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An Aid to the Study of Hamilton Buchanan's "Gangetic Fishes". *S. L. Hora* ... 169

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# AN AID TO THE STUDY OF HAMILTON BUCHANAN'S "GANGETIC FISHES".<sup>1</sup>

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(Plates XIII—XXIII.)

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## INTRODUCTION.

There is no work of greater importance than "An Account of the Fishes found in the River Ganges and its branches" by Francis Hamilton (formerly Buchanan) for the student of Indian freshwater fishes. Invaluable as this work is for all time, its value would have been still further enhanced had not Buchanan, at the time of his departure from India in 1815, been deprived of a large number of his drawings and several volumes of his manuscript notes. In the absence of this material Buchanan's published descriptions of several species in the "Gangetic Fishes" are defective, while it has been a matter of considerable difficulty to identify the species that have not been illustrated. The controversy that raged between Günther and Day, two eminent ichthyologists, in the late sixties and early seventies of the last century, regarding the specific validity of some of Buchanan's species fully testifies to this deficiency. In 1928, I had the opportunity of examining Buchanan's manuscript fish-drawings preserved in various libraries in London, and of scrutinising his volumes of manuscript notes preserved in the library of the India Office.<sup>2</sup> Through the kindness of Lieut.-Col. R. B. Seymour Sewell I also had with me the Zoological Survey set (copies recently made) of Buchanan's fish-drawings preserved in the Asiatic Society of Bengal. With all this material I have thought it worth while to prepare a sort of a guide to the study of Hamilton Buchanan's "Gangetic Fishes", to throw further light on the fate of his

<sup>1</sup> Buchanan's work entitled "An Account of the Fishes found in the River Ganges and its branches" is referred to in this paper as "Gangetic Fishes", an abbreviation used by Buchanan himself as a page heading in his work.

<sup>2</sup> Mention may here be made of three volumes of manuscripts of Buchanan's in the India Office library which have not been examined by any previous ichthyologist. One of these contains the original notes concerning the Gangetic Fishes and the other two (a volume of text and a volume of plates) formed the Manuscript of his published work. Much valuable information concerning the provenance and the local names of the species is contained in the original notes, and I have used these manuscripts extensively in the preparation of this paper.

collections, drawings and notes and the use which has been made of the data in connection with the study of Indian fishes.

This work was carried out during my stay in London at the British Museum of Natural History and I have to offer my sincere thanks to Dr. W. T. Calman and Mr. J. R. Norman for the facilities so kindly extended to me for this work. Through the kind offices of Lt.-Col. J. Stephenson the three valuable manuscript volumes of Buchanan's "Gangetic Fishes" from the library of the India Office have been lent to me for study in Calcutta, and for this my best thanks are due to Col. Stephenson and to the authorities concerned at the India Office. The Council of the Asiatic Society of Bengal has permitted me, through the Director of the Zoological Survey of India, to reproduce the hitherto unpublished manuscript drawings of Buchanan and for this I am greatly indebted to them. My thanks are also due to Dr. B. Prashad, who has taken a keen interest in the progress of this work and has helped me with his valuable suggestions and criticism.

#### "GANGETIC FISHES."

In 1822, Buchanan published his "Fishes of the Ganges"; it was accompanied with an atlas of 39 plates in Royal Quarto. This work contains the descriptions of 271<sup>1</sup> species, while one species is mentioned only by name (p. 316). There are 198 figures on the 39 plates; 5 of these on plates ii, iv, xii, xxxiii and xxxv are drawings of special parts of fish. There are 93 outline sketches showing the fish from above and 100 finished drawings of fish in lateral view. Of the 100 drawings two are to illustrate the juvenile forms of the species figured also as adults, viz., *Ophiocephalus lata* (pl. xxxiv) and *O. marulius* (pl. xvii). The drawing reproduced in the "Gangetic Fishes" as *Ophisurus hijala* (pl. v, fig. 5) belongs to an undescribed species which Buchanan called *Muraena serpens* in his original notes; this name is also to be found on the manuscript drawing, and Buchanan apparently mixed up the drawings and descriptions of the two species when he published his work. The drawing of *Ophisurus hijala* is present in the Asiatic Society of Bengal collection (No. 27) and is reproduced here (pl. xiv, fig. 2). The following additional corrections may also be noted:—

- (1) *Macrognathus pancalus* (p. 30) is illustrated on pl. xxii and not on pl. xvii.
- (2) *Ophiocephalus marulius* (p. 65) is illustrated on pl. xvii and not on pl. xxii.
- (3) *Chanda nama* (p. 109) is illustrated on pl. xxxix as fig. 31, but no reference is made to this drawing in the text.
- (4) *Plotosus canius* (p. 142) is illustrated on pl. xv as fig. 44, but no reference is made to the drawing in the text.
- (5) The drawing on pl. xxiii, fig. 60, referred to as *Pimelodus batasio* (p. 179), in reality illustrates *P. carcio* (p. 181), as the same vernacular name is used on the manuscript drawing and in the notes under *P. carcio*.
- (6) The drawing on pl. i, fig. 72, is an illustration of *Pimelodus menoda* (p. 203).
- (7) *Cyprinus (Bangana) dero* (p. 277) is illustrated on pl. xxii and not on pl. xvii.

<sup>1</sup> Both Day (*Fish. India*, p. iii, 1876) and Gudger (*J. A. S. B.* XIX, p. 127, 1923) remark that Buchanan's "Gangetic Fishes" contains descriptions of 269 species and illustrations of 97 species. This is obviously incorrect, *vide* table at the end. Gudger gives the total number of drawings in this work as 173; this figure is also inaccurate.

- (8) The drawing on pl. iv, fig. 82 referred to as *Cyprinus (Cyprinus) gonius* (p. 292) in reality illustrates *C. (Cyprinus) curchius* (p. 289). The local name in the manuscript and on the drawing is *Kurchi* and I have, therefore, no hesitation in suggesting that the figure referred to is that of *C. (C.) curchius*.

It is clear from the above that out of a total of 272 species described in the " Gangetic Fishes " delineations of only 97 species were published with this work. On the paucity of the figures the author himself in the introduction of the manuscript of his text remarks as follows :—" I have to regret that the number of plates is so small owing to my having been deprived of the drawings of 144 fishes. These together with drawings of 20 quadrupeds, of 241 birds and of 130 plants the Government of Bengal at the instigation of the Earl of Moira took from me by one of those mean exertions of power, into which a weak man thrust into high authority is liable to fall."<sup>1</sup> It is not possible to say why this useful statement was not published by the author, for an equally strong indictment by him appeared in 1826 in the *Transactions of the Royal Society of Edinburgh* (p. 186). I have quoted the passage here as it stands, firstly to clear the controversy regarding the number of drawings of which Buchanan was deprived and secondly to show why his book is deficient in figures, and on whom the blame for this rests. Writing to his friend Sir J. E. Smith, the founder of the Linnean Society of London, on 23rd April, 1816, he says, " So far as I have leisure I am engaged in preparing an account of the fishes of the Ganges the materials for which I procured from among my papers before I left London. That generous protector of Science Lord Moira has deprived me of 144 of the drawings but enough still remains to render the work abundantly splendid" Again on the 24th of November 1816, he wrote to Smith, " I am much obliged to you for the offer of assisting me with Lord Moira who not only took 144 drawings of fishes, but 20 of quadrupeds, 241 of birds and 130 of plants"<sup>2</sup>. These statements leave no doubt that in 1815 Buchanan left behind him in India drawings of 144 species of fish. This is also clear from the acknowledgment receipt of Buchanan's drawings by Wallich, dated the 26th of February, 1815, which contains a reference to " one hundred and forty-four drawings of fishes" These drawings were sent to the Royal Botanical Garden, Calcutta and in 1816, Hare, who superseded Wallich as Superintendent, got permission " to copy the zoological as well as the botanical drawings before returning them to the Secretariat for transmission to England" There is no doubt that some copies were made in accordance with the Government orders but later the interest in them seems to have slackened and both the original and the copies remained in the library of the Botanical Garden, Calcutta.

It has been rightly concluded by Sir David Prain that fishes received Buchanan's chief attention when he was stationed at Baruipur, near Calcutta, from October, 1798, till the beginning of 1800. Sir David Prain has further informed me " that at this stage of his career Dr. Buchanan was in correspondence with Sir James Edward Smith, the founder of the Linnean Society of London, as to the possibility of publishing an illustrated work on

<sup>1</sup> In the Ms. volume this passage occurs as a separate paragraph and in the published work its position would have been on p. vi starting as a new paragraph, line 4th.

<sup>2</sup> Sir David Prain, since the publication of his memoir entitled " A Sketch of the Life of Francis Hamilton (once Buchanan)", has collected further valuable information about the life of Buchanan. He very generously allowed me to copy portions dealing with fishes from the copies of letters of Buchanan in his possession. My best thanks are due to him for this and for helpful suggestions.

the fishes of India and that he sent to Smith, who had been a fellow student of his when both were at the University of Edinburgh, a considerable number of drawings of fishes. These drawings are still carefully preserved in the library of the Linnean Society” In the library of the Linnean Society there are 9 original drawings (probably out of a set of 10, one is now missing) accompanied by the descriptions of 10 species in Latin. These were sent to Smith with the following covering letter dated the 1st of January, 1799 :—

“ My dear Smith,

Since I wrote you last I have been removed from Luckipour to a place within 20 miles of Calcutta named Barripore : and during Roxburgh’s absence at the Cape for the recovery of his health I have got charge of the Company’s Garden. Having at Luckipour examined all the plants, I began to describe and draw fishes and have collected a good many. As a specimen Captain Burt of the Duke of Montrose will forward descriptions and drawings of 10 Cyprini. The interpretation of the Bengal character for the names of the fishes I have given according to Halhed’s plan : but as it is totally illegible except to an Englishman I have added another explanation after the Italian manner of pronouncing Latin. When you have looked over these performances you will be able to inform me what I can do with them. If you think the whole would bear the expense of publication I would send you all that I have got. By next season I should suppose that I may have ready nearly 200 drawings of fishes. If you do not think that a separate publication would defray its expense you may publish whatever you please in the Linnean Transactions. ..” All these drawings are published in the “ Gangetic Fishes”, no doubt from the replicas of these very drawings. In a letter dated 3rd March, 1802, from Bassaria Buchanan again wrote to Smith as follows : “ I have left a number of drawings and descriptions of fishes with my good friend Mr. Fleming, President of our Medical Board and a very great encourager and promoter of the study of Natural History. If he should go home before my return to Bengal he will take them with him and endeavour to get them published. .. If you hear of his arrival in England while you are in London I request that you would be so good as to offer to assist him in selecting and correcting the descriptions and drawings of fishes

..” Again in a letter, dated 8th of October, 1802, from Catmandu he writes to Smith : “ This will be either delivered or sent to you by my best friend Mr. Fleming. He has a copy of my manuscript on Fishes and I hope you will be so good as to give him your advice and assistance relative to the correction and publication of such parts of it as he may deem proper.” It is clear from these quotations that at this period Buchanan was deeply engrossed in the study of fishes and that he was having them drawn at his own expense. In a letter to Roxburgh, dated 30th November, 1797, he says : “ I have given my old painter a gold mohur a month and have him employed on fishes.” There is no doubt that Buchanan had a private collection of fish-drawings when he was instructed to carry out a Statistical Survey of Bengal in September 1807, but from the paucity of illustrations in the “ Gangetic Fishes ” it is evident that he did not possess a large collection of fish-drawings. The original notes on a number of species are dated and assuming that the drawings were made about the same time as the notes, it seems probable that Buchanan used at least 15 such illustrations<sup>1</sup> in his “ Fishes of the Ganges,” which were made during the survey period at the

<sup>1</sup> For details regarding these 15 illustrations refer to the species marked with an asterisk in the table at the end.

Government expense. It must, however, be said that he took with him drawings of only such species of which duplicates were available and that he left duplicates wherever such were available in his collection for the Bengal Government collection. This also clearly shows that Buchanan did not generally prepare duplicates of his drawings; this has also been indicated by Sir David Prain (p. xlii). The drawings used in the " Gangetic Fishes " are, as has been mentioned already, now preserved in the library of the India Office. The volume contains 104 plates of which 99 only were published. The remaining 5 are delineations of the following species:—*Macrogathus aculeatus* (p. 29); *Cyprinodon cundinga* (p. 254); *Clupea purava* (p. 238); *Mystus kaporat* (p. 235) and *Cyprinus (Cyprinus) sarana* (p. 307). The drawings of these species were not reproduced by Buchanan presumably because some of them had either been previously illustrated by their authors or as in some cases closely allied species had been figured.

