CONTRIBUTIONS TO THE STUDY OF BAGRID FISHES. 4. NOMENCLATURAL STATUS AND SYSTEMATIC POSITION OF THE FISHES OF THE SUBGENUS *OSTEOBAGRUS* JAYARAM (SILUROIDEA : BAGRIDAE)

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(With five Text-figures)

CONTENTS

I—INTRODUCTION

In my revision of the genus *Mystus* Scopoli (Jayaram, 1955), I proposed *Osteobagrus* as a new subgenus, with *Pimelodus aor* Hamilton as the type-species. The subgenus included the species of *Mystus* in which there is a distinct interneural shield between the basal bone of the dorsal fin and the occipital process, and the air-bladder is elongated posteriorly, with a longitudinal complete septum *in situ* separating the two lateral chambers. Other species referred to this subgenus were : *Bagrus lamarii* Valenciennes (=*Mystus seenghala* (Sykes)) and *Bagrus leucophasis* Blyth (=*Mystus leucophasis* (Blyth)).

Recently Misra (1962) used the name *Aorichthys* Wu in place of *Osteobagrus*. Sarkar (1964) believed that in all the species of *Mystus*, the interneural shield is present and that "the creation of the two subgenera, *Mystus* and *Osteobagrus* " was "premature " This paper examines these nomenclatural and systematic problems.

II—Nomenclatural Status

Wu (1939) proposed the name *Aorichthys* as a substitute for *Aoria* Jordan, 1919 (=*Macrones* Duméril, 1856), which is preoccupied in Insecta (Coleoptera). *Aorichthys* shares the same type-species with *Aoria viz., Bagrus lamarii* Valenciennes (=*Mystus seenghala* (Sykes)). When I proposed *Osteobagrus* with *Pimelodus aor* Hamilton (=*Mystus aor* (Hamilton)) as the type-species, *Aorichthys* Wu with a different type species (*Bagrus lamarii* Valenciennes) was not considered to be applicable. On the authority of the Nomenclatural Committee of the American Society of Ichthyologists and Herpetologists, it now turns out that placing *Pimelodus aor* and *Bagrus lamarii* in the same subgenus, involves also the use of the older subgeneric name *Aorichthys* Wu, 1939 for both the species. *Aorichthys* Wu should therefore replace *Osteobagrus* Jayaram. It is also pertinent to point out that the name *Sperata* Holly (1939), proposed as a substitute name for *Aoria* Jordan, though earlier than *Aorichthys*, cannot however replace *Osteobagrus*, since the type-species of *Sperata*, *Mystus vittatus* (Bloch), does not come under the new subgenus.

III—Systematic Position

On the basis of studies of the skeletons of "some species of the subgenus *Mystus* and both the species of the subgenus *Osteobagrus*" Sarkar (1964) stated that "in *all* the species of the two subgenera interneural shield is present" (italics mine). "Only in the subgenus *Mystus* it is covered by a skin which is naked in *Osteobagrus* subgenus"

The occipital process in siluroid genera is an important bone and its presence is easily discernible even externally without any extensive preparation of the skull. When the bone is covered by skin with hardened mucus, as in the case of *Mystus montanus* (Jerdon), *Mystus punctatus* (Jerdon), *Mystus malabaricus* (Jerdon), a little peeling of the skin covering the bone, clearly indicates its relative length, size and shape. The occipital process is a posterior elongation of the supraoccipital bone. It varies in its length considerably and this character has been much adopted as of specific value (Smith, 1945, Ahmad, 1951, Jayaram, 1955). In the genus *Mystus*, there are two groups of species : in one the occipital process is long and meets the basal bone of the dorsal fin and in the other the occipital process is short and does not meet the basal bone of the dorsal fin. These two groups of species are given in the following list. It includes all the valid species of the genus *Mystus* so far known from its entire range of distribution. Some of the Indian species of the two groups are illustrated in Text-figs. 1 to 4.

Group A. Occipital process meeting the basal bone of dorsal fin.

