

A PRELIMINARY REVIEW OF THE GENERA OF THE FAMILY BAGRIDAE (PISCES: SILUROIDEA)

by K. C. JAYARAM, *Research Fellow, N.I.S.I., Laboratories of the Zoological
Survey of India, Indian Museum, Calcutta 13*

(Communicated by Sunder Lal Hora, F.N.I.)

(Received June 29; approved for reading on August 5, 1955)

INTRODUCTION

The family Bagridae (type-genus *Bagrus* Cuvier) comprises cat-fishes distributed in the Ethiopian, Oriental and Palaearctic regions. These are primarily freshwater forms, though some species of *Mystus* Scopoli live in brackish waters also. No comprehensive treatise exists on the family as a whole, but certain genera have been revised piece-meal by various workers, such as Regan (1913, *Leiocassis* Bleeker), Rendahl (1928, south Chinese genera) and Worthington and Ricardo (1937, *Chrysichthys* Bleeker in part). An attempt is made here to review in a preliminary way the present systematic position of the various genera included under the family.

The work has been aided by the award of a research fellowship by the National Institute of Sciences of India, Delhi, to which the writer is much indebted. Besides, many foreign museums and ichthyologists have helped by lending material preserved in their museums for this study. Particularly, I wish to thank in this connection Drs. E. Trewavas, L. P. Schultz, S. L. Hora, G. S. Myers, T. Mori and Mr. J. T. Nichols.

NOMENCLATURE AND CLASSIFICATION

Fishes of this family have in common with other Siluroids barbels and a scaleless body which led earlier workers like Belon (1553), Artedi (1758), Linnaeus (1758) to name them as *Mystus*. The last author in his subsequent edition of the *Systema Naturae* kept them under the genus *Silure*. Bloch and Schneider (1801) considered them under the genus *Silurus*. Lacépède (1803) divided *Silure* into two groups, *Pimelodus* and *Doras*, the former for fishes with a nude body and the latter for those with a row of shields along its lateral line. Cuvier (1817) was the first to use the name *Bagres* as a separate taxon and he assigned *Silurus bayad* Forskål as the first species under *Bagres*. Hamilton (1822) adopted Lacépède's classification and described a number of these fishes under *Pimelodus*. Valenciennes (1849) adopted Cuvier's nomenclature but named the genus as *Bagrus* instead of the polynomial phrase *Les Bagres*. Bleeker (1862) gave a separate rank of 'Strips Bagrini' for these fishes and described a number of new genera under it. Günther (1864) included these fishes under his fourth subfamily Siluridae Proteropterae and gave a separate rank of 'group Bagrina'. Day (1878) did not recognize Günther's grouping but described all Siluroid fishes under the family Siluridae. He adopted almost the same classification in his *Fauna* volumes on fishes (1889, p. 101).

In 1911, Regan gave a separate family rank Bagridae to these fishes and divided them on the basis of osteological features into two subfamilies Chrysichthinae and Bagrinae. Jordan (1923), however, did not recognize these subdivisions but only listed a number of homonyms and synonyms under Bagridae. Fowler (1936, 1949) used the names Porcidae and Mystidae (1935) for Bagridae without assigning any

reasons whatsoever. Berg (1940) also followed Jordan, but did not list the genera. He merged Fowler's homonyms under Bagridae.

STATUS OF GENERA

A. FOSSIL.—Jordan (1923) listed under Bagridae 44 living and 4 fossil genera. Of the four fossil genera, *Glyptocephalus* Agassiz is stated to be a synonym of *Bucklandium* König (as per Jordan, 1919) which itself is said to belong to Tachysuridae in view of the 'inferior process at the junction of the basioccipital with the vertebral column which is diagnostic of the Aridae' (Regan, 1922). The remaining two fossil genera are *Fajumia* Stromer and *Socnopaea* Stromer. Peyer (1928) discussed the validity of these two genera and placed them under Tachysuridae.