#### CONTROVERSY REGARDING BUCHANAN'S MANUSCRIPT FISH-DRAWINGS.

McClelland, Griffith, Cantor and Day have made observations on Buchanan's fish-drawings but in their accounts discrepancies are to be found regarding the number of drawings. As I have shown above Buchanan left behind him in India drawings of 144 species of fish and it will be useful here to clear up these discrepancies and to elucidate the question of the 144 fish-drawings. In 1815, Wallich acknowledged the receipt of 144 fish-drawings, but in 1838 he handed over a collection of 150 drawings to McClelland for examination, as is clear from McClelland's statement: " a collection of drawings from Dr. Wallich amounting to 150 beautifully executed, and including nearly all the unpublished species on which my painters had been so long employed, with the specific names in Buchanan's handwriting marked under the figures, so as to leave no doubt or difficulty in referring them to corresponding descriptions in the 'Gangetic Fishes'." It is clear, therefore, that in the intervening period some other drawings must have got mixed up with Buchanan's collection. Hare in 1816 had obtained permission to have copies made of these drawings and it seems probable that when copies were being made no particular attention was paid to keeping the original set separate, as Griffith in 1843 remarked that " For many of the originals copies appear to have been substituted". He mentioned, however, drawings of only 144 fishes and pointed out that there were in addition " 18 folio sheets containing copies of some of the drawings of Fish, executed apparently in Dr. Wallich's time". Griffith's reference to 144 fish-drawings appears to have been based on Wallich's original acknowledgment receipt, for it is otherwise difficult to conceive how the number of drawings fell from 150 in 1838 to 144 in 1843. Cantor's reference to these drawings in 1849 is evidently based on Griffith's report and requires no special consideration. In 1871, Day found in two volumes " one hundred and forty-nine original, coloured delineations of fish, and 45 copies". In 1926, I pointed out that the drawings listed as 123 and 146 in Day's list are now missing, while there is a drawing of *Cyprinus tor* which I numbered 125a. This is an unfinished copy of the drawing No. 121 and was probably made by Day for use in his " *Fishes of India*".

The next point to be considered is, which are the original 144 drawings left behind by Buchanan? It seems to me certain that only 138 out of the 146 drawings listed by Day are the originals of which Buchanan was deprived in 1815, and drawings Nos. 34, 53, 62,

63, 64, 70, 71, 84 must have been added afterwards to this set. In this connection it may be mentioned that Buchanan generally himself wrote the vernacular name or specific name (or both) under each drawing, and where no such entry is found it may reasonably be concluded that the drawing does not belong to Buchanan's collection. I will now deal with the doubtful drawings serially.

Drawing No. 34. There is no entry on the plate in Buchanan's handwriting. Day identified it as "*Squalus carcharias*? H. B.", while for the next drawing (No. 35) which contains the legend in Buchanan's handwriting—"*Squallus characias*? Karnta"—he remarks: "This shark with a sharp nose was not described." Day was wrong in making the above statement for a comparison of Buchanan's description of *S. carcharias*?, p. 4 and of drawing 35 leaves no doubt that both refer to the same species. Moreover *Karnta* (from the Bengali name *Kampta*) is the name used in the original notes for the species afterwards described as *S. carcharias*? in the "Gangetic Fishes" In the description of *S. carcharias* Buchanan notes that "the specimen from which I took the description was very small" and probably the young age of the specimen accounts for the 'sharp nose' to which Day refers.

Drawing No. 53. There is no entry below the figure in Buchanan's handwriting, neither is there any reference to *Cobitis scaturigina* in the original notes. McClelland says: "I cannot find this species referred to in 'Gangetic Fishes', although it is figured in Buchanan's collection." It is impossible to say how McClelland came to assign the authorship of this species to Buchanan.

Drawings Nos. 62, 63, 84. These are all unfinished drawings with no legends below the figures in Buchanan's handwriting.

Drawings Nos. 64, 70, 71. These three drawings are of the same species "*Mugil bongon*." Day remarks: "This fish does not appear to have been described by Hamilton Buchanan, unless as *M. cephalus*? The 'Bongon' in the Calcutta markets is *M. planiceps*, C. V." "*Bhanggan*" and "*Sole Bhanggan Calcutta*" are the vernacular names given in the original notes for *M. cephalus*? "*Bongon*" on the drawing is probably in Wallich's handwriting.

In the 1st volume there are two doubtful drawings, Nos. 36 and 38 (?*Catla* and *Cyprinus mirgala* respectively). Buchanan published a drawing of *Cyprinus (Bangana) mirgala* (pl. vi, fig. 79) and of *Cyprinus (Cyprinus) catla* (pl. xiii, fig. 81) in his "Fishes of the Ganges." The published drawings are altogether different from these manuscript drawings, and I am, therefore, positive that they do not belong to Buchanan's collection.

Of drawing No. 15 of Vol. I Day observed that it was a larger drawing of 123 of Vol. IV. This statement is not accurate for in no other case have I seen two drawings of the same fish of two different sizes. Drawing 15 in Vol. I is reproduced in the "Gangetic Fishes" as *Cyprinus gonius*, but as I have shown above (p. 171) it is really a drawing of *Cyprinus curchius*. Probably the smaller figure (123 of Vol. IV) was meant to represent *C. gonius*, but as the drawing is now missing from the collection there is no way of verifying this hypothesis; there are also unfortunately no copies of either of these two drawings in any other collection. I further believe that drawing 15, Vol. I, and drawing 123, Vol. IV, represent two different species, *C. curchius* and *C. gonius*, in Buchanan's sense.

From the above it is clear that in the two volumes of drawings in the library of the Asiatic Society of Bengal examined by Day there were 142 drawings out of the 144 left behind by Buchanan, 138 in Vol. IV (two of these, 123 and 146, are missing now) and 4, *Cyprinus curchius* (15), *Mystus chitala* (27), *Cheilodipterus panijus* (33) and *Cyprinus chagunio* (39), in Vol. I.

Two drawings of Hamilton-Buchanan still remain to be accounted for.

In 1839 McClelland published a number of drawings of Cyprinidae from Buchanan's collection. Among these are two figures the originals of which were missing when Day examined the set in 1871. One is the drawing of *Cyprinus chola* reproduced by McClelland on pl. lviii, fig. 3. The other reproduced on pl. lv, fig. 4 is the drawing of *C. dancena* and about which McClelland remarked as follows (p. 316): " Fig. 4, is a species of the curious genus *Aplocheilus* figured in Buchanan's collection, but not named on the drawing, or alluded to in the ' Gangetic Fishes ' ; nor has the species itself been met with by me. It differs apparently from the two I have described, in the greater depth of the body, as well as in other characters, which, however, it would be unsafe to derive from the figure alone." A copy of this drawing is available in the Hardwicke collection, and the correct identification—*Cyprinus dancena*—is entered below the figure in Hardwicke's handwriting. Since there was no name on the drawing examined by McClelland it is quite probable that he only saw a copy and not Buchanan's original drawing of the species.

The original 144 drawings of Buchanan are, therefore, available now in the following places : 138 in Vol. IV ; 4 in Vol. I and published copies of 2 in McClelland's Cyprinidae (one of these, as remarked above, is also to be found in Hardwicke's collection).

#### CONTROVERSY REGARDING BUCHANAN'S ZOOLOGICAL COLLECTIONS AND THE IMPORTANCE OF HIS FISH-DRAWINGS.

The great importance of Buchanan's drawings lies in the fact that for his descriptions in the " Gangetic Fishes " he entirely relied on his drawings and the field notes. After a careful survey of the available information I have no doubt whatsoever that no zoological collections were ever kept by Buchanan. In reference to the above Sir David Prain, who has made a special study of Buchanan's career, observes (p. xxxvii) as follows: " he appears to have been somewhat chary of collecting duplicates and to have been inclined to rely on good drawings accompanied by field descriptions as equivalent to actual specimens" Writing about Buchanan's Mysore journey he says (p. xli): " There is no indication that Buchanan made any zoological collections at this time." Again on p. xlii he remarks: " There is no record of any natural history specimens having been preserved while Buchanan was in charge of the menagerie at Barrackpur in 1803-05, but many drawings and descriptions were prepared." In 1826, Buchanan himself made the following observation in the *Transactions of the Royal Society of Edinburgh* (p. 172): " In 1796, 1797, and part of 1798, I was stationed at Lukhipur, in the south-eastern part of Bengal, and in the ancient kingdom of Tripura. My time was then much occupied in describing the fishes of the country ; but I took many descriptions of plants, which are also deposited in the Company's Library ; *but I did not preserve specimens* " (italics are mine). That Buchanan greatly relied on his drawings for descriptions of species and did not preserve any specimens is also evident from the passages quoted below from his " Gangetic Fishes."

Of *Raia fluviatilis* (p. 2) he says: "I always deferred taking a description, until I had an opportunity of having it drawn, and that opportunity never occurred. I cannot, therefore, give its specific character."

Of *Bola coibor* (p. 79) he says: "I saw only one specimen, which was four feet in length; but it is said to grow considerably larger. At the time, I omitted to take a full description, and only noted the differences between the *coibor* and the description of the *pama*, which follows; and I had no opportunity afterwards of supplying the omission."

Of *Bola? coioides* (p. 83) he says: "I have referred this fish to the genus *Bola* with a mark of doubt, because, in the description which I took long before I had the present arrangement in view, I have omitted to notice whether it possessed the characters by which the *Bola* is distinguished from the following genus called *Coius*."

Of *Silurus chechra* (p. 153) he says: "The rays in the *vent* fin are about sixty-seven in number, but I am not satisfied that this was exactly determined."

Of *Cyprinus (Puntius) tictis* he says (p. 315): "In the north-east parts of Bengal I saw another fish called by the same names, and procured a drawing, now in possession of the Bengal Government. It differed in a few particulars from the *ticto*, but, the drawings being sufficient to point out the differences, I took no notes, and, therefore, until I recover the drawings, I cannot give this fish a specific character, although I call it *Tictis*."

In spite of the above a certain amount of uncertainty has been expressed owing to Günther referring some specimens in the collections of the British Museum (Nat. Hist.), London, as having originated from Buchanan's collection.

In 1861, Günther when referring to the important additions to the collection of the British Museum remarked: "6. A collection of Fishes from Bengal, believed to contain many typical specimens of Buchanan Hamilton's work, presented by G. R. Waterhouse, Esq.". In the descriptions of the species in the *Catalogue* these specimens are noted as "Types of the species. Presented by G. R. Waterhouse, Esq." (p. 427, vol. III). In 1869, the same author commenting on a remark made by Day wrote as follows: "It may be questioned whether it is desirable to utilize drawings, the types of which are lost, in any other way but as a help to supplement the insufficient published descriptions." On the authority of Günther it is still believed by some ichthyologists that at least a part of Buchanan's collection exists in the British Museum. I, therefore, tried to trace the history of the Waterhouse collection so far as possible during my stay in London, and give below the results.

In 1877, Day could not trace any records either at the India House or anywhere else regarding the transfer of any of Buchanan's fish specimens from India to England. Day also examined the fishes in the British Museum believed to be the types of Buchanan's specimens and found that some of the labels on these fishes were in a handwriting very similar to that of Buchanan's manuscript and "identical with that on original drawings, which differs widely from that of Dr. Buchanan himself, as shown in his personally kept journal." Unfortunately Day's testimony regarding different types of handwritings is not very reliable but he has made the whole matter quite clear in his introduction to the "Fishes of India." Referring to Blyth he says on p. v: "He sent a number of fishes, personally collected, to Europe, and he informed me that he entertained no doubt that in the 'collection of Fishes from Bengal, believed to contain many typical specimens of Buchanan-

Hamilton's work, presented by G. R. Waterhouse, Esq.' to the British Museum, were some which had been sent by him to England. Having been permitted by Mr. Winter Jones to examine the register, I find the majority of the generic names under which they were received as *Ailia*, *Ambassis*, *Amblyopus*, *Apocryptes*, etc. were not invented until after Buchanan's death." I have examined some of the specimens believed to be the types of Buchanan's species (at least they are stated as such in Günther's *Catalogue*), but unfortunately the old labels are now missing and, I cannot, therefore, comment on the evidence regarding the handwriting on them. I have also examined the register in which Waterhouse's specimens are entered. In the register 168 specimens are entered as received on August 15, 1858, and Day's remark about the generic names under which these specimens are entered is absolutely correct. Mr. G. R. Waterhouse was at one time Curator of the Museum of the Zoological Society of London and it is conceivable that he sent to the British Museum a collection from there. I referred to the Secretary of the Zoological Society for information, but he was unfortunately unable to give any information on this point. In his letter he says: "I understand that there was a catalogue of the Museum collection, but it seems to have been handed over to the Museum when the Society handed over its set of type specimens. We have made from time to time a thorough search, but can find no trace of the catalogue in our archives." A thorough search was also made in the British Museum for the Catalogue but without success. At the present moment it is, therefore, impossible to be certain regarding the source of the Waterhouse collection, but I have no hesitation whatsoever in asserting that it contained no specimens from Buchanan's collection, even if any zoological collection was ever made by Buchanan.

The following statement by Sir David Prain in his *Life of Buchanan*, however, deserves consideration here: "Buchanan's period of residence at Puttahaat (Luckipur) was largely occupied in zoological research. He kept on his old artist to make drawings, chiefly of fishes. In some instances he was evidently unable to preserve his zoological specimens and had to be satisfied with drawings, but it appears that of some, if not all, the fishes, specimens were preserved in spirit." As this is the only clear statement about Buchanan having preserved fish specimens in spirit I requested Sir David Prain for the authority on which he based this remark. He has very kindly cleared the whole position to me in his letter dated August 22, 1928, where he writes: "I am afraid I cannot help with regard to the fish specimens; as you remark, I had gathered from Buchanan's own statements that in some instances he was unable to preserve his zoological specimens. But I was aware that the late Dr. Günther, who was a worker who weighed the words he used with some care had, in a letter addressed to the son of Dr. Buchanan, expressed the view that Buchanan was one of those who, in recording his observations described what he could see and nothing 'more or else.' It was this remark that led me to conclude that perhaps some if not all the fishes had been preserved. I am afraid my deduction was rash; Dr. Günther may have felt justified in saying what he did to Dr. Buchanan's son from a study of Buchanan's drawings and not from an examination of any fish specimens." Günther's remark to Sir David Prain refers above had nothing to do with the fish specimens but showed the great value of Buchanan's "Fishes of the Ganges" and the great reliance that can be placed on the observations contained therein "for it was the work of one who recorded in absolute truthfulness the results of his own observations and nothing more or else" (Prain, 1905, p. lx).

