NOTES ON THE SYSTEMATIC POSITION OF THE TWO GOBIOID FISHES, *GOBIELLA PELLUCIDA* SMITH AND *G. BIRTWISTLEI* HERRE, WITH SPECIAL REMARKS ON THE VALIDITY OF THE GENUS.

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In 1931, Smith [1] erected the genus *Gobiella* for his new Siamese translucent goby, *G. pellucida*, and observed: "This diminutive goby has as yet been found only in Bangkok, but may doubtless be looked for anywhere in Central Siam. Its only known habitat is a small canal or ditch and a small pond in the grounds of the Department of Fisheries; the pond and canal are ultimately connected with the Menam Chao Phya" Recently, while examining collections of a similar goby, *Gobiopterus chuno* (Hamilton)[2], from the brackish water areas of the Gangetic Delta, I became doubtful about the validity of the Siamese genus *Gobiella* and the species *pellucida* and tentatively believed that *Gobiella pellucida* was the same as *Gobiopterus chuno*. In order to clarify my views, request was made to the Director-General of the Department of Fisheries, Bangkok, to send to the Indian Museum a few specimens of *G. pellucida* for examination, and 15 specimens of both sexes, 7 from the original series, and the rest freshly collected from the type-locality, were received. In December, 1934, Herre [3] described another similar goby, *Gobiella birtwistlei* from brackish water tidal creeks on the Singapore Island. A comparison of its description with that of *G. pellucida* induced me to think that the two forms were conspecific. To confirm this view 4 co-types, one male and three females, were procured by the Indian Museum through the courtesy of the Director of the Raffles Museum, Singapore.

The genus *Gobiopterus* of the subfamily Sicydiaphiinae [4] was proposed by Bleeker [5] in 1874 for his species "*Apocryptes brachypterus*" described [6] in 1855 from the Grati Lake in Java. It comprises small translucent, pelagic or lake gobies which fairly correspond in habits with similar gobies of the European waters, such as *Aphia* Risso (1826) and *Crystallogobius* Gill (1863). It is of interest to note that according to Collet [7] certain species of the genera *Aphia* and *Crystallogobius* (for example *A. pellucidus* and *C. nilssonii*) are annual forms. It is not known whether species of the genus *Gobiopterus* of the Oriental waters have also a similar duration of life. From a study of the description of

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[1] Smith, H. M.—*Proc. U. S. Nat. Mus.*, LXXIX, pp. 33-35, fig. 16, (1931).
[2] Hora, S. L.—*Rec. Ind. Mus.*, XXXVI, pp. 487, 488, (1934).
[3] Herre, A. W. C. T.—*Bull. Raff. Mus. Singapore*, No. 19, pp. 85, 86, (1934).
[4] Koumans, F. P.—*Pre. Rev. Genera Gobioid Fish.*, p. 24, (1931).
[5] Bleeker, P.—*Esquisse Arch. Neerl. Sc. ex. et nat.*, IX, p. 311, (1874).
[6] Bleeker, P.—*Nat. Tijd. Ned. Ind.*, IX, p. 402, (1855).
[7] Collet, R.—*Forh. Vid. Selsk. Christiana*, pp. 1-12 (1876); *Proc. Zool. Soc. London*, pp. 318-339, (1878).

Gobiopterus Bleeker and *Gobiella* Smith, as also from an examination of extensive material of *Gobiopterus chuno* from the Salt Lake areas near Calcutta, Chilka Lake in Orissa and other places and the para- and topo-types of *Gobiella pellucida* at my disposal, I am unable to separate the two genera. For convenience of comparison I give below in a table the salient features of *Gobiopterus* and *Gobiella* as accepted by Koumans (*op. cit.*).