After Jordan, White (1934) described *Eomacrones*, *Eaglesomia* and *Nigerium* from Nigeria which are valid.

Amongst the living genera, *Chrysichthys* Bleeker, *Mystus* Scopoli and *Rita* Bleeker are known to occur in the fossiliferous Siwalik beds of the Panjab in India. Hora and Menon (1953), on the basis of Woodward (1901) and Lydekker (1886), gave the range of time distributions of *Mystus* to Eocene Africa and of *Chrysichthys* to fossiliferous Pliocene Siwalik beds. Romer (1947), however, did not include *Chrysichthys* but listed *Macronoichthys*, *Heterobagrus* and *Bagrus* besides the above-named genera. The record of *Chrysichthys* from India, is based on Lydekker (1886), who himself was in doubt regarding the generic status of the specimen. The enlarged supraoccipital and post-temporal bones which are rugose appear to be those of *Rita* rather than of *Chrysichthys*.

Thus at present, the following genera can be stated to be known from the fossiliferous beds:—

- | | | |
|--------------------------------|----|-------------------------------|
| 1. <i>Eaglesomia</i> White | .. | Eocene, Africa.. |
| 2. <i>Eomacrones</i> White | .. | Eocene, Africa; Recent, Asia. |
| 3. <i>Nigerium</i> White | .. | Eocene, Africa. |
| 4. <i>Bagrus</i> Cuvier | .. | Pleistocene—Recent, Africa. |
| 5. <i>Rita</i> Bleeker | .. | Pliocene—Recent, Asia. |
| 6. <i>Mystus</i> Scopoli | .. | Tertiary—Recent, East Indies. |
| 7. <i>Heterobagrus</i> Bleeker | .. | Pliocene—Recent, Asia. |

B. LIVING.—As stated earlier, Jordan (1923) listed 44 genera under Bagridae. They can be analysed as below.

I. The following genera do not now belong to Bagridae:—

<i>Olyra</i> McClelland	at present belongs to Family	Olyridae.
<i>Macronoides</i> Hora	" "	Sisoridae.
<i>Laguvia</i> Hora	" "	Sisoridae.
<i>Liobagrus</i> Hilgendorf	}	" " " Amblycipitidae.
<i>Branchiosteus</i> Gill		
<i>Neobagrus</i> Bellotti		
<i>Cranoglanis</i> Peters	" "	Cranoglanidae.

II. The following are synonymous with genera cited against each:—

Synonyms	Valid genera
<i>Mystus</i> Gronow, 1763 <i>Macrones</i> Duméril <i>Aspidobagrus</i> Bleeker <i>Hypselobagrus</i> Bleeker <i>Aoria</i> Jordan <i>Hemibagrus</i> Bleeker	<i>Mystus</i> Gronow (<i>emend</i>) Scopoli.

Synonyms	Valid genera
<i>Auchenaspis</i> Bleeker	<i>Auchenoglanis</i> Günther
<i>Pseudobagrighthys</i> Bleeker	<i>Bagroides</i> Bleeker
<i>Rhinobagrus</i> Bleeker	<i>Leiocassis</i> Bleeker
<i>Porcus</i> Geoffroy	<i>Bagrus</i> Cuvier
<i>Melanodactylus</i> Bleeker	<i>Chrysichthys</i> Bleeker
<i>Chrysobagrus</i> Boulenger	
<i>Octonematichthys</i> Bleeker	<i>Clarotes</i> Kner
<i>Gogrius</i> Day	<i>Rita</i> Bleeker
<i>Pseudobagrus</i> Bleeker, 1860	<i>Pseudobagrus</i> Bleeker, 1858
<i>Fluvidraco</i> Jordan and Fowler	<i>Pelteobagrus</i> Bleeker

III. Besides the above cited 10 genera which are valid, the following 11 listed by Jordan are at present referable to Bagridae:—

<i>Rama</i> Bleeker	<i>Phyllonemus</i> Boulenger
<i>Bagrichthys</i> Bleeker	<i>Parauchenoglanis</i> Boulenger
<i>Heterobagrus</i> Bleeker	<i>Liauchenoglanis</i> Boulenger
<i>Gephyroglanis</i> Boulenger	<i>Amarginops</i> Nichols and Griscom
<i>Notoglanidium</i> Günther	<i>Gnathobagrus</i> Nichols and Griscom
<i>Leptoglanis</i> Boulenger.	

