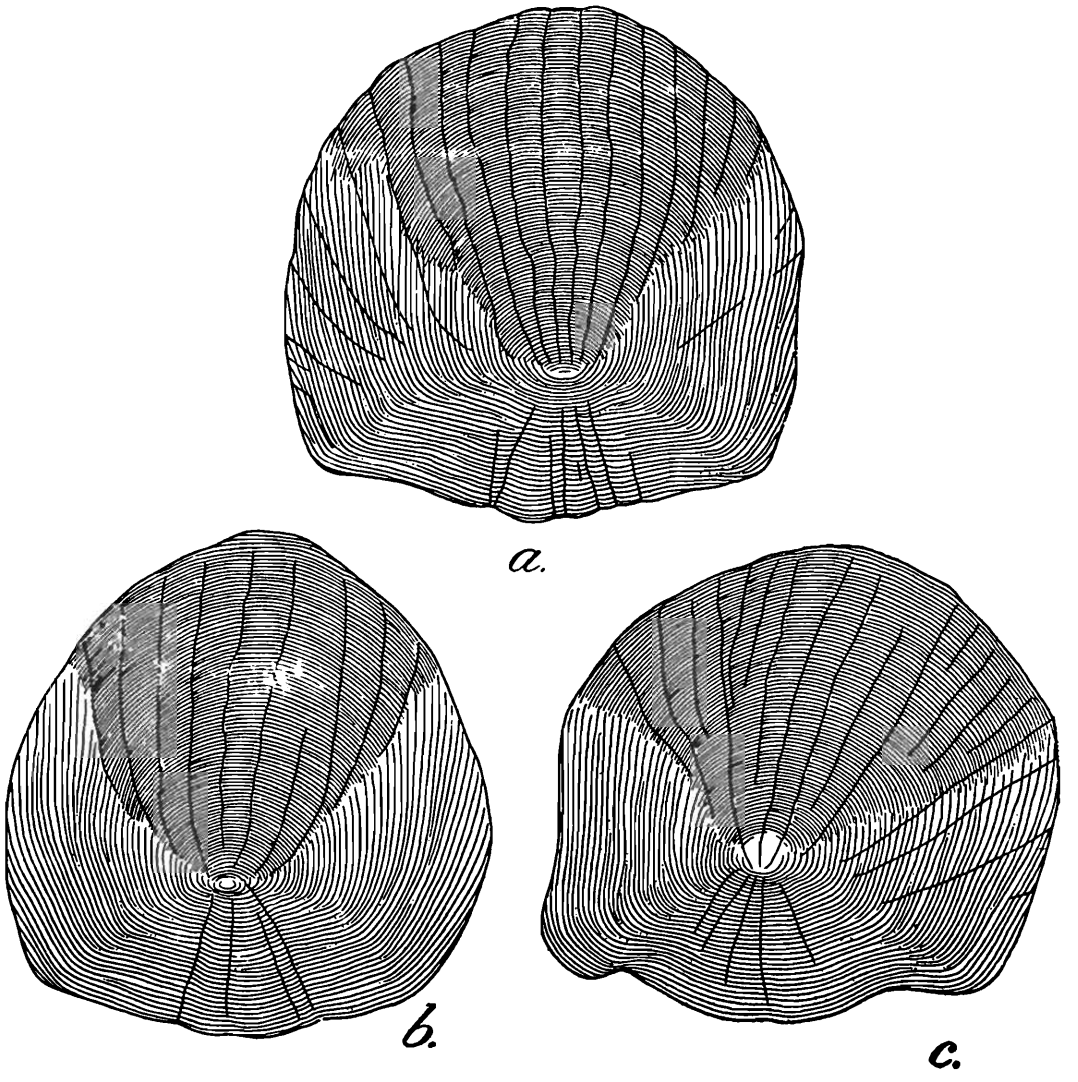
[1] Fowler, H. W., *Proc. Acad. Nat. Sci. Philad.* LXXXIX, p. 179 (1937).

[2] Derived from a Sanskrit word meaning spine.

Type-species.—Scaphiodon thomassi Day.

The other species referable to *Osteochilichthys* is *S. nashii* (Day). Though agreeing in lepidosis and number of fin-rays, the two species



TEXT-FIG. 6.—Scales from below base of dorsal fin of species of *Osteochilus* from Peninsular India.

a. Osteochilus (*Kantaka*) *brevidorsalis* (Day), young specimen : ×12½ ; *b. Osteochilus* (*Osteochilichthys*) *thomassi* (Day) : ×15 ; *c. Osteochilus* (*Osteochilichthys*) *nashii* (Day) : ×12½.

differ in their respective relative depth of the body and the structure of the mouth and associated parts as indicated above.

Subgenus **Kantaka,** nov.