Reference may also be made to a foot-note on p. 134 of Gudger's paper in which he says : " Buchanan explains the absence of a list for Shahabad as due to the fact that while surveying that district he had no fixed abode (where specimens could be stored), and further that these fishes were the same as those found in Patna." What Buchanan wrote was this : " As I made no fixed residence in any part of the district, I had no opportunity of collecting an assortment of the fishes."<sup>1</sup> Buchanan's statement does not mean the lack of storage space as was surmised by Gudger, but only means that during the survey of the Shahabad District he did not stay at one place for a sufficiently long time to collect, examine and tabulate an assortment of fishes of this district. In any case I am of opinion that there is no indication in Buchanan's statement about his lacking opportunities for preserving fish specimens, which, as I have explained above, he never did even in the case of other districts. *In the absence of any authentic preserved material these drawings are of special interest, for they are the only indications we possess of the different species described by Buchanan.*

#### BUCHANAN'S DRAWINGS OF INDIAN FISH.

Gudger, in 1923, remarked : " Whether Buchanan had drawings made for every species of fish studied in Bengal is a matter of conjecture. But he certainly had great numbers made and it is equally certain that, while he made use of some, he did not have access to all." From a study of Buchanan's drawings it is clear that out of the 272 species described by him in the " Gangetic Fishes " drawings of 47 species were not made at all. The reasons for this omission are given in his work and may be summed up under three headings, (i) lack of opportunities, (ii) certain species resembled so closely some others, of which drawings were made, that there was no necessity for their delineations to be executed and lastly (iii) certain species or their close allies had already been figured by previous authors.

For example, of the very first species he says (p. 2) : " I always deferred taking a description, until I had an opportunity of having it drawn, and that opportunity never occurred." Again in the description of *Bola coibor* (p. 79) he writes : " I saw only one specimen, which was four feet in length ; but it is said to grow considerably larger. At the time, I omitted to take a full description. . . .and had no opportunity afterwards of supplying the omission." Obviously in these two cases Buchanan could not get the drawings made.

*Tetrodon gularis* (p. 10) is very like *T. caria* ; *Silurus duda* (p. 152) is like *S. canio* ; *Pimelodus sagor* (p. 169), *P. arius* (p. 170), *P. jatius* (p. 171), and *P. nenga* are all compared with *P. gagora* and only the few points of minor importance distinguishing them are given ; *Clupanodon cortius* (p. 249) resembles *C. manmina* so strongly that Buchanan " considered it unnecessary to mark anything but the specific character ;" *Clupanodon cagius* (p. 25) " very much resembles the *Chanpole* " ; *Cyprinus chedrio* (p. 268) is like *C. barila* ; both *C. acra* and *C. cura* (p. 284) show a great resemblance to *C. bata* ; *C. putitora* (p. 303) has a strong resemblance to *C. tor* and *C. mosal* ; *Cyprinus titius* (p. 315) is so like *C. ticto* that Buchanan " did not think it necessary to take a drawing or particular description of the

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<sup>1</sup> Day (Editor), The Fish and Fisheries of Bengal by Francis Buchanan (afterwards Hamilton) in Hunter's *A Statistical Account of Bengal*, XX, p. 93 (London : 1877).

Calcutta kind;" the form of *C. puntio* (p. 318) " is very similar to that of *Catla* "; *Cyprinus pausius* (p. 332) and *C. musiha* (p. 333) are like *C. morala* ; *C. solio* (p. 337) is like *C. borelio* and *C. mosario* (p. 346) differs very little from *C. latius*.

No drawings were prepared of such fishes which were even at that time well known to naturalists, for example, *Squalus pectinatus* (p. 5), *Muraena anguilla* (p. 22). In the case of certain other species, close allies of which had been figured in the then published accounts, for example, *Tetrodon tepla* (p. 11), *Syngnathus cuncalus* (p. 12), *Gobius septemradiatus* (p. 46), *G. tredecemradiatus* (p. 48), *Ophiocephalus chena* (p. 62), *Bola? coioides* (p. 84), *Chaetodon caris* (p. 125), *Pleuronectes nauphala* (p. 126), etc. no figures were made. It was probably on this account that Buchanan did not publish drawings of *Macrognathus armatus*, *Cyprinodon cundinga*, *Clupea purava*, *Mystus kaporat* and *Cyprinus sarana* in his " Gangetic Fishes," though he had drawings of these species with him. It is not, therefore, a matter of conjecture to say that, though Buchanan had drawings of a large number of the species studied by him prepared, he certainly did not draw every species of fish which he studied.

It may be mentioned here that there is a drawing of a species reproduced in the " Gangetic Fishes " (pl. v, fig. 5) which is not described anywhere in the text.

#### USE MADE OF BUCHANAN'S FISH-DRAWINGS.

As I have explained above, Buchanan had drawings of 225 species out of 272 described in the " Gangetic Fishes." His work, however, contains delineations of 97 species, while the figures of 3 others—*Cyprinus bendilisis* (p. 270), *C. ariza* (p. 286) and *C. curmuca* (p. 294)—were published in his *Mysore Journey*, Vol. III. This leaves a balance of 125 species of which Buchanan had the drawings made, but which he could not utilize at the time of publication of his work. It has been shown above that Buchanan was deprived of 144 drawings in 1815. In this collection there are 24 drawings which Buchanan had published in his " Gangetic Fishes." There are five drawings in the India Office library set which Buchanan purposely did not publish ; no other ichthyologist also had paid any attention to them. Of these 125 unpublished drawings 26 drawings were published by Gray in his *Illustrations of Indian Zoology*, in most cases without any acknowledgment as to their source. In Gray's work there are illustrations of 77 fishes and of these 28 are copies of Buchanan's drawings, two, namely *Cyprinus morar* and *C. morala*, being the same which Buchanan had already published in his " Gangetic Fishes" In 1839, McClelland directed attention to 20 of these figures but missed the following 8 species :—

Vol. I, pl. 95, fig. 5.	<i>Muraena bengalensis</i> Gray	= <i>Muraena maculata</i> ?, G. F., p. 23 (A. S. B. IV, 32).
Vol. I, pl. 97, fig. 2.	<i>Polynemus teria</i> Ham.	= <i>Polynemus teria</i> , G. F., p. 224 (A. S. B. IV, 82).
Vol. II, pl. 91, figs. 5, 6.	<i>Clupea champil</i>	= <i>Clupanodon manmina</i> , G. F., p. 247 (A. S. B. IV, 90).
Vol. II, pl. 91, figs. 3, 4.	<i>Clupea motius</i>	= <i>Clupanodon motius</i> , G. F., p. 251 (A. S. B. IV, 88).
Vol. II, pl. 91, figs. 7, 8.	<i>Corica soborni</i>	= <i>Coricu soborna</i> , G. F., p. 253 (A. S. B. IV, 87).
Vol. II, pl. 96, fig. 2.	<i>Chela alpar</i>	= <i>Cyprinus (Chela) alpar</i> , G. F., p. 259 (A. S. B. IV, 142).
Vol. II, pl. 96, fig. 3.	<i>Bengana elanga</i>	= <i>Cyprinus (Bangana) elanga</i> , G. F., p. 281 (A. S. B. IV, 103).
Vol. II, pl. 96, fig. 1.	<i>Tor hamiltonii</i>	= <i>Cyprinus (Cyprinus) tor</i> , G. F., p. 305 (A. S. B. IV, 121).

In directing public attention to Buchanan's drawings published in Gray's " *Illustrations* " McClelland observed : " Buchanan died in 1829. The work to which so much of his labour has been transferred was published in 1833, and although no descriptions of the

plates have yet appeared, it is no excuse for having suppressed the source from whence so many of them at least were derived, especially, when it was thought necessary to acknowledge the source of other figures in the same work" (p. 222). This and other remarks of McClelland regarding these "pirated" figures have excited considerable interest and attempts have been made on various occasions to show that no harm was intended to Buchanan by the publication of his figures. But the fact remains that they are there in the "*Illustrations*" without any word of acknowledgment. In the course of my researches I have found some fresh facts bearing on this subject and it seems worth while to record them here.

In the copy of McClelland's "Indian Cyprinidae," belonging to the library of the Zoological Department of the British Museum of Natural History, now kept in the "Fish Room," there is a signed note in Gray's handwriting below McClelland's remark on p. 220 to the following effect: "If anyone will take the trouble to consult the Hardwicke collection of Drawings in the British Museum he will find this statement is not correct. They are all quoted as Buchanan or rather Hamilton's and were copies made by Dr. Hamilton's own artist for General Hardwicke by Dr. Hamilton's permission." In 1845, Richardson made a similar statement (probably based on information supplied by Gray). He says that among the drawings of fish which Hardwicke procured there were "a considerable number copied from the drawings of Buchanan Hamilton, by that gentleman's consent, and by the same artists which he employed. This is mentioned because a charge of piracy has been made in the Calcutta Journal against General Hardwicke, who was, however, too high-minded to appropriate to himself the labours of others without due acknowledgment; and the careful references in his own writing, on the drawings of Buchanan Hamilton, show that he had no intention of claiming anything that belonged to that distinguished naturalist." Day, in 1878, wrote, "The late Dr. J. E. Gray observed (in a letter to myself, dated January 19th, 1872), 'Hamilton and Hardwicke were great friends, and he allowed his artist to make copies of all his fishes from Mysore and other drawings for General Hardwicke, in whose collection of drawings now in the Museum they are to be seen.'" I have very carefully scrutinised Hardwicke's drawings<sup>1</sup> of fishes in the British Museum. In the volumes containing the drawings of the soft-rayed and spinous-rayed fishes of India and China there are at least 127 copies of Buchanan's drawings. Of these only 19 are marked *M.H.B.*, evidently meaning MS. Hamilton Buchanan, and most of these bear a reference to the "Gangetic Fishes," as the names of the species are identical with those used by Hamilton

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<sup>1</sup> The drawings of Indian fishes in the Hardwicke Collection bequeathed to the British Museum are to be found in the undernoted volumes:

i. Drawings of the fishes of India and China. There are four volumes, two dealing with the soft-rayed and two with the spinous-rayed fishes. There are in all 813 drawings in these volumes including one set of the drawings of Chinese Fish done for J. Reeves. In addition there are a number of drawings of Indian Fish prepared for Hardwicke and at least 127 copies of Buchanan's drawings (*see table at the end*).

ii. One volume No. 10997 marked Drawings of Indian Fish contains delineations of 81 species. With the exception of a few all the drawings are tracings of the figures published by Buchanan in his "Gangetic Fishes." There seems no doubt that these tracings, which were made from the set of the MS. drawings now in the India Office Library as tracings of the 5 figures (p. 173) not published by Buchanan anywhere, are represented in this set (Nos. 70, 66, 64, 60, 6) and the vernacular names of the species, also copied from the MS. drawings, are noted on them. Drawing No. 59 is a copy of the drawing of *Mugil albula* ? in the A. S. B. set IV, 69. Similarly the drawing No. 80 is a copy of A. S. B. IV, 114 (*Cyprinus bata*). This was reproduced by Günther (*P. Z. S.*, p. 765, 1871). Drawing No. 79 is a copy of the A. S. B. I, 38 drawing (labelled *Cyprinus mrigala*, but differs from the published drawing of the species in the "Gangetic Fishes") which is not Buchanan's drawing (p. 174). Drawing 38 is labelled *Bootringy*, a vernacular name employed for

and he is also cited as the author of the species. All this information and a few other comments here and there are in Hardwicke's own handwriting and sometime the notes are initialled. In some cases, however, entries were also made by Günther on these manuscript draw-

*Barilius Barila.*

Legend below one of Buchanan's Drawings in Hardwicke's collection.

The upper portion—*Cyprinus Barila*, etc.—is in Hardwicke's handwriting, while the lower portion—*Barilius Barila*—is in Günther's handwriting.

ings, and for reference I reproduce a photograph of the legend of one of these figures showing entries in Hardwicke's and Günther's handwriting. On some a date is given and this shows that the drawings were executed sometime about September-October 1818, when Buchanan had no control over the Calcutta manuscript collection. Figures, such as 4. 4. 55, that were pointed out by me (1927, p. 100) as occurring on certain plates in Vol. I of the Asiatic Society's set, are also found on certain copies of Buchanan's drawings in Hardwicke's collection. Moreover in both these sets copies are to be found of certain drawings—*Mugil bongon*, *Cyprinus mrigala*, etc.—which, as shown above (p. 174) certainly did not form part of Buchanan's original collection. It is possible, therefore, that the copies in the Hardwicke collection are those that Hare was directed to prepare in 1816, as has been previously surmised by Prain (p. xlix). In his letters Buchanan makes no reference to Hardwicke at all, and it seems probable that Hardwicke was supplied with copies of Buchanan's drawings by Wallich.

It is to be regretted that in publishing these copies Gray in certain cases gave new names (taken from Buchanan's MS. vernacular names on the plates, as in *Clupea champil*), and in most cases though the outlines are correct the colouring differs materially from that of the originals.