Subgenus *Mystus*

*1. *argentivittatus* (Regan)
2. *armatus* (Day)
3. *bleekeri* (Day)
4. *cavasius* (Hamilton)
5. *gulio* (Hamilton)
*6. *johorensis* Herre
7. *leucophasis* (Blyth)
8. *micracanthus* (Bleeker)
9. *montanus dibrugarensis* (Chaudhuri)
10. *montanus montanus* (Jerdon)
11. *nemurus* (Valenciennes)
12. *nigriceps* (Valenciennes)
13. *oculatus* (Valenciennes)
*14. *peguensis* (Boulenger)
*15. *pelusius colvilli* (Günther)
*16. *pelusius pelusius* (Solander)
*17. *pluriradiatus* (Vaillant)
18. *pulcher* (Chaudhuri)
*19. *rufescens* (Vinciguerra)
*20. *sabanus* Inger & Chin
21. *tengara* (Hamilton)
22. *vittatus horai* Jayaram
23. *vittatus vittatus* (Bloch)
*24. *wolffii* (Bleeker)

Note.—*No specimens of these species have been seen by me.

Group B. Occipital process not meeting the basal bone of the dorsal fin.

Subgenus *Mystus*

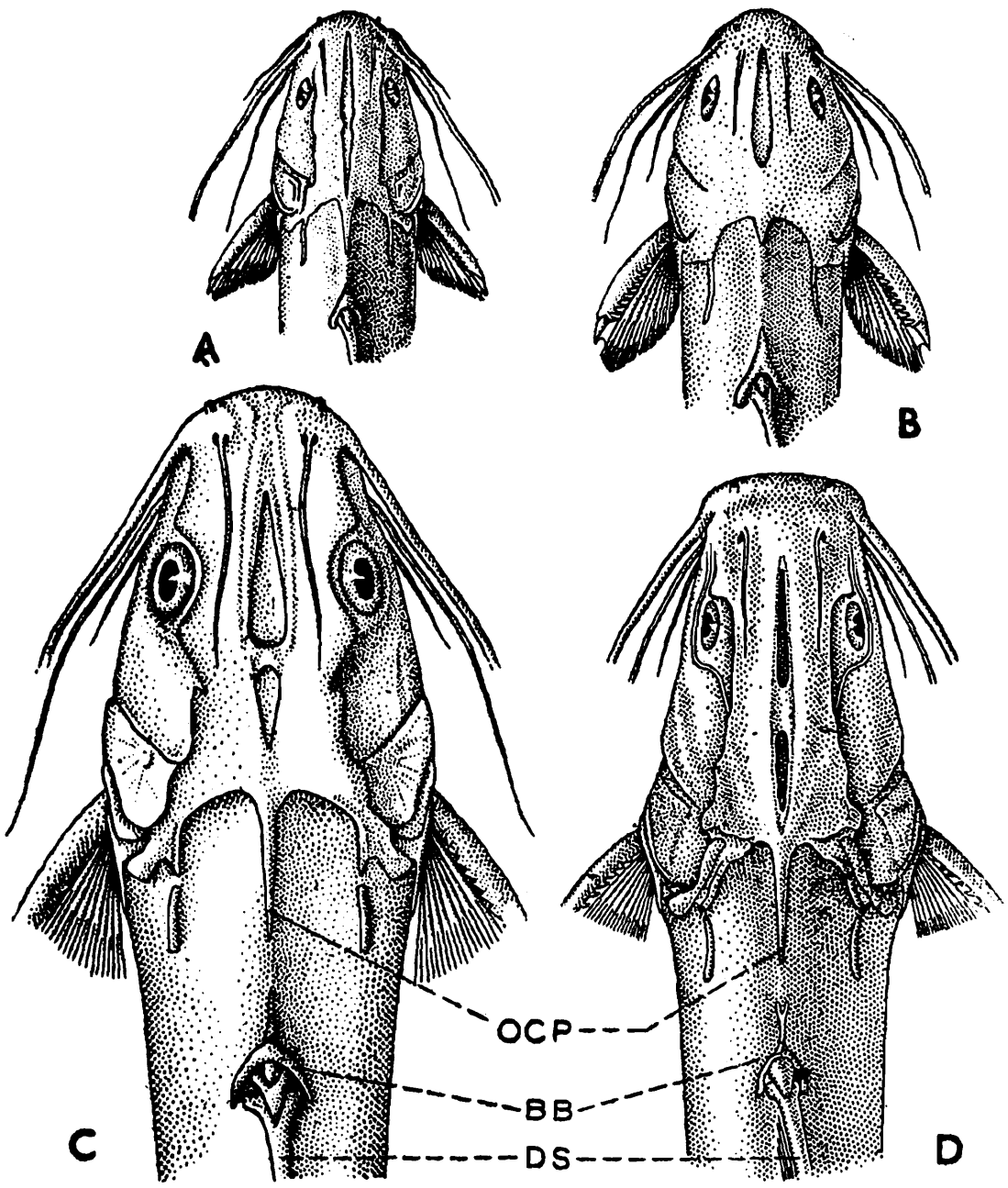
*25. *amemiyae* (Kimura)
*26. *chinensis* (Steind.)
*27. *elongatus* (Günther)
28. *keletius* (Valenciennes)
29. *malabaricus* (Jerdon)
*30. *maydelli* Rossel
31. *menoda menoda* (Hamilton)
32. *menoda microphthalmus* (Day)
33. *menoda trachacanthus* (Valenciennes)
*34. *pahangensis* Herre
35. *planiceps* (Valenciennes)
36. *punctatus* (Jerdon)
*37. *wyckii* (Valenciennes)