Since Jordan's time, Mori (1936) described *Coreobagrus* which is probably synonymous with *Leiocassis*; Poll (1942) described *Lophiobagrus* and the writer (1955a) *Horabagrus* which are valid. Thus at present, there are 23 genera under Bagridae which are reviewed in the following pages.

AFRICAN GENERA

1. **Bagrus** Cuvier—*Regne Animal.*, II, 1817, 204 (generic type by original designation *Bagrus bayad* Forsk&l).

This is the type genus of the family Bagridae. Fishes of this genus are very generalized and resemble to a great extent the species of the Indian genus *Mystus* Scopoli. There appears to be enough justification for using the name *Porcus* Geoffroy, an earlier name, though the familiarity of *Bagrus* is greater and appealing for its retention. Fowler (1936, p. 309) used the name Porcidae apparently on this basis, although he gave no reasons. The problem is being investigated. So far 10 species are known of this genus.

2. **Chrysichthys** Bleeker—*Acta. Soc. Sc. Indo-Neerl.*, IV, 1858, 60 (generic type by subsequent designation *Pimelodus auratus* Geoffroy).

This genus is in need of a complete revision. So far 40 species are known. Worthington and Ricardo (1937, p. 1089) found the continuous or discontinuous nature of the vomeropterygoid dentition of diagnostic value. Along with this, the occipital region of the head being covered or uncovered with skin, and the length-width ratio of the premaxillary band of teeth appear to be of taxonomic value. Many species seem to have been wrongly identified. This genus is also one of the generalized Bagrids, known even from fossiliferous beds. The Indian genus *Rita* Bleeker is allied to *Chrysichthys* in having small, slender, valve-like nasal barbels and in other general features. However, both are different in the character of palatine dentition and fin structure. An anatomical comparison is being undertaken.

3. **Clarotes** Kner—*Sitzb. Akad. Wiss. Wien.*, XVII, 1855, 313 (generic type by original designation and monotypy *C. heuglinii* = *Pimelodus laticeps* Rüppel).

This genus is closely allied to *Chrysichthys* excepting that besides the first dorsal fin the adipose fin is also modified into cartilaginous rays and ossified spines. This condition is met with only in adult specimens as young ones show absolutely no trace of any such modification (see Hyrtl, 1859 for detailed anatomical study). Whether on this basis, the fish should be given a generic distinction is questionable. However, for taxonomic purposes, external well-defined characters as these seem to be sufficient for a generic recognition. Two species are known at present.

4. **Gephyroglanis** Boulenger—*Ann. Mus. Congo, belge.*, I, 1899, 42 (generic type by original designation *G. congicus*).

This genus is also allied to *Chrysichthys*, chiefly distinguished from it by the absence of teeth on the palate and rudimentary or sometimes absent nasal barbels. Ten species have so far been described of this genus.

5. **Phyllonemus** Boulenger—*Trans. Zool. Soc. Lond.*, XVII, 1906, 552 (generic type by original designation and monotypy *P. typus* Boulenger).

Worthington and Ricardo (*op. cit.*, p. 1096) emended the generic diagnosis by correcting Boulenger's statement that the prevomer alone is dentigerous. They found after examining a large series of fresh specimens collected by Christy, that the pterygoids are also with teeth. The genus is allied to *Chrysichthys* from which it differs in having no nasal barbels, and the maxillary barbels fringed on both sides by a leaf-like membrane in its distal part. Whether this latter character is taxonomically significant is doubtful. Worthington and Ricardo (*loc. cit.*) examined specimens in which the distal part of the maxillary barbels is not leaf-like but flattened. Examination of a large series of specimens seems desirable, particularly of different age groups to find out any possible variations in respect of these two features.