McClelland, in 1839, published 45 drawings<sup>1</sup> out of Buchanan's collection with due acknowledgment; of these three had been previously published, 2—*Cobitis dario* and *C. geto*—in the " Gangetic Fishes " and 1—*Cyprinus atpar*—in the " Illustrations." McClelland described all the species he figured in his work except *Cyprinus dancena* which he could not identify from the drawing (see p. 175).

certain types of loaches. It appears to be a *Lepidocephalichthys*, but it is not a copy of any drawing in the A. S. B. collection. These drawings bear reference notes to the " Gangetic Fishes " in the handwriting of Hardwicke or Günther.

iii. A volume of " Miscellaneous drawings of Indian Animals " (Library No. 11009). This volume contains large sized drawings of 14 species of fish, but these delineations have nothing to do with Buchanan's drawings.

Günther in 1869 remarked that Buchanan's " drawings exist in triplicate, one copy being in the British Museum, where their free use is allowed." But later on in 1871 he found that " In the British Museum copy of those drawings (which he always believed to be complete) no such drawing (*C. chagunio*) exists, nor anything approaching *Barbus w. v. v. v.*" The copy referred to by Günther is evidently the same which is now present in the Hardwicke collection and as shown above it is by no means complete. Gray showed to Cuvier and Valenciennes this collection of Buchanan's drawings of fishes which are described but not figured in the " Gangetic Fishes." The third copy of which mention is made is probably the one now kept in the India Office Library and which contains the originals of the figures published in the " Gangetic Fishes," besides the 5 others noted above.

<sup>1</sup> For remarks on the drawing of *Cobitis scaturigina* refer to p. 174.

After the publication of McClelland's work there remained only 57 unpublished drawings in Buchanan's collection. Of these 2—*Chanda? setifer*, and *Cyprinus (Cabdio) gaganio*, were published by Day in his *Fishes of India* (pp. 97 and 579 respectively) and 1—*Cyprinus (Bangana) bata* (*P.Z.S.*, p. 765, 1871)—by Günther. Günther also reproduced the head and dorsal fin of *Cyprinus (Cyprinus) chagunio* (*P.Z.S.*, pp. 876, 877, 1872). Recently Prashad and Mukerji have reproduced the drawing of *Labrus daris* (*Rec. Ind. Mus.* XXXI, pl. vii, figs. 7, 7a). The drawing of *Cyprinus gonius* (*A.S.B.* IV, 123) is lost and no copy of it exists anywhere. The species, however, seems to be very much like *C. curchius* of which an illustration was published by Buchanan (pl. iv, fig. 82). The remaining 51 unpublished drawings together with the lateral view of *Cyprinus chagunio* are reproduced here to facilitate reference to Buchanan's species.

#### DAY'S WORK ON BUCHANAN'S MS. DRAWINGS.

Day in 1871 examined the drawings in the library of the Asiatic Society of Bengal and listed by number the drawings in the volume marked IV. He gave the unpublished names written on them by Buchanan and identified the drawings according to the determinations of the species in the "Gangetic Fishes" and the "Catalogue of Fishes in the British Museum." He also identified some of these drawings with the published figures in the "Gangetic Fishes," in Gray's "Illustrations," and in McClelland's "Indian Cyprinidae." On the drawings he placed the number used in his list and lastly he contributed a few notes of his own regarding the drawings. I have very carefully scrutinised Day's list and have found a few errors in the determinations of these drawings by checking Day's list with the help of the original notes on "Gangetic Fishes", in which the vernacular and MS. names of the species entered on the drawings are given. Notes on drawings Nos. 34, 53, 62, 63, 64, 70, 71 and 84 of this list have been given above (p. 174), while notes on the remaining species are published below. With the exception of these I agree with the identifications of Day.

Draw- ing No.	Name on the drawing.	Day's determination and remarks.	My identifications and page reference to "Gangetic Fishes."	REMARKS.
5	<i>Silurus kanipabda</i>	"Probably the omitted first species of <i>Callichrous</i> . P. spine serrated. Maxillary barbules reach the middle of the total length. Anal fin with about 63 rays."	<i>Silurus (Callichrous) canio</i> , p. 151.	Buchanan did not omit any species of <i>Callichrous</i> for his 1st, 2nd and 3rd species, etc., all refer to the species of the genus <i>Silurus</i> . <i>Kanipabda</i> is the local name of <i>S. canio</i> (see Buchanan's description of <i>S. canio</i> ).
11	<i>Pimelodes batasi</i>	<i>Pimelodus batasio</i> , H. B. " (quite different from pl. 23, f. 60, which is <i>P. carcio</i> , H. B., erroneously named <i>P. batasius</i> )." )	<i>Pimelodus batasio</i> , p. 179.	Day's presumption of Buchanan's published figure of <i>P. batasio</i> being a drawing of <i>P. carcio</i> is correct.
16	<i>Pimelodes auratus</i>	<i>Pimelodus nenga</i> , H. B.	<i>Pimelodus sona</i> , p. 172	In the original notes the specific name <i>auratus</i> is replaced by <i>sona</i> . <i>Sona Gagora</i> is recorded by Buchanan as the local name of the species.

Draw- ing No.	Name on the drawing.	Day's determination and remarks.	My identifications and page reference to "Gangetic Fishes."	REMARKS.
18	<i>Pimelodes telagra menoda</i>	"Published as <i>P. carsula</i> , H. B., pl. i, fig. 72 = <i>Macrones</i> ? B. M. Catal. = <i>Macrones trachacanthus</i> , C. and V."	<i>Pimelodus menoda</i> , p. 203	In the original notes the following vernacular names are given for this species <i>Telgogra</i> , <i>Gagor</i> and <i>Menoda</i> .
27	<i>Ophisurus rostratus</i>	"Perhaps <i>O. hijala</i> , H. B."	<i>Ophisurus hijala</i> , p. 20.	In the original notes <i>rostratus</i> is replaced by <i>hijala</i> . The figure published as <i>O. hijala</i> (pl. v, fig. 5) by Buchanan is that of an undescribed species.
35	<i>Squallus characias</i> ? Kamta	"This shark with a sharp nose was not described."	<i>Squalus carcharias</i> ?, p. 4.	In the original notes <i>Kamta</i> is replaced by <i>Carcharias</i> ? It is "Kampta of the Bengalese near Calcutta."
36	<i>Trichopodus beje</i>	" <i>T. colisa</i> H. B., pl. 15, fig. 40."	<i>Trichopodus bejeus</i> , p. 118.	The Ms. figure does not agree with the published figure referred to by Day. It is <i>Beje kholisha</i> of original notes.
65	....	<i>Raia fluviatilis</i> H. B.	<i>Raia sancur</i> , p. 2	Of <i>R. fluviatilis</i> Buchanan made no drawing, while the drawing of <i>R. sancur</i> "was commenced, but never finished." This is the reason why the drawing bears no name.
66	<i>Katchanda</i>	<i>Chanda</i> ? <i>setifer</i> H. B.	<i>Chanda</i> ? <i>setifer</i> , p. 105	In the original notes <i>Katchanda</i> is given as the Calcutta local name of <i>Chanda lala</i> , while the name of <i>Chanda</i> ? <i>setifer</i> is <i>Bazar Chanda</i> at Calcutta. On the original figure of <i>C. lala</i> published in the "Gangetic Fishes" (pl. xxi, fig. 39) the name <i>Kaat Chaandao</i> occurs. On drawing No. 66 <i>Katchanda</i> is written in pencil and this is in the hand-writing of the transcriber of Buchanan's notes. In spite of this discrepancy in the local names I agree with Day's determination of this figure.
81	<i>Polynemus paradiseus</i>	....	<i>Polynemus toposui</i> , p. 232.	In the original notes <i>paradiseus</i> is replaced by <i>toposui</i> .
89	<i>Clupanodon Chapra</i>	<i>Clupanodon chapra</i> H. B. "The drawing is reproduced in the Illustrations of Indian Zoology under the name <i>C. Indica</i> , and = <i>Clupea Indica</i> , Gray, B. M. Catalogue."	<i>Clupanodon chapra</i> , p. 248	This drawing is reproduced in the "Illustrations" as <i>Alosa chapra</i> (Vol. II, pl. xcii, fig. 2). The drawing of <i>Clupanodon indica</i> Gray is not a copy of any of Buchanan's drawings.
90	<i>Clupanodon champil</i>	"Apparently not described."	<i>Clupanodon manmina</i> , p. 247.	In the original notes <i>Champil</i> is replaced by <i>Mannina</i> . The drawing is reproduced under the Ms. name <i>Champil</i> in the "Illustrations" (Vol. II, pl. xci, figs. 5 and 6).
92	<i>Mystus ramcarati</i>	<i>Mystus ramcarati</i> H. B. "reproduced Ill. Ind. Zool."	<i>Mystus ramcarati</i> , p. 233.	This drawing is not reproduced in the "Illustrations" though a copy of it occurs in Hardwicke's Collection. Day seems to have confused it with <i>Engraulis (Coilia) hamiltoni</i> Gray (Vol. I, pl. lxxxv, fig. 3), the original of which has the following note in Hardwicke's own hand-writing: "Doubtful—In part agrees with Hamilton's <i>Mystus Ramcarati</i> ."

Draw- ing No.	Name on the drawing.	Day's determination and remarks.	My identifications and page reference to "Gangetic Fishes."	REMARKS.
93	<i>Labrus darki</i>	<i>Labrus badis</i> H. B.	<i>Labrus dario</i> , p. 72	In the original notes <i>Darhi</i> and <i>Daris</i> are the specific names mentioned for the species described as <i>L. dario</i> . <i>L. badis</i> is figured by Buchanan (pl. xxv, fig. 23).
94	<i>Tetradon Kariya Phoksa</i>	<i>Tetrodon cutcutia</i> H. B.	<i>Tetrodon caria</i> , p. 9.	In the original notes <i>Kariya Phoksa</i> is the local name given for <i>T. caria</i> and Day's identification of this as <i>T. cutcutia</i> is wrong; the latter was figured by Buchanan (pl. xviii, fig. 3) and its local name is <i>kotkotiya</i> .
95	<i>Esox angulatus</i>	"not <i>E. ectuntio</i> H. B."	<i>Esox ectuntio</i> , p. 212.	In the original notes the Ms. name <i>angulatus</i> occurs along with <i>ectuntio</i> .
104	<i>Cyprinus bukrangi</i>	<i>Cyprinus morar</i> H. B. ?	<i>Cyprinus (Cabdio) borelio</i> , p. 336.	In the original notes <i>Bukrangi</i> is mentioned as the Goalpara & Dacca name of <i>C. borelius</i> .
117	<i>Cyprinus bangana</i>	"It appears to be <i>Cirrhina reba</i> H. B."	<i>Cyprinus (Bangana) reba</i> , p. 280.	In the original notes <i>Bangana</i> is given as the local name of <i>C. reba</i> at "Gualpara" (Goalpara).
128	<i>Cyprinus bimaculatus</i>	<i>Cyprinus titius</i> H. B.	<i>Cyprinus (Puntius) tictis</i> , p. 316.	Of <i>C. titius</i> no drawing was made by Buchanan (p. 315), whereas a drawing of <i>C. tictis</i> was prepared but he took no notes about the species.
137	<i>Cyprinus phakra</i>	<i>Cyprinus vagra</i> , H. B.	<i>Cyprinus (Barilius) shacra</i> , p. 271.	<i>Shacra</i> is a misprint for <i>Phacra</i> , the name occurs both in the original notes and in the Ms. of the "Gangetic Fishes."

TABLE SHOWING DETAILS REGARDING BUCHANAN'S MS. AND PUBLISHED DRAWINGS.

In the following table I give full particulars regarding the figures of the various species described or mentioned in the "Gangetic Fishes."

No.	BUCHANAN'S "GANGETIC FISHES."		Reference to Buchanan's Ms. drawings that have already been reproduced.	Buchanan's Ms. drawings reproduced here.	Ms. drawings in the A. S. B. collection. Originals and copies. Miscellaneous drawings.	COPIES OF BUCHANAN'S MS. DRAWINGS IN BRIT. MUS., LONDON.	
	Name.	Page and plate reference.				Soft-rayed.	Spinous-rayed.
1	<i>Raia fluviatilis</i>	P. 1.					
2	" <i>sancur</i>	P. 2.					
3	<i>Squalus carcharias</i> ?	P. 4.					
4	" <i>pectinatus</i>	P. 5.					
5	<i>Tetrodon fluviatilis</i>	P. 6, pl. xxx, fig. 1.					
6	" <i>patoca</i> .	P. 7, pl. xviii, fig. 2.					
7	" <i>cutcutia</i>	P. 8, pl. xviii, fig. 3.					
8	" <i>caria</i>	P. 9.		Pl. xvi, figs. 2 & 3.	IV 94.		
9	" <i>gularis</i>	P. 10.					
10	" <i>tepa</i>	P. 10.					