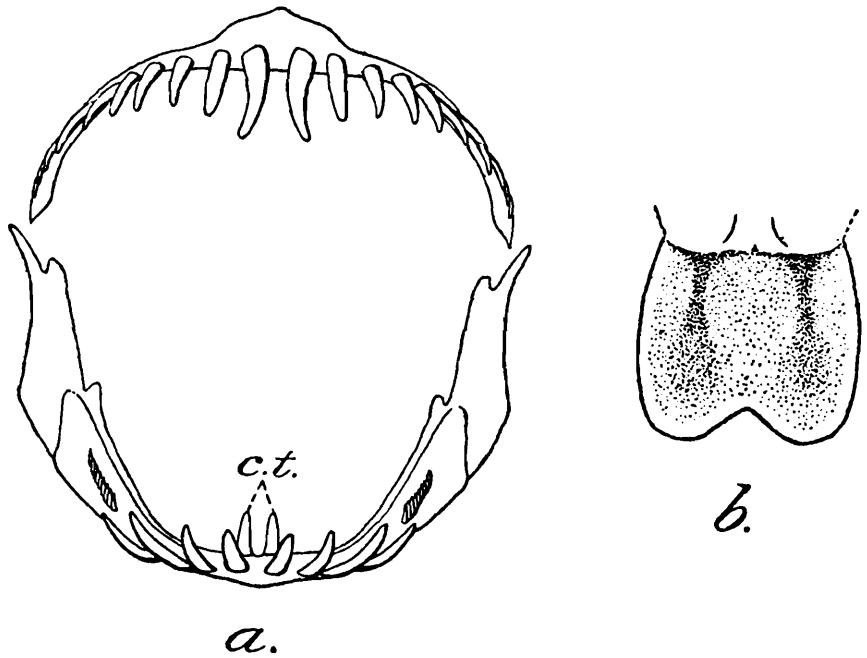
	Gobiopterus Bleeker.	**Gobiella** Smith.
1.	" Body elongate, compressed, covered with 25-36 scales, ctenoid ?"	" Body elongate, compressed, covered with.... about 25 ctenoid scales ".
2.	" Head compressed, naked "	" Head very slightly compressed, naked ".
3.	" Eyes in anterior half of head " .	" Eyes large, in anterior half of head "
4.	" Cleft of mouth nearly vertical, lower jaw prominent ".	" Mouth very oblique, lower jaw prominent ".
5.	" Teeth in both jaws in one row, in upper jaw caninoid, in lower jaw anterior ones caninoid, lateral ones smaller ".	" Minute teeth in bands in each jaw ".
6.	" Dorsal fins separate. D_1 with 5-6 spines, D_2 with 8-9 rays ".	" Dorsal fins widely separate. D_1 with 5 spines. D_2 with 9 rays ".
7.	" A. with 8-14 rays " .	" A. with 12 rays ".
8.	" V. united, but free from belly "	" V. united " (free from belly).
9.	" C. truncate "	" C. truncate ".

From the above table it is abundantly clear that there is not a single character that can be taken into consideration in separating the two genera, excepting the superficial disparity in regard to the nature of dentition. Unfortunately Smith's account of the teeth in *Gobiella* is inadequate and inaccurate, and Koumans (*op. cit.*) having had no chance of examining the type of *Gobiella pellucida*, adopted Smith's description of the teeth in his synopsis of the genus *Gobiella*, and was naturally influenced to regard it as distinct from *Gobiopterus*. A careful examination, however, reveals that, like *Gobiopterus*, *Gobiella* exhibits marked sexual differences in the character of dentition. In the adult males and females of *Gobiella pellucida*, the type species of the genus, the teeth are conical in both the jaws and are arranged in a single row and not in " bands ".[1] In the upper jaw the teeth are comparatively small in both the sexes. In females, the teeth are considerably smaller in both the jaws, very minute and set somewhat close together. In males, like those of *Gobiopterus chuno*,[2] the teeth in both the jaws are better developed and distinctly caniniform. The anterior ones of the lower jaw are fairly enlarged, curved and are widely spaced, while the lateral ones are somewhat smaller, close-set and implanted slightly inwards. In the upper jaw the teeth are also large and caninoid, but smaller than those of the lower jaw and are more or less uniformly arranged. Besides these, the males of *G. pellucida* are provided with a pair of enlarged canine teeth on the mandibular symphysis, implanted inwards (Text-fig. 1, *a*). As in *Gobiopterus*, the labial teeth are

[1] In certain specimens the teeth in one or both the jaws appear to be irregularly distributed and arranged in interrupted bands, but this is either an abnormality or individual variation.

[2] For an account of the nature of dentition of *Gobiopterus chuno* (=" *Micrapocryptes fragilis* " Hora) *vide* Hora, S. L.—*Mem. Ind. Mus.*, V, pp. 752, 753, text-fig. 32, 1923.

absent in *Gobiella*. It is thus seen that the nature of dentition of *Gobiella* is absolutely the same as that of *Gobiopterus*.



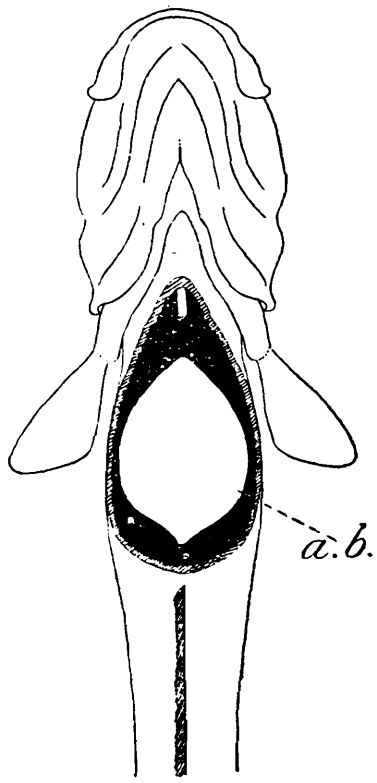
TEXT-FIG. 1.—*a*. Tooth-bands of a paratype (male) of "*Gobiella pellucida*" from Bangkok, Siam. ×18. *c. t.*=canine teeth.
b. Dorsal view of tongue of a paratype (male) of "*Gobiella pellucida*" from Bangkok, Siam. ×22.