6. **Auchenoglanis** (Günther)—*Cat. Fish. Brit. Mus.*, V, 1864, 137 (substitute name for *Auchenaspis* Bleeker preoccupied; generic type by original designation *Pimelodus biscutatus* Geoffroy).

7. **Parauchenoglanis** Boulenger—*Cat. African Fish. Brit. Mus.*, II, 1911, 364 (generic type by original designation *Pimelodus guttatus* Lonnberg).

Fourteen species are known of the first genus and three of the second. The generic limits of *Auchenoglanis* have been confused because of referring species such as *A. iturii* Steindachner, *A. büttikoferi* Popta, etc., which are referable to *Parauchenoglanis* in view of their having the teeth on jaws arranged in bands instead of in patches and having simple, non-fleshy lips. Similarly certain species such as *A. balayi* (Sauvage), etc., are different from *Auchenoglanis sensu stricto*. The latter category appears to be intermediate between *Auchenoglanis* and *Parauchenoglanis*.

8. **Leptoglanis** Boulenger—*Ann. Mus. Congo belge.*, II, 1902, 42 (generic type by original designation *L. xenognathus* Boulenger).

The affinities of this genus have so far been considered with Amphilidae by David and Poll (1937) and others. Examination of a specimen of *L. rotundiceps* (Hilgendorf) shows this contention to be an error. Harry (1953) in his revision of Amphilidae stated that *Leptoglanis* is a Bagrid by virtue of its possessing a normal,

large, free air-bladder. It seems likely that *Leptoglanis* gave rise to Amphiliidae in Africa and Amblycipitidae in Asia. Four species are so far known of this genus.

9. **Lophiobagrus** Poll—*Rev. Zool. Bot. afr.*, XXXV, 1942, 318 (generic type by original designation and monotypy *L. lestradei* Poll).
10. **Amarginops** Nichols and Griscom—*Bull. Amer. Mus. nat. Hist.*, XXXVII, 1917, 713 (generic type by original designation and monotypy *A. platus* Nichols and Griscom).
11. **Gnathobagrus** Nichols and Griscom—*Ibid.*, XXXVII, 1917, 711 (generic type by original designation and monotypy *G. depressus* Nichols and Griscom).

Each of these monotypic genera is known by their respective type specimens and has not been subsequently recorded. The genera appear to be primitive and interrelated. *Lophiobagrus* appears to be intermediate between *Amarginops* and *Gnathobagrus* and is perhaps only subgenerically distinct from the former. These genera appear to have given rise to *Chaca*-like fishes of India, Burma, Siam and Malaya through *Lophiosilurus*-like genera.

12. **Notoglanidium** Günther—*Proc. Zool. Soc. Lond.*, II, 1902, 336 (generic type by original designation *N. walkeri* Günther).
13. **Liauchenoglanis** Boulenger—*Cat. African Fish. Brit. Mus.*, IV, 1916, 314 (generic type by original designation and monotypy *L. maculatus* Boulenger).

These two genera are peculiar. The first one is known by two species *N. walkeri* Günther and *N. thomassi* Boulenger, while the second is monotypic. Both are different from all the other Bagrids in having a long rayed dorsal fin of 14 to 20 rays, no occipital process and a very low, posteriorly adnate, small adipose dorsal fin extending to the caudal fin. On this combination of external characters alone, it seems justified to keep them under a separate subfamily Notoglanidini.

INDIAN GENERA

14. **Rita** Bleeker—*Ichth. Archipel. Ind. Prodr.*, I, *Siluri*, 1858, 60 (generic type by original designation *Pimelodus rita* Hamilton = *Rita buchnani* Bleeker).