This subgenus is proposed for *Scaphiodon brevidorsalis* (Day). It is closely allied to *Osteochilichthys* described above, but differs from it in the possession of a very strong osseous dorsal spine. So far as I am aware, this is the only species of *Osteochilus* in which the dorsal spine is osseous and strong.

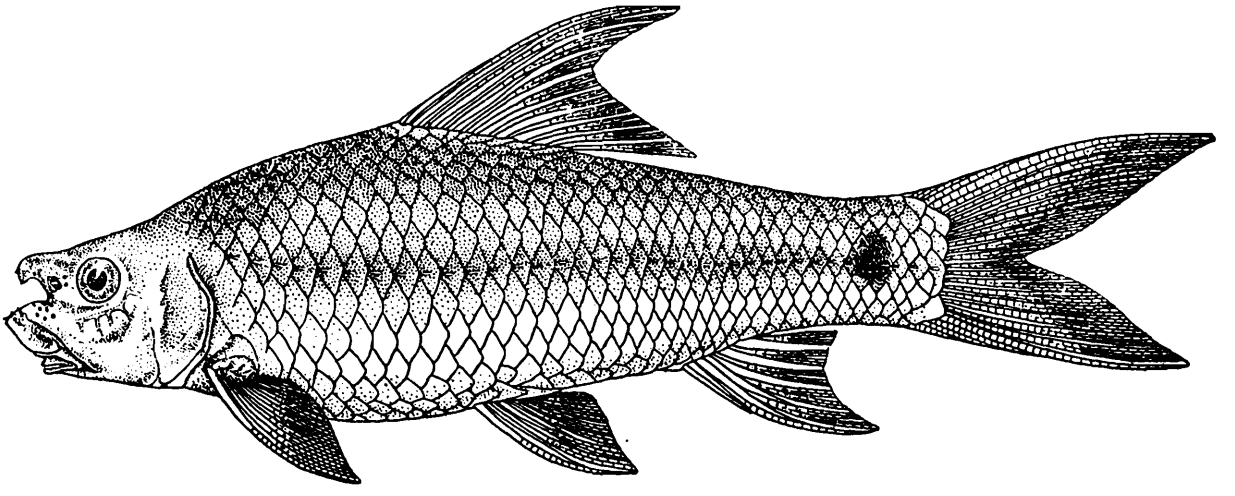
Type-species.—Semiplotus brevidorsalis Day.

Measurements in millimetres, scale-counts and fin-rays of Osteochilus (Osteochilichthys) thomassi (*Day*), O.(Osteochilichthys) nashii (*Day*) *and* O. (Kantaka) brevidorsalis (*Day*).

	O. thomassi.			*O. nashii.*				*O. brevi-dorsalis.*	
Total length ..	166	143+C.	82	141	104	95	92	264	103
Length of caudal	33	—	20	29	23	22	19	63	29
Depth of body	47	56	24	35	26	21	20	77	25
Length of head	31	33	16	26	19	18	17	43	18
Width of head	18	22	10	16	12	11	10	32	11
Height of head	26	28	13	19	16	14	14	41	15
Diameter of eye	9	10	5	7	6	6	6	11	7
Interorbital distance	12	17	7	11	8	7	7	23	8
Length of caudal peduncle.	19	21	9	18	12	11	12	32	11
Least height of caudal peduncle.	16	20	8	14	10	9	9	26	10
Scales along lateral line	40	39	40	43	41	41	41	40	41
Transverse rows of scales.	13	12	14	14	13	14	14	14	14
No. of predorsal scales	13	13	13	14	13	13	13	12	12
No. of rows of scales between L. 1. and V.	5	4½	5	5	5	5	5	5	5
No. of rays in dorsal .	4/11	4/11	4/11	4/11	4/11	4/11	4/11	4/12	4/11
No. of rays in pectoral	14	14	14	14	14	14	14	14	14
No. of rays in ventral	9	9	9	9	9	9	9	9	9
No. of rays in anal ..	2/6	3/6	3/6	3/5	3/5	3/6	3/5	3/6	3/5
No. of rays in caudal	19	19	19	19	19	19	19	19	19

XLIII. ON THE SYSTEMATIC POSITION OF *CYPRINUS NUKTA* SYKES.

In describing his *Cyprinus nukta* from the Inderanee river, 18 miles north of Poona, Sykes[1] stated that the character of its head—" with



TEXT-FIG. 7.—Lateral view of *Schismatorhynchus* (*Nukta*) *nukta* (Sykes) : ×½.

two short horns or bosses on the space between the eyes "—is sufficient to distinguish it from all other species of *Cyprinus*. According to him, both Rüppell and Yarrell, after examining the fish, pronounced it as " a monstrosity of *C. auratus* " Sykes, however, found it very common in the Deccan and the local people recognised it as a distinct kind and called it by the specific name *Nukta*, in which reference is made to the

[1] Sykes, W. H., *Trans. Zool. Soc. London* II, p. 325 (1841).