Subgenus *Aorichthys*

38. *aor* (Hamilton)
39. *seenghala* (Sykes)

Unidentifiable Species

*40. *sinensis* (Bleeker)

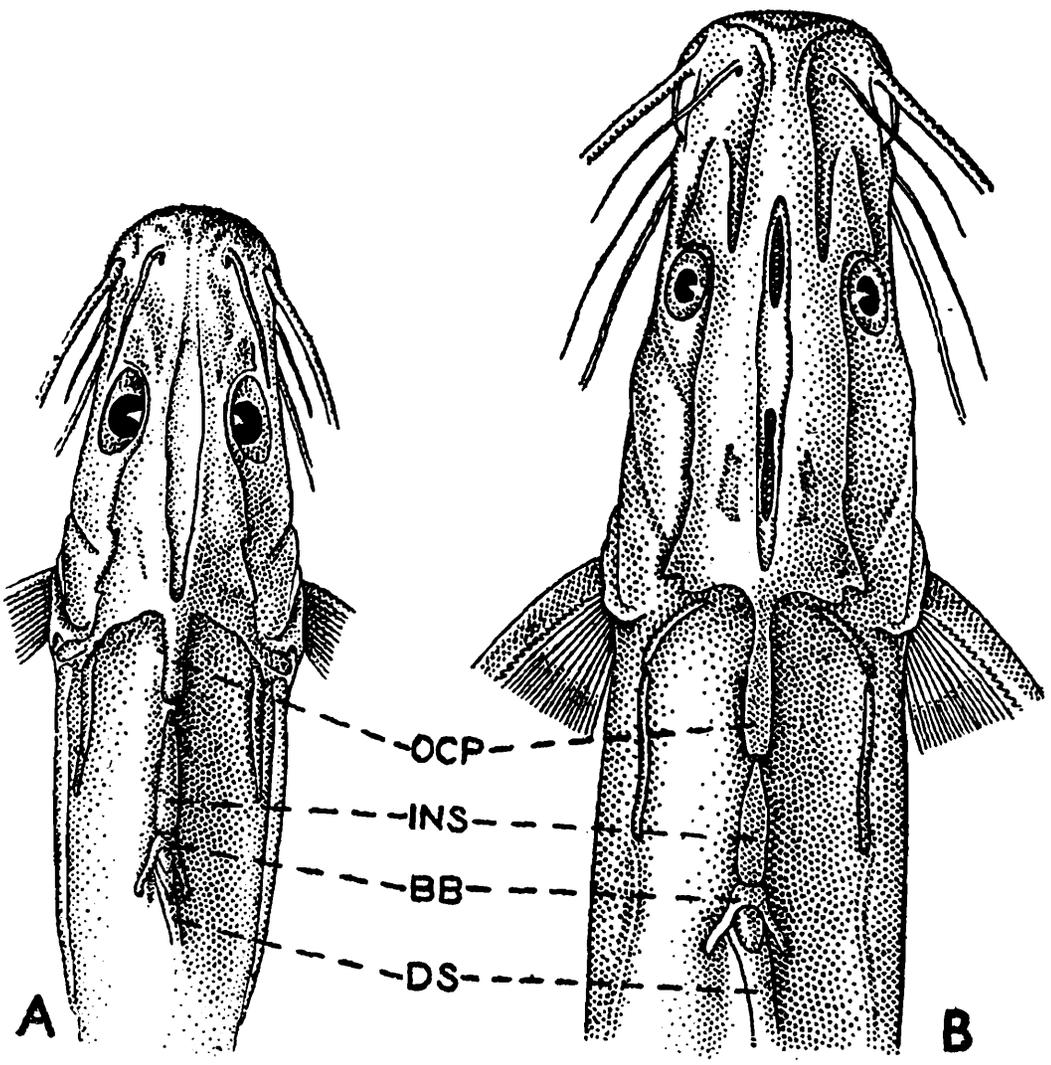


TEXT-FIG. 1.—Head and anterior portion of body of a few species of *Mystus* in which the occipital process is not meeting the basal bone of the dorsal fin.

(A). *Mystus* (*Mystus*) *menoda* (Hamilton). (B). *Mystus* (*Mystus*) *malabaricus* (Jerdon). (C). *Mystus* (*Mystus*) *punctatus* (Jerdon). (D). *Mystus* (*Mystus*) *microphthalmus* (Day). (A, B, after Jayaram, 1955).

NOTE.—*No specimens of these species have been seen by me.

It will be seen from the text-figures that there is a clear interspace without any intervening bone in between the posteriormost tip of the occipital process and the anteriormost end of the basal bone of the dorsal fin in the case of the species of group B (Text-fig. 1). In the case of the