This is the only Bagrid genus known so far with 7-8 rays in the pelvic fin (*versus* uniformly 6 in all others); three pairs of barbels, maxillary, nasal and only one pair of mandibulars (*versus* two pairs of mandibulars in genera with three pairs of barbels) and prevomer enlarged and disc-shaped (*versus* simple). In order to find whether these features are constant in all the species and in all the individuals of each species, a tour to the Mahanadi, Godavari and Krishna river systems was undertaken. About 400 specimens of *Rita chrysea* Day, previously known only from 13 specimens; about 275 of *R. hastata* (Valenciennes); about 40 of *R. pavimentata* (Sykes) were collected. About 60 specimens of *R. rita* (Hamilton), the generic type, were also examined. In none of the specimens of the four species examined the pelvic fin ray count is found to be six, but only either seven or eight. As such, *Rita* is kept under a separate subfamily Ritaini. Osteological comparison with other available genera is in progress.

15. **Rama** Bleeker—*Atlas Ichth. Ind. Orient.*, II, 1862, 8 (provisionally proposed; generic type by original designation and tautonymy *Pimelodus rama* Hamilton = *Rama rama* Bleeker).

No material of *P. rama* Hamilton and *P. chandramara* Hamilton, the two species of this genus so far known, is stated to exist in any museum. Bleeker provisionally erected this genus and included it under the Phalanx 'Ritae' along with *Rita*. The original drawings and illustrations of the two species show clearly that the former is sufficiently distinct to warrant a new generic status and that the latter is only questionably separable from the known species of *Rita*. There are discrepancies in Hamilton's description of these species between his original MS. and his published account in the *Gangetic Fishes*. Day's specimen from Assam, *Leiocassis rama* is distinctly referable to *P. rama* as shown by an examination of the much damaged specimen of the former species, present in the ZSI. Day and Regan (1913) were wrong in considering this species as belonging to *Leiocassis* which does not occur in India.

16. **Mystus** Scopoli—*Introductio ad historiam*, 1777, 451 (generic type by subsequent selection *Silurus pelusius* Solander).

The nomenclatural status of this genus has been elucidated in another article (Jayaram, 1955b). This genus is very generalized, with 39 species, from which many forms seem to have arisen. It seems likely that several subgeneric complexes are present in this widely distributed genus. *Heterobagrus* Bleeker from Siam, Indo-China and Malaya is only a subgenus of *Mystus*. *M. seenghala* (Sykes), *M. aor* (Hamilton) and *M. leucophasis* (Blyth) are separable under a new subgenus *Osteobagrus* Jayaram (1955, pp. 529 and 547). Whether any such subgeneric complexes are present in the Malayan, East Indian, Chinese, North-East Asian species is being investigated.

17. **Horabagrus** Jayaram—*Bull. Nat. Inst. Sci. India*, no. 7, 1955, 261 (generic type by original designation and monotypy *Pseudobagrus brachysoma* Günther).

The circumstances under which this genus was proposed have been discussed in an earlier article (Jayaram, 1952). This is a monotypic genus found in Peninsular India along the Malabar coast. Its affinities are with the Palearctic genus *Pelteobagrus* from which it differs in having low set eyes visible when viewed from below, short barbels, and a long anal fin with 27-28 rays. It is also allied to *Crano-glanis* Peters.

SIAM, MALAYA AND EAST INDIAN GENERA

18. **Heterobagrus** Bleeker—*Versl. Med. Akad. Wet. Amsterdam*, XVI, 1864, 354 (generic type by original designation and monotypy *H. bocourti* Bleeker).

This monotypic genus is only subgenerically different from *Mystus* Scopoli as stated earlier. Examination of material of *H. bocourti* Bleeker justifies that *Prajadhipokia rex* Fowler based on differences in gill raker counts is within the range of specific variation of *Heterobagrus bocourti* and that it is synonymous with *P. rex*. This genus is probably evolved from the widely distributed and generalized genus *Mystus* and has diverged from it only subgenerically. An osteological comparison with *Mystus* is being undertaken.