TABLE SHOWING DETAILS REGARDING BUCHANAN'S MS. AND PUBLISHED DRAWINGS—*contd.*

No.	BUCHANAN'S "GANGETIC FISHES."		Reference to Buchanan's Ms. drawings that have already been reproduced.	Buchanan's Ms. drawings reproduced here.	Ms. drawings in the A. S. B. collection. Originals and copies. Miscellaneous drawings.	COPIES OF BUCHANAN'S MS. DRAWINGS IN BRIT. MUS., LONDON.	
	Name.	Page and plate reference.				Soft-rayed.	Spinous-rayed.
11	<i>Syngnathus cuncalus</i>	P. 12.					
12	" <i>carce</i>	P. 13.	Gray I, pl. lxxxix, fig. 1.		IV 79.		
13	" <i>deocata</i>	P. 14.	Gray I, pl. lxxxix, fig. 4.		IV 80.		
14	<i>Unibranchapertura cuchia</i>	P. 16, pl. xvi, fig. 4.					
15	<i>Muraenophis sathete</i>	P. 17.		Pl. xiv, fig. 3.	IV 31; I 42.	308	
16	" <i>tile</i> .	P. 18.		Pl. xv, fig. 3.	IV 30; I 41.	309	
17	<i>Ophisurus lialala</i>	P. 20.		Pl. xiv, fig. 2.	IV 27; I 9.	299	
18	" <i>boro</i>	P. 20.	Gray I, pl. xcv, figs. 1, 2a.		IV 26; I 43.	301	
19	" <i>harancha</i>	P. 21.	Gray I, pl. xcv, fig. 2.		IV 28; I 17.	302	
20	<i>Muraena anguilla</i>	P. 22.					
21	" <i>maculata</i> ?	P. 23.	Gray I, pl. xcv, fig. 5.		IV 32; I 8.	289	
22	" <i>comos</i> .	P. 24.					
23	" <i>bagio</i>	P. 24.		Pl. xiv, fig. 1.	IV 29; I 21.		
24	" <i>rañaborua</i>	P. 25.	Gray I, pl. xcv, figs. 4, 1a.		IV 33.	298	
25	<i>Macroglyphus armatus</i>	P. 28, pl. xxxvii, fig. 6.					
26	" <i>aculeatus</i>	P. 29.		Pl. xiv, fig. 4.	I. O. L. 100.		
27	" <i>pancalus</i>	P. 30, pl. xxii, fig. 7.					
28	<i>Trichiurus lepturus</i>	P. 31.		Pl. xviii, fig. 1.	IV 77.		18
29	<i>Cynoglossus lingua</i>	P. 32.		Pl. xv, figs. 1 & 2.	IV 41; I 40.		
30*	<i>Batrachoides gangene</i>	P. 34, pl. xiv, fig. 8.			IV 85.		297
31	<i>Gobioides rubicundus</i>	P. 37, pl. v, fig. 9.					
32	" <i>ruber</i>	P. 38.		Pl. xviii, fig. 2.	IV 76.		284
33	<i>Gobius bato</i>	P. 40, pl. xxxvii, fig. 10.					
34	" <i>changua</i> .	P. 41, pl. v, fig. 10.					
35	" <i>viridis</i>	P. 42, pl. xxxii, fig. 12.					
36	" <i>plinianus</i>	P. 45, pl. xxxv, fig. 13.					
37	" <i>septemradiatus</i> .	P. 46.					
38	" <i>novemradiatus</i>	P. 47, pl. ii, fig. 14.					
39	" <i>tredecemradiatus</i>	P. 48.					
40	" <i>gutum</i>	P. 50.		Pl. xiv, fig. 7.	IV 74.		272
41	" <i>giuris</i>	P. 51, pl. xxxiii, fig. 15.					
42	" <i>sadanundio</i>	P. 52.		Pl. xviii, fig. 3.	IV 78.		271
43	" <i>chumo</i>	P. 53.		Pl. xiv, fig. 6.	IV 72.		273
44	" <i>nunus</i>	P. 54.		Pl. xiv, fig. 5.	IV 75.		274
45	<i>Cheilodipterus culius</i>	P. 55, pl. v, fig. 16.					
46	" <i>butis</i>	P. 57.	Gray II, pl. xciii, fig. 3.		IV 78; I 23.		270
47	" <i>panijus</i>	P. 57.		Pl. xx, fig. 6.	I 33.		79
48	<i>Ophiocephalus wrahl</i> ?	P. 60, pl. xxxi, fig. 17			IV 61; I 19.		262
49	" <i>chena</i>	P. 62.					
50	" <i>lata</i>	P. 63, pl. xxxiv, fig. 18.					
51	" <i>marulius</i>	P. 65, pl. xvii, fig. 19.					
52*	" <i>barca</i>	P. 67, pl. xxxv, fig. 20.			IV 50; I 40.		263
53	" <i>gachua</i>	P. 68, pl. xxi, fig. 21.					

TABLE SHOWING DETAILS REGARDING BUCHANAN'S MS. AND PUBLISHED DRAWINGS—*contd.*

No.	BUCHANAN'S "GANGETIC FISHES."		Reference to Buchanan's Ms. drawings that have already been reproduced.	Buchanan's Ms. drawings reproduced here.	Ms. drawings in the A. S. B. collection. Originals and copies. Miscellaneous drawings.	COPIES OF BUCHANAN'S MS. DRAWINGS IN BRIT. MUS., LONDON.	
	Name.	Page and plate reference.				Soft-rayed.	Spinous-rayed.
54*	<i>Ophiocephalus aurantiacus</i>	P. 69, pl. xxiii, fig. 22.			IV 60.		254
55	<i>Labrus badis</i>	P. 70, pl. xxv, fig. 23.					
56	" <i>dario</i>	P. 72.	Prashad & Mukerji, <i>Rec. Ind. Mus.</i> , xxxi (3), pl. vii, figs. 7, 7a.		IV 93.		238
57	<i>Bola coitor</i>	P. 75, pl. xxvii, fig. 24.					
58	" <i>chaptis</i>	P. 77, pl. x, fig. 25.					
59	" <i>coibor</i>	P. 78.					
60	" <i>pama</i>	P. 78, pl. xxxii, fig. 26.					
61	" <i>cuja</i>	P. 81, pl. xii, fig. 27.					
62	" ? <i>coioides</i>	P. 82.					
63	<i>Coius vacti</i>	P. 86, pl. xvi, fig. 28.					
64	" <i>datnia</i>	P. 88, pl. ix, fig. 29.					
65	" <i>catus</i>	P. 90, pl. xxxviii, fig. 30.					
66	" <i>trivittatus</i>	P. 92.	Gray II, pl. lxxxviii, fig. 1.		IV 67.		
67	" <i>gudgutia</i>	P. 94.					
68	" <i>polota</i>	P. 95, pl. xxxviii, fig. 31.					
69	" <i>nandus</i>	P. 96, pl. xxx, fig. 32.					
70	" <i>cobojius</i>	P. 98, pl. xlii, fig. 33.					
71	" <i>chatareus</i>	P. 101, pl. xiv, fig. 34.					
72	<i>Chanda ? setifer</i>	P. 105.	Day, <i>Fish. India</i> , p. 97.		IV 66.		116
73	" <i>ruconius</i>	P. 106, pl. xii, fig. 35.					
74	" <i>nalua</i>	P. 107, pl. vi, fig. 36.					
75	" <i>nama</i>	P. 109, pl. xxxix, fig. 37.					
76	" <i>phula</i>	P. 111.		Pl. xx, fig. 1.	IV 1.		10
77	" <i>bogoda</i> .	P. 111.		Pl. xx, fig. 3.	IV 3.		11
78	" <i>baculis</i>	P. 112.		Pl. xx, fig. 7.	IV 2.		12
79	" <i>ranga</i>	P. 113, pl. xvi, fig. 38.					
80	" <i>lala</i>	P. 114, pl. xxi, fig. 39.					
81	<i>Trichopodus colisa</i>	P. 117, pl. xv, fig. 40.					
82	" <i>bejens</i>	P. 118.		Pl. xix, fig. 1.	IV 36.		243
83	" <i>cotra</i>	P. 119.		Pl. xx, fig. 4.	IV 40.		245
84	" <i>lalius</i>	P. 120.		Pl. xix, fig. 5.	IV 37.		244
85	" <i>sota</i>	P. 120.		Pl. xix, fig. 6.	IV 39.		241
86	" <i>chuna</i>	P. 121.		Pl. xix, fig. 4.	IV 38.		247
87	<i>Chaetodon paratalius</i>	P. 122, pl. xiv, fig. 41.					170
88	" <i>caris</i>	P. 125.					
89	<i>Pleuronectes nauphala</i>	P. 126.					
90	" <i>arsius</i>	P. 128.		Pl. xvii, figs. 1 & 2.	IV 43.	258	
91	" <i>pan</i>	P. 130, pl. xxiv, fig. 42.					
92	<i>Achirus cynoglossus</i>	P. 132.		Pl. xix, figs. 2 & 3.	IV 42 ; I 44.	279	
93	<i>Calliomorus chaca</i>	P. 133.	Gray II, pl. xciii, fig. 2.		IV 86 ; I 6.		111
94	<i>Platystacus chaca</i>	P. 140, pl. xxviii, fig. 43.			IV 4 ; I 45.	202	

TABLE SHOWING DETAILS REGARDING BUCHANAN'S MS. AND PUBLISHED DRAWINGS—*contd.*

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	Name.	Page and plate reference.				Soft-rayed.	Spinous-rayed.
95	<i>Plotosus canius</i>	P. 142, pl. xv, fig. 44.					
96	<i>Macropteronotus jagur</i>	P. 145.					
97	" <i>magur</i>	P. 146, pl. xxvi, fig. 45.					
98	<i>Silurus singio</i>	P. 147, pl. xxxvii, fig. 46.					
99	<i>Silurus (Callichrous) pabda</i>	P. 150, pl. xxv, fig. 47.					
100	" " <i>canio</i>	P. 151.		Pl. xx, fig. 5.	IV 5.	138	
101	" " <i>duda</i>	P. 152.					
102	" " <i>chechra</i>	P. 152.					
103*	" " <i>pabo</i>	P. 153, pl. xxii, fig. 48.			IV 6 ; I 14.	140	
104	" " <i>boalis</i>	P. 154, pl. xxix, fig. 49.					
105	" " <i>garua</i>	P. 156, pl. xxi, fig. 50.					
106	<i>Malapterurus coila</i>	P. 158.	Gray I, pl. lxxxv, fig. 2.		IV 7.	153	
107	<i>Ageneiosus mino</i>	P. 159.					
108	<i>Pimelodus sionda</i>	P. 160, pl. vii, fig. 50.					
109	" <i>chandramara</i>	P. 162.		Pl. xxi, fig. 6.	IV 13.	182	
110	" <i>pangasius</i>	P. 163, pl. xxxiii, fig. 52.					
111	" <i>rita</i>	P. 165, pls. xxiv & xxv, fig. 53.					
112	" <i>gagora</i>	P. 167, pl. x, fig. 54.					
113	" <i>sagor</i>	P. 169.					
114	" <i>arius</i>	P. 170.					
115	" <i>jatius</i>	P. 171.					
116	" <i>nenga</i>	P. 171.					
117	" <i>sona</i>	P. 172.		Pl. xix, fig. 7.	IV 16 ; I 11.	176	
118*	" <i>viridescens</i>	P. 173, pl. xi, fig. 56.			IV 23.	157	
119	" <i>cenia</i>	P. 174, pl. xxxi, fig. 57.			IV 20.	187	
120	" <i>rama</i>	P. 176, pl. iii, fig. 55.			IV 25 ; I 34.	189	
121*	" <i>tengana</i>	P. 176, pl. xxxix, fig. 58.			IV 19.		
122	" <i>urua</i>	P. 177.		Pl. xxi, fig. 4.	IV 15.	177	
123	" <i>datasio</i>	P. 179.		Pl. xxii, fig. 3.	IV 11.	158	
124	" <i>angius</i>	P. 180, pl. xxix, fig. 59.					
125	" <i>carcio</i>	P. 181, pl. xxiii, fig. 60.			IV 22.	191	
126	" <i>tengara</i>	P. 183, pl. iii, fig. 61.				192.	
127	" <i>telchitta</i>	P. 185.		Pl. xxi, fig. 3.	IV 10.	190	
128	" <i>bagarius</i>	P. 186, pl. vii, fig. 62.					
129	" <i>cavia</i>	P. 188.					
130	" <i>hara</i>	P. 190.		Pl. xxi, fig. 5.	IV 12.	185	
131	" <i>conta</i>	P. 191.		Pl. xxi, fig. 8.	IV 17.	186	
132	" <i>botius</i>	P. 192.					
133*	" <i>nangra</i>	P. 193, pl. xi, fig. 63.			IV 24.	188	
134	" <i>murius</i>	P. 195.		Pl. xxii, fig. 2.	IV 14 ; I 20.	155	
135	" <i>vacha</i>	P. 196, pl. xix, fig. 64.					
136	" <i>gagata</i>	P. 197, pl. xxxix, fig. 65.					