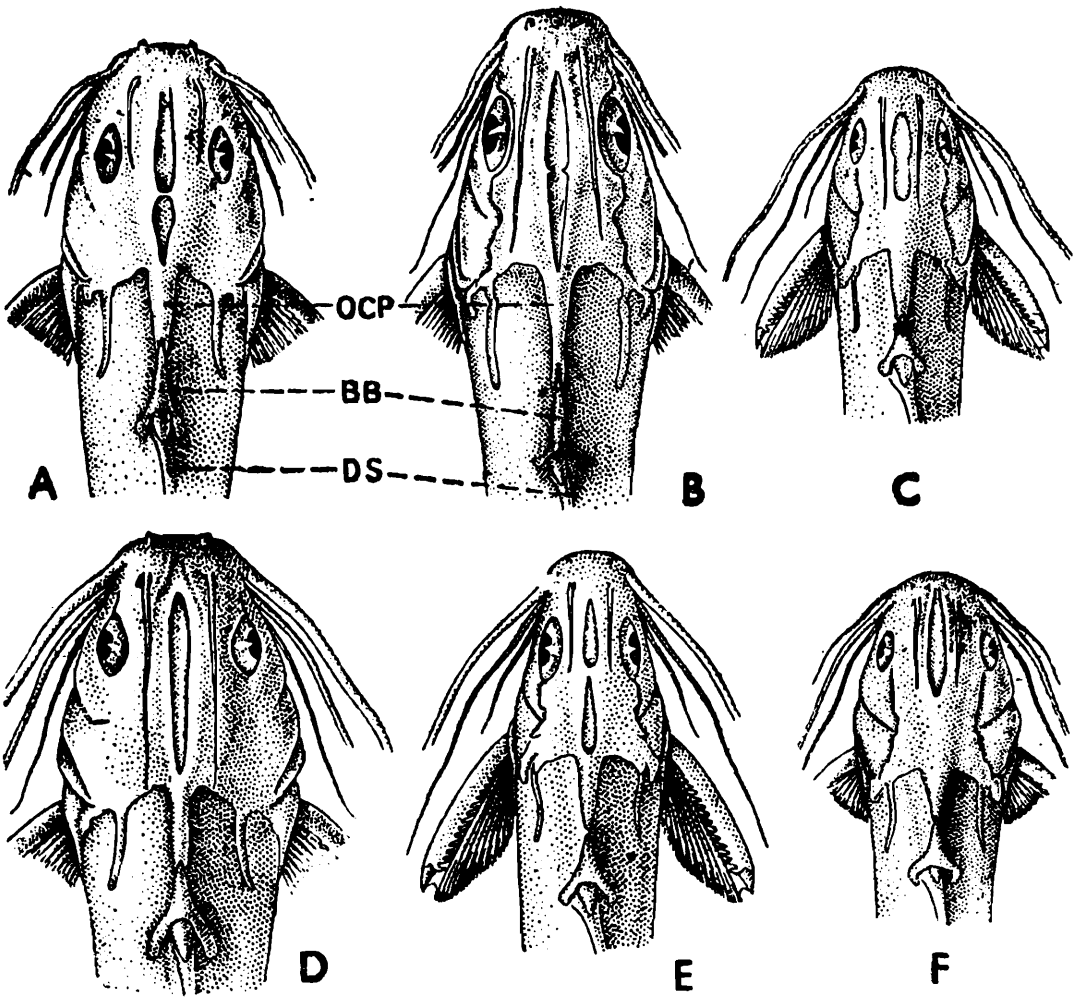


TEXT-FIG. 2.—Head and anterior portion of body of the two species of *Aorichthys* showing the interneural shield.

(A). *Mystus* (*Aorichthys*) *seenghala* (Sykes) (After Jayaram, 1955). (B). *Mystus* (*Aorichthys*) *aor* (Hamilton).

two species of *Aorichthys*, the occipital process meets only the interneural shield and not the basal bone of the dorsal fin (Text-fig. 2). In the case of the species of group A, though the length of the occipital process is varying, it always meets the basal bone of the dorsal fin (Textfigs. 3, 4).