19. *Bagroides* Bleeker—*Nat. Tijdschr. Ned. Ind.*, II, 1851, 204 (generic type by original designation *Bagroides melapterus* Bleeker).

All the three known species of this genus have been examined. *Leiocassis vaillanti* Popta is synonymous with *Bagroides macracanthus* Bleeker. The genus is allied to *Heterobagrus* Bleeker.

20. *Bagrichthys* Bleeker—*Ichth. Arch. Ind. Prodr.*, I, Siluri, 1858, 130 (generic type by original designation and monotypy *Bagrus hypselopterus* Bleeker).

This is a monotypic genus related to *Synodontis* Cuvier found in Africa. Both genera resemble each other in having the mandibularly barbels branched, body compressed, adipose fin large, long, labial teeth enlarged and movable, and caudal fin filamentous (only in some species of *Synodontis*). *Bagrichthys* differs from *Synodontis* in having a dentigerous palate, four pairs of barbels (*versus* three pairs), gill membranes free from the isthmus and in not possessing a cephalonuchal shield. It appears evident that *Synodontis* has evolved from *Bagrichthys*-like fishes.

JAPANESE AND CHINESE GENERA

21. *Pseudobagrus* Bleeker—*Acta. Soc. Sc. Indo-Neerl.*, VIII, 1860, 87 (generic type by original designation *Bagrus aurantiacus* Temminck and Schlegel).
22. *Pelteobagrus* Bleeker—*Ned. Tijdschr. Dierk.*, II, 1865, 9 (generic type by original designation *Silurus calvarius* Basilewsky).
23. *Leiocassis* Bleeker—*Ichth. Archipel. Ind. Prodr.*, I, Siluri, 1858, 139 (generic type by original designation *Bagrus poecilopterus* Valenciennes).

These three genera are involved in a complex group, separation of them on external features being almost impossible. Nichols (1943) stated that recognition of these genera is only a matter of convenience. Günther (1873), Tchang and Shih (1934), Kreyenberg and Pappenheim (1909) and others felt this complexity and considered these genera either as synonyms or as subgenera of *Mystus* Scopoli. *Leiocassis* possesses a well-developed post-temporal plate which is in varying degree of development in the other genera, *Pseudobagrus* having the most ill-developed one. Regan (1911, p. 561) separated *Pseudobagrus* from *Leiocassis* on the modification of the pterygoid bones being laminar and loosely connected in the former and united suturally in the latter, and on the modification of the parapophyses of the IVth vertebra. It is obvious that generic fixation based on such features, although very sound, involves considerable damage to the specimens; in many instances they being unique representatives for the concerned museum. A combination of the caudal fin shape, being forked or otherwise; shape, size and position of the eyes; cranial roof being covered or uncovered with skin and the count of the anal fin rays appear to be of diagnostic value. On this basis, many out of the 48 species of *Leiocassis* so far known, have been reassigned either to *Pelteobagrus*, *Pseudobagrus* or *Mystus*.

The following are a few other noteworthy points:—

1. *Hemibagrus taphrophilus* Sauvage is likely to be a synonym of *Pseudobagrus medianalis* (Regan).
2. A neotype of *Bagrus vachellii* Richardson has been selected.
3. The generic status of *L. hirsutus* Herre appears to be doubtful in view of its peculiar features,

4. *L. torosilabris* Sauvage is not a *Bagrichthys* as was considered by Regan (1913) and others, but is synonymous with *L. crassilabris* Günther.
5. The generic type of *Leiocassis* is undoubtedly *Bagrus poccilopterus* Valenciennes contrary to other views of considering *Bagrus micro-pogon* Bleeker as the type.
6. The generic spelling of *Leiocassis* was unnecessarily emended to *Liocassis* by Günther (1864) in the absence of any inadvertent error or nomenclatural preoccupation.
7. *Leiocassis longirostris* Günther and *L. dumerili* Bleeker are homonyms and *longirostris* has precedence over *dumerili* being the one to be published two months earlier.
8. *L. doriae* Regan, *L. merabensis* Regan and *L. hosii* Regan, all known from Borneo by their respective type-specimens and with their range of morphometric characters over-lapping appear to be all probably subspecifically related to the widely distributed *L. baramensis* Regan.