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	Name.	Page and plate reference.				Soft-rayed.	Spinous-rayed.
137	<i>Pimelodus mangois</i>	P. 199.		Pl. xxii, fig. 4.	IV 9.	193	
138	" <i>gultio</i>	P. 201, pl. xxiii, fig. 66.					
139*	" <i>menoda</i>	P. 203, pl. i, fig. 72.			IV 18 ; I 22.	181	
140	" <i>cavasius</i>	P. 203, pl. xi, fig. 67.			IV 21.	160	
141	" <i>aor</i>	P. 205, pl. xx, fig. 68.					
142	<i>Sisor raddophorus</i>	P. 208.	Gray I, pl. lxxxiv, fig. 1.		IV 8 ; I 10.	194	
143	<i>Osmerus ? nehereus</i>	P. 209.					
144	<i>Esox panchax</i>	P. 211, pl. iii, fig. 69.					
145	" <i>ectuntio</i>	P. 212.		Pl. xxi, fig. 1.	IV 95.	130	
146	" <i>cancila</i>	P. 213, pl. xxvii, fig. 70.					
147	<i>Mugil parsia</i>	P. 215, pl. xvii, fig. 71.					
148	" <i>cascasia</i>	P. 217.		Pl. xxiii, fig. 3.	IV 68.		267
149	" <i>albula ?</i>	P. 218.		Pl. xxii, fig. 1.	IV 69 ; I 85.		
150	" <i>cephalus ?</i>	P. 219.					
151	" <i>corsula</i>	P. 221, pl. ix, fig. 97.					
152	<i>Atherina danius</i>	P. 222.		Pl. xxiii, fig. 7.	IV 91.		53
153	<i>Polynemus teria</i>	P. 224.	Gray I, pl. xcii, fig. 2.		IV 82 ; I 30.		92
154	" <i>sele</i>	P. 226.		Pl. xvii, fig. 4.	IV 83 ; I 48.		94
155	" <i>risua</i>	P. 228.					
156	" <i>toposui</i>	P. 232.		Pl. xvi, fig. 1.	IV 81.		
157	" <i>aureus</i>	P. 232.					
158	<i>Mystus ramearati</i>	P. 233.		Pl. xxi, fig. 2.	IV 92 ; I 13.	250	
159	" <i>kapirat</i>	P. 235.		Pl. xxiii, fig. 1.	I. O. L. 103.		
160	" <i>chitala</i>	P. 236.	Gray I, pl. xci, fig. 1.		I 27.	245	
161	<i>Clupea purava</i>	P. 238.		Pl. xvii, fig. 3.	I. O. L. 102.		
162	" <i>phasa</i>	P. 240.					
163	" <i>telara</i>	P. 241, pl. ii, fig. 72.					
164	<i>Clupanodon ilisha</i>	P. 243, pl. xix, figs. 73 (75).					
165	" <i>chacunda</i>	P. 246.					
166	" <i>manmina</i>	P. 247.	Gray II, pl. xci, figs. 5, 6.		IV 90.	215	
167	" <i>chapra</i>	P. 248.	Gray II, pl. xcii, fig. 2.		IV 89.	218	
168	" <i>cortius</i>	P. 249.					
169	" <i>chanpole</i>	P. 249, pl. xviii, fig. 74.					
170	" <i>cugiis</i>	P. 250.					
171	" <i>motius</i>	P. 251.	Gray II, pl. xci, figs. 3, 4.		IV 88.	217	
172	<i>Coriaca soborna</i>	P. 253.	Gray II, pl. xci, figs. 7, 8.		IV 87.	229	
173	<i>Cyprinodon cundinga</i>	P. 254.		Pl. xviii, fig. 4.	I. O. L. 101.		
174	<i>Cyprinus (Chela) cachiis</i>	P. 258.	McClelland, pl. xlvi, fig. 6.		IV 145.	73	
175	" " <i>atpar</i>	P. 259.	Gray II, pl. xcvi, fig. 2.		IV 142 ; I 24.	74	
176	" " <i>laubuca</i>	P. 260.	McClelland, pl. xlvi, fig. 4.				
176	" " <i>laubuca</i>	P. 260.	McClelland, pl. xiv, fig. 4 (10).		IV 139.	47	
177	" " <i>phulo</i>	P. 262.	McClelland, pl. xlviii, fig. 10.		IV 130.	43	
178	" " <i>gora</i>	P. 263.	Gray II, pl. xcv, fig. 2.		IV 146 (missing) ; I 2.		
179*	" " <i>morar</i>	P. 264, pl. xxxi, fig. 75.	Gray II, pl. xcvi, fig. 1.		IV 113.	38	

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	Name.	Page and plate reference.				Soft-rayed.	Spinous-rayed.
180	<i>Cyprinus (Chela) bacaila</i>	P. 265, pl. viii, fig. 76.					
181	" ( <i>Barilius</i> ) <i>barila</i>	P. 267.	McClelland, pl. xviii, fig. 8.		IV 134.	49	
182	" " <i>chedrio</i> .	P. 268.					
183	" " <i>barna</i>	P. 268.	McClelland, pl. xviii, fig. 9.		IV 138.	50	
184	" " <i>vagra</i>	P. 269.	McClelland, pl. lvi, fig. 1.		IV 100.	44	
185	" " <i>bendilisis</i>	P. 270.	Buchanan, M. J. III, pl. xxxii.				
186	" " <i>shacra</i>	P. 271.	McClelland, pl. lvi, fig. 5.		IV 137.	82	
187*	" " <i>cocsa</i>	P. 272, pl. iii, fig. 77.			IV 112; I 50.	84	
188	" " <i>chedra</i>	P. 273.	Gray I, pl. lxxxvii, fig. 3.		IV 111.	75	
189	" " <i>tita</i>	P. 274.					
190	" " <i>bola</i>	P. 274.	McClelland, pl. xviii, fig. 5.		IV 131.	48	
191	" " <i>goha</i>	P. 275.	Gray I, pl. lxxxvi, fig. 2.		IV 126; I 32.	53	
192	" " <i>tileo</i>	P. 276.	Gray I, pl. xciv, fig. 1.		IV 125.	37	
193*	" ( <i>Bangana</i> ) <i>dero</i>	P. 277, pl. xxii, fig. 78.			IV 108.		
194	" " <i>mrigala</i>	P. 279, pl. vi, fig. 79.			IV 109; I 28.	91	
195	" " <i>reba</i>	P. 280.	McClelland, pl. lviii, fig. 1.		IV 117; I 25.	90	
196	" " <i>elanga</i> .	P. 281.	Gray II, pl. xcvi, fig. 3.		IV 103; I 31.	39	
197	" " <i>bata</i>	P. 283.	Günther, P. Z. S., 1871, p. 765.		IV 114; I 5.	35	
198	" " <i>acra</i>	P. 284.					
199	" " <i>cura</i>	P. 284.					
200	" " <i>pangusia</i>	P. 285.	McClelland, pl. xlii, fig. 1.		IV 116.	51	
201	" " <i>ariza</i>	P. 286.	Buchanan, M. J. III, pl. xxxi.				
202	" " <i>boga</i>	P. 286, pl. xxviii, fig. 80.			IV 115; I 16.		
203	" ( <i>Cyprinus</i> ) <i>catta</i>	P. 287, pl. xlii, fig. 81.			L. S. I.		
204*	" " <i>curchius</i>	P. 289, pl. iv, fig. 82.			I 15.		
205	" " <i>cursa</i>	P. 290.	McClelland, pl. xxxviii, fig. 2.		IV 124; I 1.	19, 20	
206	" " <i>cursis</i>	P. 292.		Pl. xxii, figs. 5 & 6.	IV 119; I 37.	76	
207	" " <i>gonius</i> .	P. 292.			IV 123 (missing).		
208	" " <i>curmuca</i>	P. 294.	Buchanan, M. J. III, pl. xxx.				
209	" " <i>chagunio</i>	P. 295.	Günther, P. Z. S., 1872, pp. 876, 877 (head and dorsal fin only).	Pl. xxi, fig. 7.	I 39.		
210	" " <i>calbasu</i>	P. 297, pl. ii, fig. 83 (83).			L. S. 2.		
211	" " <i>nancar</i>	P. 299.					
212*	" " <i>nandina</i>	P. 300, pl. viii, fig. 84.			IV 120; I 26.	77	
213	" " <i>rohita</i>	P. 301, pl. xxxvi, fig. 85.					
214	" " <i>putitora</i>	P. 303.					
215	" " <i>tor</i>	P. 305.	Gray II, pl. xcvi, fig. 1.		IV 121; 125a	80	
216	" " <i>mosal</i>	P. 306.	Gray I, pl. xciii, fig. 1.		IV 122; I 29.	85	
217	" " <i>savana</i>	P. 307.		Pl. xxiii, fig. 5.	I. O. L. 104.		
218	" ( <i>Puntius</i> ) <i>sophore</i>	P. 310, pl. xix, fig. 86.			L. S. 3.		
219	" " <i>chola</i>	P. 312.	McClelland, pl. lviii, fig. 3.		Missing.		
220	" " <i>terio</i>	P. 313.	McClelland, pl. xlii, fig. 7.		IV 97.	58	
221	" " <i>ticlo</i>	P. 314, pl. viii, fig. 87.			L. S. 4.		
222	" " <i>titius</i>	P. 315.					
223	" " <i>tictis</i>	P. 316.		Pl. xxiii, fig. 6.	IV 128.	60	

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	Name.	Page and plate reference.				Soft-rayed.	Spinous-rayed.
224	<i>Cyprinus (Puntius) joalius</i>	P. 316.	McClelland, pl. xlii, fig. 6.		IV 99.	86	
225	" "	P. 317.	McClelland, pl. xlii, fig. 4.		IV 98.	61	
226	" "	P. 317.	McClelland, pl. xlii, fig. 8.		IV 96.	59	
227	" "	P. 318.					
228	" "	P. 319.	McClelland, pl. xlii, fig. 2.		IV 129.	52	
229	" "	P. 320.	McClelland, pl. xlii, fig. 4.		IV 133.	57 <sup>^</sup>	
230	" "	P. 320.	McClelland, pl. xlii, fig. 6.		IV 127.	41	
231	" ( <i>Danio</i> ) <i>dangila</i> .	P. 321.	McClelland, pl. xlii, fig. 1 (7).		IV 140; I 12.	78	
232	" "	P. 323.	McClelland, pl. xlii, fig. 1.		IV 144.	87	
233	" "	P. 324.					
234	" "	P. 325, pl. xvi, fig. 88.					
235	" "	P. 326.	McClelland, pl. xlii, fig. 2.		IV 141.		
236	" "	P. 327.	McClelland, pl. xlii, fig. 3.		IV 143.	88	
237	" "	P. 327, pl. xv, fig. 89.			L. S. 5.		
238	" "	P. 328.		Pl. xxvii, fig. 2.	IV 136.	56	
239	" "	P. 329, pl. ii, fig. 90.			L. S. 6.		
240	" "	P. 331.	Gray I, pl. lxxxvi, fig. 1.		IV 118; I 18.	89	
241	" ( <i>Morulius</i> ) <i>moralis</i>	P. 331, pl. xviii, fig. 91.	Gray I, pl. xciii, fig. 2.		IV 110.	83	
242	" "	P. 332.					
243	" "	P. 333.					
244	" ( <i>Cabdio</i> ) <i>jaya</i>	P. 333.	McClelland, pl. lvi, fig. 2.		IV 135.	55	
245	" "	P. 334, pl. xxxviii, fig. 92.			L. S. 7.		
246	" "	P. 336.					
247	" "	P. 336.		Pl. xxliii, fig. 4.	IV 104.	46	
248	" "	P. 337.					
249	" "	P. 338.	McClelland, pl. xlii, fig. 9.		IV 132.	62	
250	" "	P. 338.	Day, <i>Fish. India</i> , p. 579.		IV 101.		
251	" "	P. 339, pl. xxxix, fig. 93.			L. S. 8.	42	
252	" "	P. 341, pl. vi, fig. 94.			L. S. 9.		
253	" "	P. 342.	McClelland, pl. iv, fig. 4.		Missing.	45	
254	" ( <i>Garra</i> ) <i>lamta</i>	P. 343.	McClelland, pl. xliii, fig. 2.		IV 105.	81	
255	" "	P. 344.	McClelland, pl. xliii, fig. 3.		IV 106.	79	
256	" "	P. 345.	McClelland, pl. xliii, fig. 7.		IV 102.		
257	" "	P. 346.	McClelland, pl. xliii, fig. 6.		IV 107.		
258	" "	P. 346.					
259	" "	P. 347.	McClelland, pl. i, fig. 1.		IV 45.	108	
260	" "	P. 348.	McClelland, pl. i, fig. 2.		IV 44.	54	
261	<i>Cobitis</i> <i>botia</i>	P. 350.	McClelland, pl. ii, fig. 4.		IV 50.	123 (lower).	
262	" <i>gongota</i>	P. 351.	McClelland, pl. ii, fig. 1.		IV 55.	122	
263	" <i>cucura</i>	P. 352.	McClelland, pl. ii, fig. 2.		IV 57.	125 (upper).	
264	" <i>guntea</i>	P. 353.	McClelland, pl. ii, fig. 3.		IV 58.	126	
265*	" <i>darjo</i>	P. 354, pl. xxix, fig. 95.	McClelland, pl. lxi, fig. 8.		IV 47.	115	
266	" <i>pangiu</i>	P. 355.	McClelland, pl. ii, fig. 5.		IV 51.	128	
267*	" <i>gelo</i>	P. 355, pl. xi, fig. 96.	McClelland, pl. lxi, fig. 9.		IV 46.	114	

TABLE SHOWING DETAILS REGARDING BUCHANAN'S MS. AND PUBLISHED DRAWINGS—*concl'd.*

No.	BUCHANAN'S " GANGETIC FISHES ".		Reference to Buchanan's Ms. drawings that have already been reproduced.	Buchanan's Ms. drawings reproduced here.	Ms. drawings in the A. S. B. collection. Originals and copies. Miscellaneous drawings.	COPIES OF BUCHANAN'S MS. DRAWINGS IN BRIT. MUS., LONDON.	
	Name.	Page and plate reference.				Soft-rayed.	Spinous-rayed.
268	<i>Cobitis balgara</i>	P. 356.	McClelland, pl. liii, fig. 2.		IV 56.	127 (lower).	
269	„ <i>savona</i>	P. 357.	McClelland, pl. liii, fig. 3.		IV 54.	125 (lower).	
270	„ <i>turio</i>	P. 358.	McClelland, pl. lii, fig. 7.		IV 48.	124 (lower).	
271	„ <i>bilturio</i>	P. 358.	McClelland, pl. li, fig. 6.		IV 49.	124 (upper).	
272	„ <i>corica</i>	P. 359.	McClelland, pl. liii, fig. 4.		IV 52.	127 (upper).	