For a proper understanding of the inter-relationship of the occipital process, the interneural shield and the so called "basal bone of the dorsal fin" it is necessary to know in detail the skeletal elements constituting these bones. These are described below.



TEXT-FIG. 3.—Head and anterior portion of body of a few species of *Mystus* in which the occipital process is meeting the basal bone of the dorsal fin.

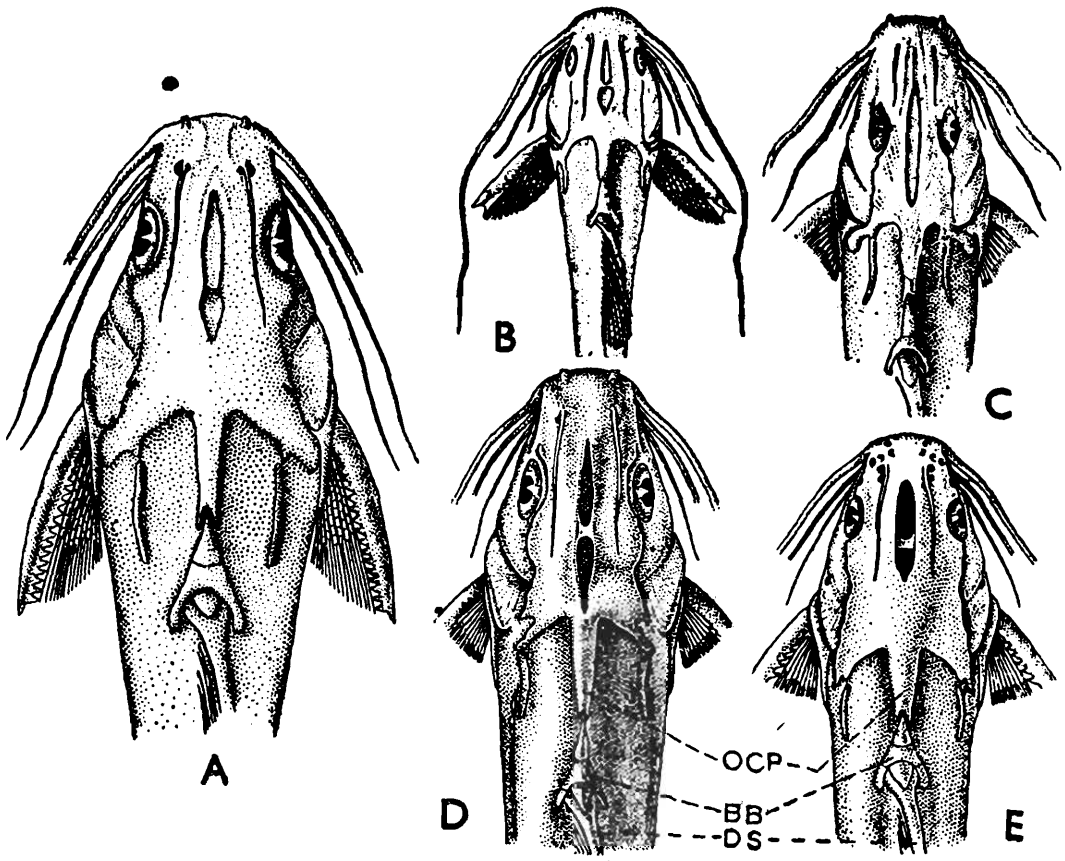
(A). *Mystus* (*Mystus*) *bleekeri* (Day). (B). *Mystus* (*Mystus*) *cavasius* (Hamilton). (C). *Mystus* (*Mystus*) *vittatus* (Bloch). (D). *Mystus* (*Mystus*) *armatus* (Day). (E) *Mystus* (*Mystus*) *oculatus* (Valenciennes). (F). *Mystus* (*Mystus*) *gulio* (Hamilton). (All figures after Jayaram, 1955).