SUMMARY

After reviewing the nomenclatural and classificatory changes undergone by the fishes of the family Bagridae, a list of the now valid fossil and living genera is given. The genera inhabiting the African, Indian, Siam, Malaya and East Indian and the Japanese and Chinese areas are grouped together phylogenetically where necessary, and the systematic problems associated with each genus are discussed. Work so far completed on each of the genera is also given.

REFERENCES

- Artedi, P. (1758). *Ichthyologia, sive opera omnia de piscibus scilicet: Genera Piscium*, Leiden, 83.
- Belon, P. (1553). *De aquatilibus libri duo. Cum eiconibus ad vivam ipsorum effigiem, quoad eis fieri potuit, expressis*, Parisiis, 16 leaves, 448 pages (not seen).
- Berg, L. S. (1947). *Classification of Fishes; both Recent and Fossil*, English translation, 448.
- Bleeker, P. (1862). *Atlas ichthyologique des Indes Orientales Néerlandaises, publié sous les auspices du Gouvernement colonial néerlandais* Amsterdam, II, Siluri, 7.
- Bloch, M. E., and Schneider, J. G. (1801). *Systema Ichthyologiae iconibus ex illustratum*, Berlini, 375-389.
- Cuvier, G. L. C. F. D. (1817). *Le règne animal distribué d'après son organisation, pour servir de base à l'histoire naturelle des animaux et d'introduction à l'anatomie comparée*, Paris, 2, edition 1.
- David, L., and Poll, M. (1937). Contribution à la Faune ichthyologique du Congo belge; Collections du Dr. H. Schouteden (1924-1926), et d'autres récolteurs. *Ann. Mus. Congo belge.*, (5) 3, 26.
- Day, F. (1878). *The Fishes of India; being a natural history of the fishes known to inhabit the seas and freshwaters of India, Burma and Ceylon*, London, 438.
- Fowler, H. W. (1935). Scientific results of the Vernay-Lang Kalahari expedition, March to September, 1930. Freshwater Fishes. *Ann. Transvaal Mus.*, 16, 275.
- (1936). Zoological Results of the George Vanderbilt African Expedition of 1934. Part III. The Freshwater fishes. *Proc. Acad. nat. Sci. Philad.*, 88, 309.
- (1949). Results of the two Carpenter African expedition, 1946-1948. Part II. The Fishes. *Ibid.*, 101, 261.
- Günther, A. (1864). *Catalogue of the Fishes in the British Museum*, London, 5, 7.
- (1873). Report on a collection of Fishes from China. *Ann. Mag. nat. Hist.*, (4) 12, 243.
- Hamilton, F. (1822). *An account of the fishes found in the river Ganges and its branches*, Edinburgh and London, 160.
- Harry, R. R. (1953). A contribution to the classification of the African catfishes of the family *Amphiliidae*, with description of collections from Cameroon. *Rev. Zool. Bot. afr.*, 47, fasc. 3-4, 180.
- Hora, S. L., and Menon, A. G. K. (1953). Distribution of Indian fishes of the past and their bearing on the geography of India. II. The Extinct freshwater Teleostean fishes of India. *Everyday Sci.*, 2, 106.
- Hyrtil, C. J. (1859). Anatomische Untersuchung des *Clarotes (Gonocephalus) heuglini* Kner, mit einer Abbildung und einer Osteologischen Tabelle des Siluroiden. *Denkschr. Akad. Wiss. Wien.*, 16, 1-18 (not seen in original; abstract consulted).