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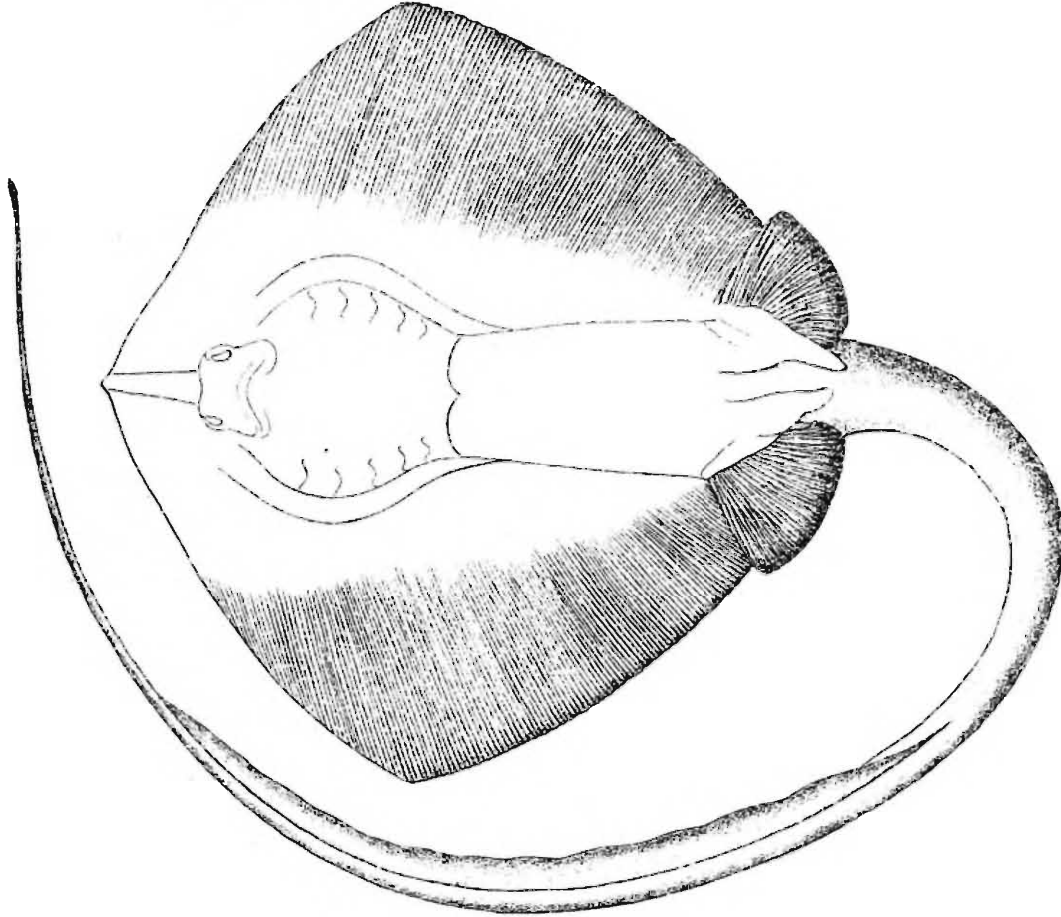
- Günther, A. C. L.—(Note on Hamilton-Buchanan's Ms. drawings of "Fishes of the Ganges"). *Zool. Rec.* VI, p. 127. (London: 1870).
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EXPLANATION OF PLATE XIII.

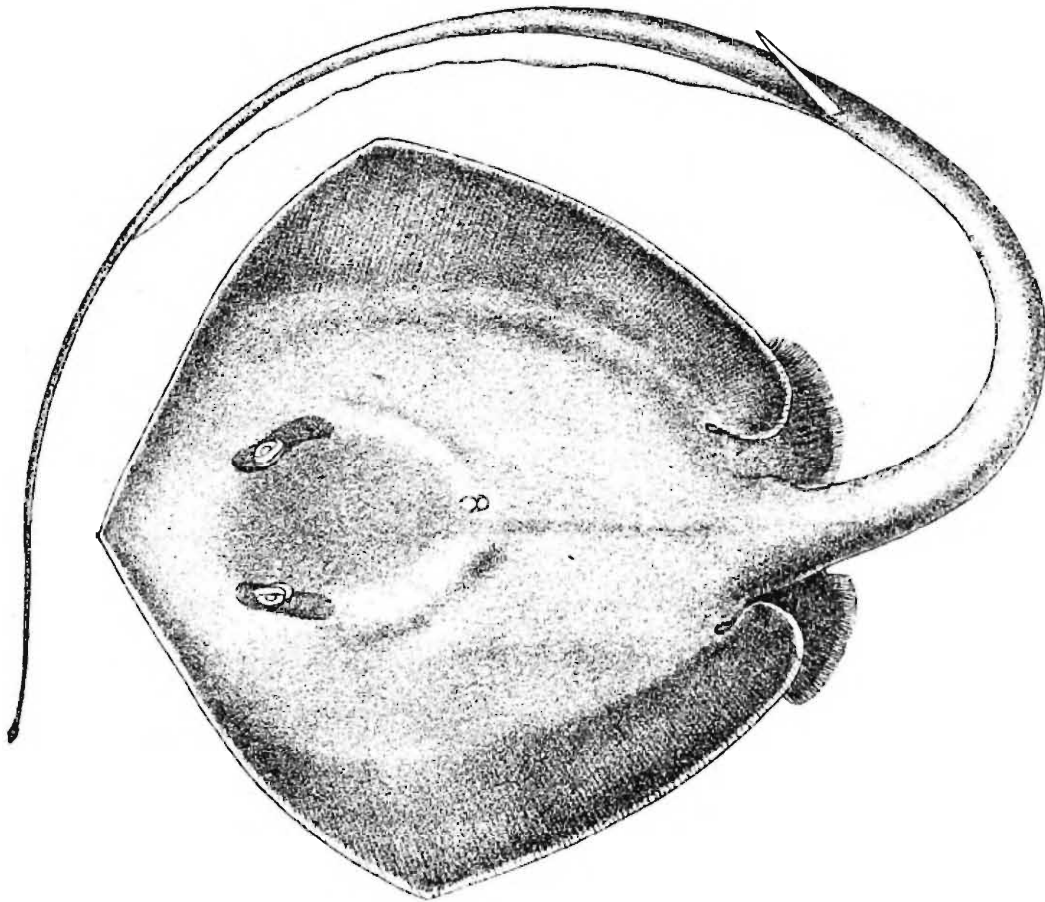
BUCHANAN'S DRAWINGS OF INDIAN FISH.

Fig. 1. Dorsal view of *Raia sancur* Ham. Buch.

Fig. 2. Ventral view of the same. *A. S. B.*, IV, 65.



2.

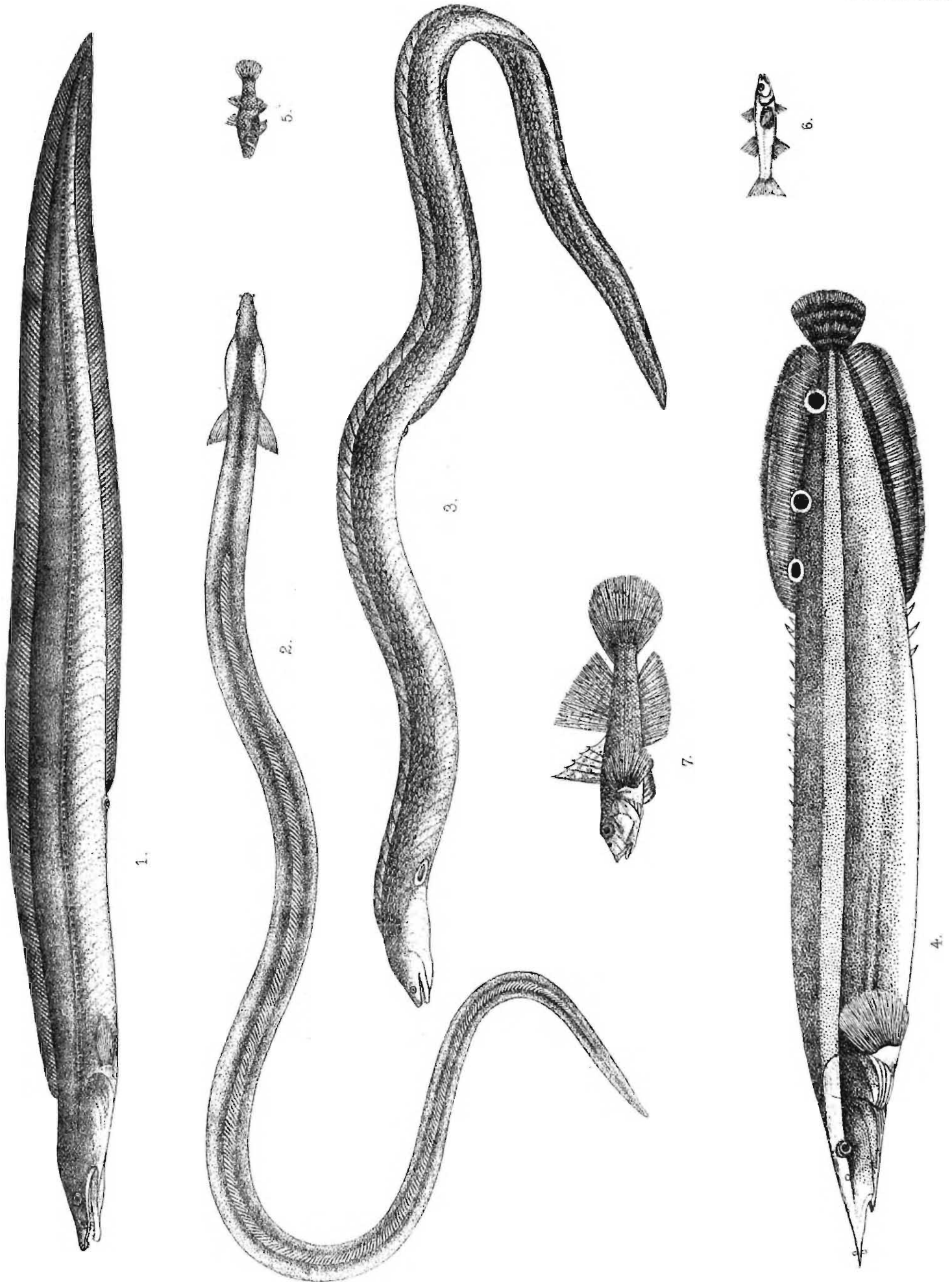


1.

## EXPLANATION OF PLATE XIV.

### BUCHANAN'S DRAWINGS OF INDIAN FISH.

- Fig. 1. Lateral view of *Muraena bagio* Ham. Buch. *A. S. B.*, IV, 29 ; slightly reduced.
- Fig. 2. Lateral view of *Ophisurus hijala* Ham. Buch. *A. S. B.*, IV, 27.
- Fig. 3. Lateral view of *Muraenophis sathete* Ham. Buch. *A. S. B.*, IV, 31 ; slightly reduced.
- Fig. 4. Lateral view of *Macrogathus aculeatus* Lacepede. *Ind. Office Lib.*, 100.
- Fig. 5. Lateral view of *Gobius nunus* Ham. Buch. *A. S. B.*, IV, 75.
- Fig. 6. Lateral view of *Gobius chuno* Ham. Buch. *A. S. B.*, IV, 72.
- Fig. 7. Lateral view of *Gobius gutum* Ham. Buch. *A. S. B.*, IV, 74.

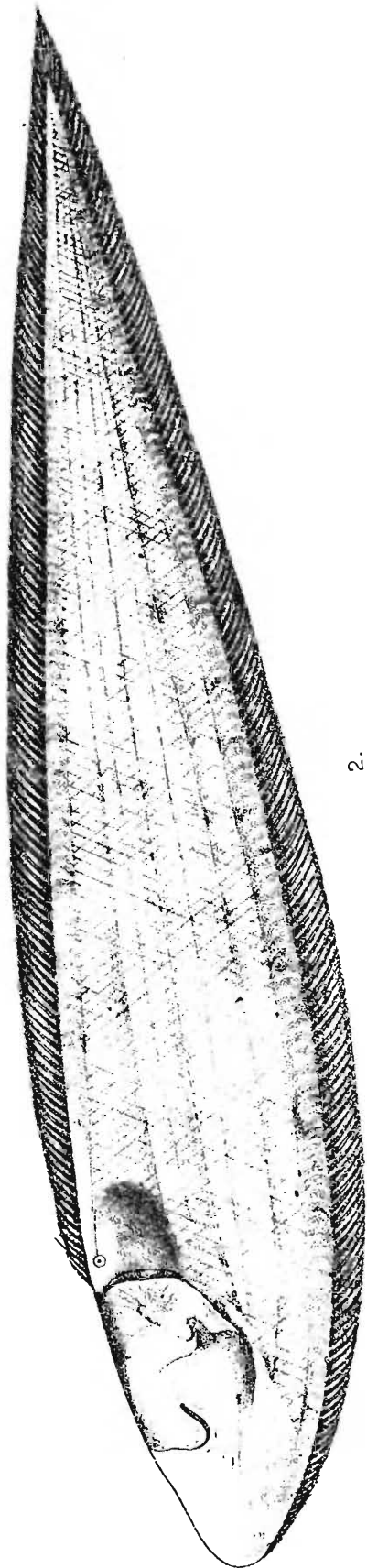


BUCHANAN'S DRAWINGS OF INDIAN FISH.