1. *Skeletal elements of the dorsal fin*

The dorsal fin in *Mystus* is composed of one spine and 7 or 8 rays. The spine is considered to be the third dermotrich whereas the rays are considered as representing the different lepidotrichia. The latter are jointed and branched and rest on nodule-like radial bones. The last two lepidotrichia have one radial bone between them.

The dorsal spine rests on a plate formed by the second and third interneural bones, and has three condyles at its base for articulation. Posteriorly the second interneural is produced into a short, triangular prism-like process on which the second lepidotrich moves. The median condyle of the dorsal spine articulates on the posterior side of this

prism-like process. The second lepidotrich itself is in the form of a short, triangular spine closely fitting the dorsal spine. On either side of the dorsal spine there are four holes for the passage of muscles which facilitate movement of the spine.



TEXT-FIG. 4.—Head and anterior portion of body of a few species of *Mystus* in which the occipital process is meeting the basal bone of the dorsal fin.

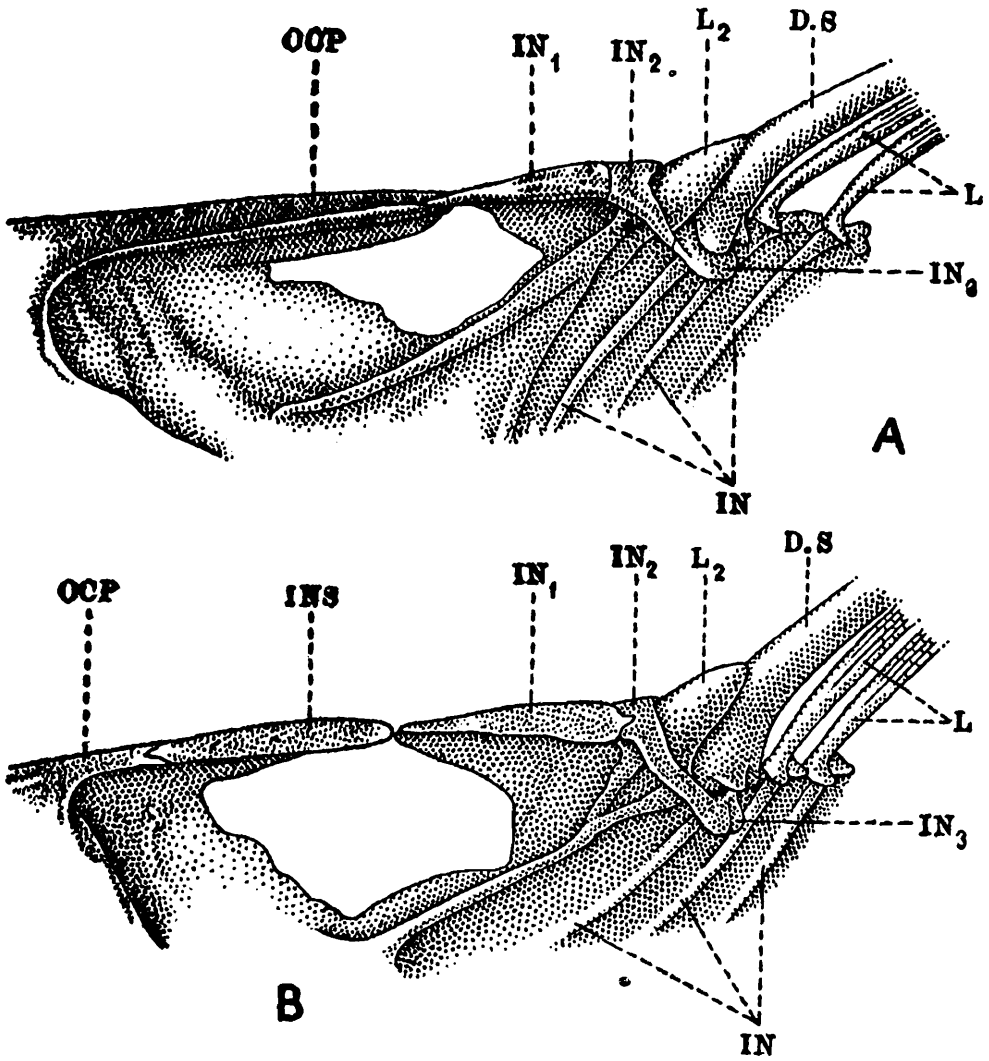
(A). *Mystus* (*Mystus*) *montanus* (Jerdon). (B). *Mystus* (*Mystus*) *vittatus horai* Jayaram. (C). *Mystus* (*Mystus*) *leucophasis* (Blyth). (D). *Mystus* (*Mystus*) *tengara* (Hamilton). (E). *Mystus* (*Mystus*) *pulcher* (Chaudhuri). (After Jayaram 1955).

2. *Skeletal elements of the "basal bone of the dorsal fin"*

The term "basal bone of the dorsal fin" (Day, 1877, Jayaram, 1955) is synonymous with "predorsal plate" (Günther, 1873), "bouchir dee 1′ interspineux " (Regan, 1905), "bony plate " (Chaudhuri, 1911) etc. It is composed of three bony plates, formed by the distally flattened first three interneurals. These bony plates are different in shape and size in the two subgenera of *Mystus*.