- Jayaram, K. C. (1952). Taxonomic notes on the Fish *Pseudobagrus chryseus* Day, 1865. *Ann. Mag. nat. Hist.*, (12) 5, 980-983.
- (1955). Siluroid Fishes of India, Burma and Ceylon. XIV. Fishes of the genus *Mystus* Scopoli. *Rec. Indian Mus.*, 51, Part 4, 527-558.
- (1955a). Palaeartic element in the Fish fauna of Peninsular India. *Bull. Nat. Inst. Sci. India*, no. 7, 260-263.
- (1955b). The nomenclatural status of *Mystus*, *Macrones*, *Aoria* and other names for a genus of Asiatic Siluroid fishes. *Copeia* (In press).
- Jordan, D. S. (1919). *The genera of Fishes*, Stanford University, California, Part 2, 217.
- (1923). *A classification of Fishes including Families and genera as far as known*, Stanford University, California, 148.
- Kreyenberg, W., and Pappenheim, P. (1909). Ein Beitrag zur Kenntnis der Fische der Jangtse und seiner Zuflüsse. II. Zur Systematik. *S.B. Ges. Naturf. Fr. Berl.*, 107.
- Lacépède, B. G. (1803). *Histoire naturelle des poissons . . . dédiée au citoyen Lacépède*, 5, 93 and 116.
- Linnaeus, K. L. (1758). *Systema naturae sive regna tria naturae, systematice proposita per classes, ordines genera et species cum characteribus, differentiis, synonymiis, locis, etc.*, Holmiae, 1, X edition.
- Lydekker, R. (1886). Indian Tertiary and post-tertiary vertebrata. Tertiary Fishes. *Palaeont. indica*, (X) 3, 249.
- Mori, T. (1936). Description of one new genus and three new species of Siluroids from Chosen. *Dobutsu Zasshi*, Tokyo, 48, 672.
- Nichols, J. T. (1943). *The Freshwater Fishes of China in Natural History of Central Asia*, 9, 42.
- Peyer, B. (1928). Ergebnisse der Forschungsreisen Prof. E. Stromers in den Wüsten Agyptens. V. Tertiäre Wirbeltiere. 2. Die Welse der ägyptischen Alttertiärs nebst einer kritischen übersicht über alle fossilen Welse. *Bayer Akad. Wiss. München*, 32, Part 3, (not seen).
- Poll, D. (1942). Description d'un genre nouveau de Bagridae du Lac Tanganika. *Rev. Zool. Bot. afr.*, 35, 318.
- Regan, C. T. (1911). The Classification of the Teleostean Fishes of the Order Ostariophysii. 2. Siluroidea. *Ann. Mag. nat. Hist.*, (8) 8, 561.
- (1913). A Synopsis of the Siluroid Fishes of the Genus *Liocassis*, with Descriptions of new species. *Ibid.*, (8) 11, 547-554.
- (1922). The distribution of the fishes of the order Ostariophysii. *Bijdr. Dierk. Amsterdam*, 22, 204.
- Rendahl, H. (1928). Beiträge zur Kenntnis der Chinesischen Süßwasserfische. I. Systematischer Teil. *Ark. Zool.*, 20 A, no. 1, 162-170.
- Romer, A. S. (1947). *Vertebrate Palaeontology*, Chicago, 583.
- Tchang, T. L., and Shih, C. Y. (1934). Notes on some Chinese Catfishes. *Sci. Quart. Peking nat. Univ.*, 4, 336.
- Valenciennes, M. A. (1839). *Histoire naturelle des Poissons*, Paris, 14, 388.
- White, E. I. (1934). Fossil Fishes of Sokoto Province. *Bull. geol. Surv. Nigeria*, 14, 70; see also *Geol. Mag. Lond.*, 74, 144.
- Woodward, A. S. (1901). *Catalogue of Fossil Fishes in the British Museum (Natural History)*, London, Part 4.
- Worthington, E. B., and Ricardo, C. K. (1937). The Fish of Lake Tanganyika (other than Cichlidae). *Proc. zool. Soc. Lond.*, part 4, 1089-1097.

Issued November 28, 1955.