Another important character to which reference must be made in considering gobioid genera is the structure of the tongue. Smith made no reference to this character in defining the genus *Gobiella*, but an examination of the paratypes of *G. pellucida* reveals that the tongue is, like that of *Gobiopterus chuno*, definitely bilobate (Text-fig. 1, *b*). Thus taking all the features of *Gobiella* and *Gobiopterus* into consideration, it is evident that *Gobiella* has to be considered as a synonym of *Gobiopterus*.

Apart from the morphological questions discussed above, about the systematic position of the two genera, a study of the geographical distribution of the genus *Gobiopterus* also throws sufficient light on the matter and leads to the conclusion that *Gobiopterus*, described under different names in different countries, is a widely distributed genus, and its hitherto known sporadic distribution in Java on the one hand and India on the other is largely due to its being overlooked in the intervening areas in the past probably owing to its invisibility in water and its small size. It is, however, now known that the distribution of the genus extends from Java, through Singapore, Siam to Bengal and Orissa in India. It appears to me highly probable, judging the path of migration of the genus, that it is equally prevalent, in suitable habitats, in Sumatra, Malay Peninsula, and the coastal areas of Burma and Assam.

In regard to the affinities of the species "*Gobiella pellucida*" from Siam and "*Gobiella birtwistlei*" from the Singapore Island Herre (*op. cit.*, p. 86) thinks that the latter species "is near *Gobiella pellucida*. . but differs in the second dorsal and anal fins, in scalation, teeth and other details". After a careful examination and comparison of the

cotypes of the two species and large series of *Gobiopterus chuno*, I am convinced that they are inseparable from each other as also from *G. chuno* and that they should be considered as synonyms of *G. chuno*. In this connection reference may be made to a form described by Hora [1] under the name " *Micrapocryptes* sp." (=*Gobiopterus* sp., *vide* Hora, *op. cit.*, 1934) from " the channel between B. Pak Raw and B. Pak Cha ", Talé Sap, Siam. As already pointed out by Hora, the species cannot be reconciled with either *G. chuno* or *G. brachypterus*, but shows a much closer agreement with the latter and may, when we have more material and better knowledge of the two fishes, turn out to be conspecific with it.



TEXT-FIG. 2.—Ventral view *in situ* of air-bladder (*a. b.*) of a male specimen of *Gobiopterus chuno* from Salt Lakes, Calcutta. ×5.

Gobiopterus chuno is a widely distributed little pelagic or lake goby, usually found in great abundance in the brackish water areas. Its present range extends from the Singapore Island, through Siam (Bangkok) to Bengal (Gangetic Delta) and Orissa (Chilka Lake) in India. The species differs in several respects from most of the typical gobies. Its light, slender and compressed body and the more or less laterally placed eyes indicate that it does not, like the greater number of gobies, live at the bottom, but swims about freely. The proportionally large and free air-bladder, which is pear-shaped and occupies a considerable part of the abdominal cavity (Text-fig. 2), also indicates the pelagic habits of the fish. Moreover, the narrow and funnel-shaped united ventrals which are free from the belly, point to the fact that they do not constitute a regular and functional organ of adhesion as in the case of the bottom dwelling gobies. The species has been found (Hora,

[1] Hora, S. L.—*Mem. Asiat. Soc. Bengal*, VI, p. 495, fig. 7, (1924).

op. cit., 1934) to feed on microscopic Copepoda and other planktonic organisms.

In Bangkok, Smith collected egg-bearing females of the species from January to May. Herre's collection from the Singapore Island, which includes gravid females, was made in March. The Indian Museum collections of the species from different areas of the Chilka Lake in Orissa and the Gangetic Delta in Bengal are dated March (Orissa), July (Bengal), August (Bengal) and November (Orissa). Among these collections there are large numbers of both gravid and spent-up females. It is evident, therefore, that the egg-laying period of *Gobiopterus chuno* of the Oriental waters is protracted and varies in different places in accordance with the changes in the salinity of the water in which the fish lives and other ecological conditions. According to Collet (*op. cit.*) the normal period of spawning season of *Aphia pellucidus* and *Crystallogobius nilssonii* of the European waters is the end of June or the beginning of July.