In the subgenus *Mystus*, the first interneural (IN_1, Text-fig. 5A) is small, triangular and sharply pointed anteriorly. It fits into and under the bifurcated posterior tip of the supraoccipital process in the species

of group A (occipital process meeting the basal bone of the dorsal fin). In species of group B(occipital process not meeting the basal bone of the dorsal fin) this remains extended in the intervening space. The second



TEXT-FIG. 5.—Skeletal elements constituting the basal bone of the dorsal fin in the two subgenera of *Mystus*.

(A). Subgenus *Mystus*. (B). Subgenus *Aorichthys*.

interneural (IN_2, Text-fig. 5A) is slightly semilunar and curved laterally on either side at the base of the dorsal spine. It has already been stated that posteriorly the second interneurals extend into a prism-like process providing articulation for the second lepidotrich. The third interneural is a reduced plate (IN_3 Text-fig. 5A) and is in the form of a pyramid turned on its side. Ventrally the third interneural provides on either side a facet for the articulation of the two lateral condyles of the dorsal spine.

In the subgenus *Aorichthys*, the first interneural is much enlarged, resembling the interneural shield (IN_1, Text-fig. 5B). Further, unlike in *Mystus* the first interneural meets anteriorly the interneural shield, which is larger in size and which is completely fused with the occipital process. This fusion turns the occipital process into a "thumb-like process" (Ahmad, 1951). The occipital process itself is a short bone in this subgenus. The size of the interneural shield varies with age of the fish. In some large examples this bone is rather wide (Day, 1877, p. 454).

The second interneural is similar to the pattern found in the subgenus *Mystus* and provides posteriorly a prism-like process for the articulation of the short triangular second lepidotrich. The third interneural is much reduced and is in the form of a heel-like process, into which the second interneural is fused laterally and ventrally (IN_3, Text-fig. 5B).

It is seen from the foregoing account, that the interneural shield is a distinct feature only in the subgenus *Aorichthys*. It seems therefore that Sarkar (1964) has confused the interneural shield with the first interneural bone. This has led to the erroneous conclusion that in all the species of *Mystus*, the interneural shield is present.

3. *Modifications of the air-bladder*

In the diagnostic characters of the subgenus *Aorichthys*, the relative length of the air-bladder and its internal structure were also considered. From my examination of a large series of specimens of *aor*, and *seenghala*, both in the field and in the laboratory, I find that the posterior elongation of the air-bladder and the internal division of the bladder into two non-communicating lateral chambers vary considerably. In specimens which are long and lean, the air-bladder is slightly elongated posteriorly, but in specimens which are deep and short, the posterior elongation of the air-bladder is insignificant. In a series of papers Nair (1937, 1938) has shown that the internal structure and shape of the air-bladder in siluroids undergo modifications to a great extent, and this seems to be applicable to the fishes of the genus *Mystus* also. As such, not much importance can be attached to the shape and structure of the air-bladder in *Aorichthys*, which is, however, easily and sufficiently distinguishable by the character of the interneural shield alone.

4. *Species to be included under* Aorichthys

Bagrus leucophasis Blyth has so far been considered as belonging to this subgenus. The inclusion of this species under *Aorichthys* was due to the statement by Day (1877, p. 449) that the occipital process in this species is "twice as long as wide at its base whilst between it and the basal bone of the dorsal fin is a pyriform bone about twice as long as wide" I have now re-examined the specimen in the Zoological Survey of India and find that there is no separate pyriform bone, as described by Day, resembling the interneural shield of *aor* or *seenghala*. The bone is only the first interneural, which is enlarged in this species. In his original description of the species, Blyth (1860) also makes no mention of such a bone, but has simply described the occipital process "as in B. gulio, (B. H.)" In view of the above it is necessary to exclude *B. leucophasis* from *Aorichthys* and include it under the subgenus *Mystus*.

IV—Acknowledgements

I am much indebted to Mr. W I. Follett of the California Academy of Sciences, San Francisco (U. S. A.) for his constructive suggestions in regard to the nomenclatural details of the subgeneric name. I am thankful to the Director, Zoological Survey of India, Calcutta for facilities.

V—SUMMARY

This paper discusses the nomenclatural and systematic status of the subgenus *Osteobagrus* Jayaram. Since the type-species of *Aorichthys* Wu *viz.*, *Bagrus lamarii* Valenciennes and the type-species of *Osteobagrus* Jayaram *viz.*, *Pimelodus aor* Hamilton are congeneric, the earlier name proposed as a substitute in the synonymy of the nominal genus should replace the latter name. Accordingly, *Aorichthys* Wu replaces *Osteobagrus* Jayaram, but in a different sense. The views of certain authors like Sarkar (1964) that all the species of *Mystus* possess an interneural shield are based on their mistaken identification of the first interneural bone in these fishes. The various skeletal elements of the dorsal fin, basal bone of the dorsal fin and the interneural shield are described in detail. A list of all the known valid species of the genus is also given, alphabetically arranged in two groups depending upon whether they meet the basal bone of the dorsal fin or not. Some species of both the groups are illustrated.

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ABBREVIATIONS USED IN TEXT-FIGURES

BB	Basal bone of the dorsal fin
DS	Dorsal spine
IN	Interneurals
IN_1	First interneural bone
IN_2	Second Interneural bone
IN_3	Third interneural bone
INS	Interneural shield
L	Lepidotrichia
L_1	Second lepidotrich
OCP	Occipital process