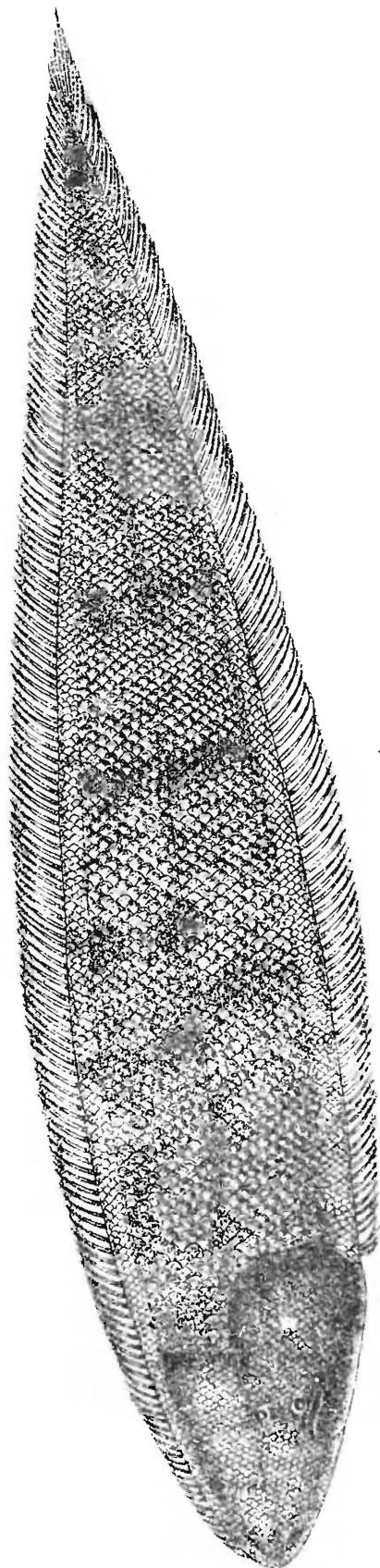
EXPLANATION OF PLATE XV.

BUCHANAN'S DRAWINGS OF INDIAN FISH.

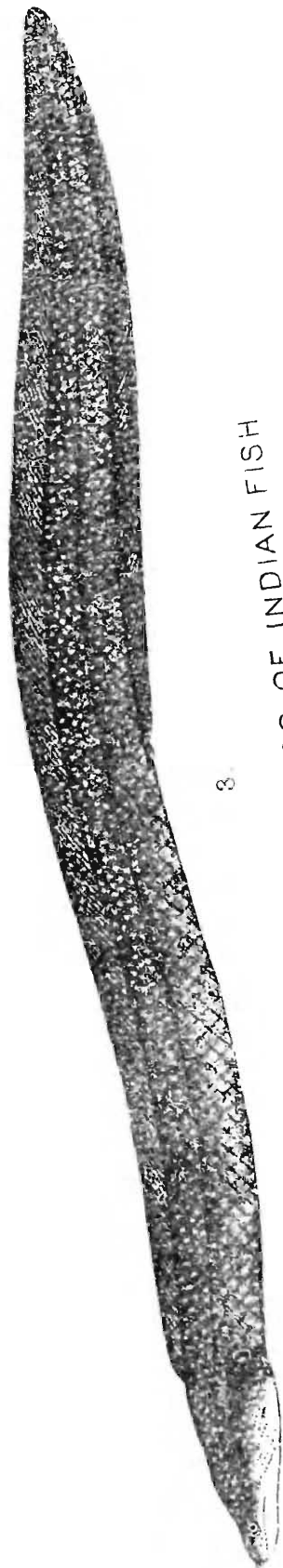
- Fig. 1. Dorsal view of *Cynoglossus lingua* Ham. Buch.  
Fig. 2. Ventral view of the same. *A. S. B.*, IV, 41; slightly reduced.  
Fig. 3. Lateral view of *Muraenopsis tile* Ham. Buch. *A. S. B.*, IV, 30.



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BUCHANAN'S DRAWINGS OF INDIAN FISH

EXPLANATION OF PLATE XVI.

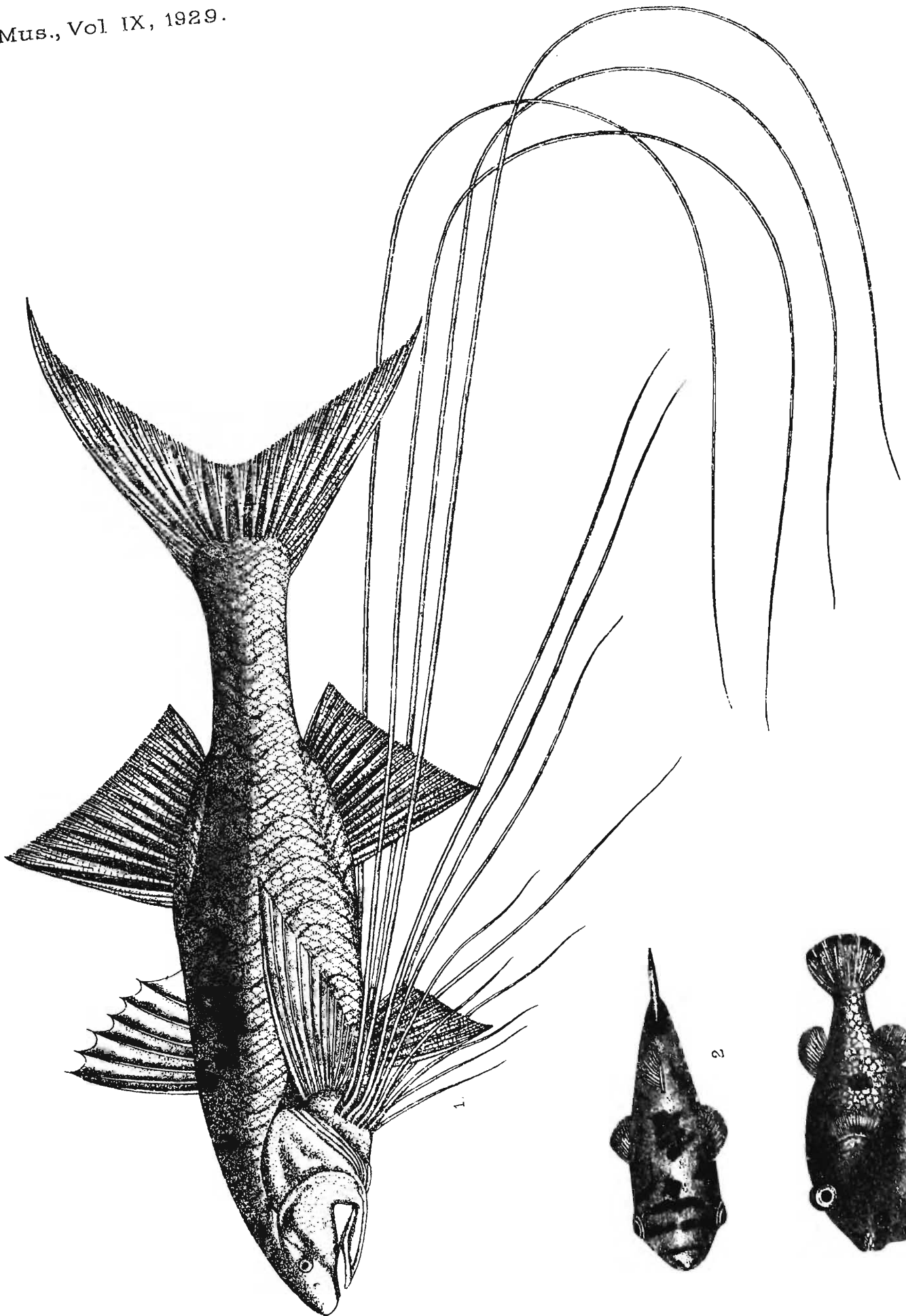
BUCHANAN'S DRAWINGS OF INDIAN FISH.

Fig. 1. Lateral view of *Polynemus toposui* Ham. Buch. *A. S. B.*, IV, 81.

Fig. 2. Dorsal view of *Tetrodon caria* Ham. Buch.

Fig. 3. Lateral view of the same. *A. S. B.*, IV, 94.

*N. B.*—The long pectoral filaments of *Polynemus toposui* have been arranged to suit the plate.

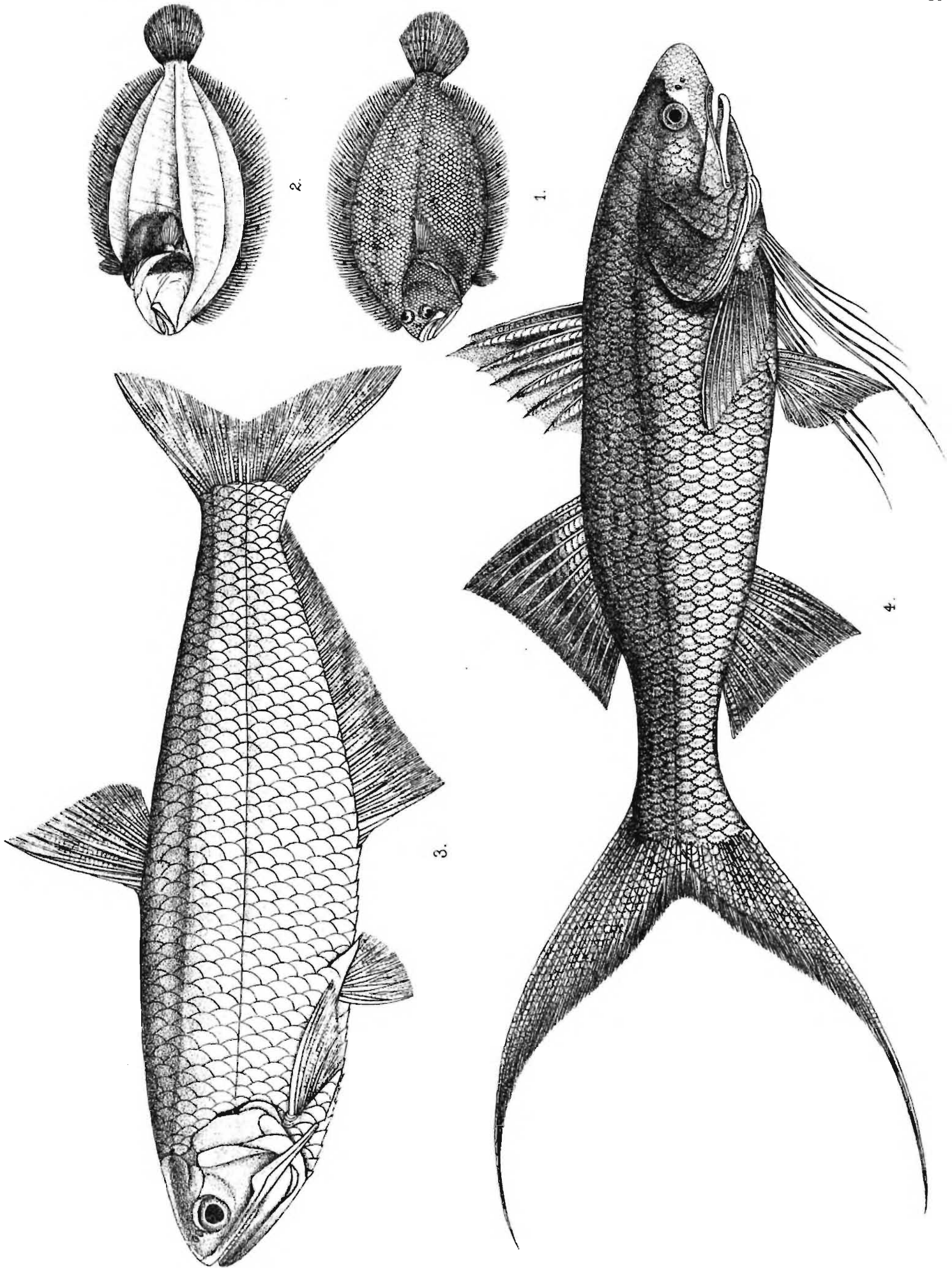


BUCHANAN'S DRAWINGS OF INDIAN FISH.

EXPLANATION OF PLATE XVII.

BUCHANAN'S DRAWINGS OF INDIAN FISH.

- Fig. 1. Dorsal view of *Pleuronectes arsius* Ham. Buch.  
Fig. 2. Ventral view of the same. *A. S. B.*, IV, 43.  
Fig. 3. Lateral view of *Clupea purava* Ham. Buch. *Ind. Office Lib.*, 102.  
Fig. 4. Lateral view of *Polynemus sele* Ham. Buch. *A. S. B.*, IV, 83 ; slightly reduced.

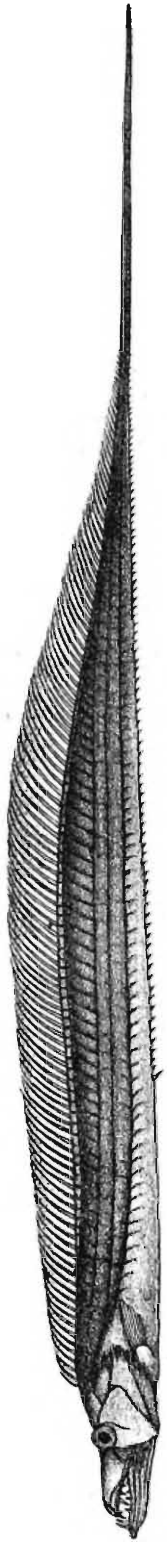


BUCHANAN'S DRAWINGS OF INDIAN FISH.

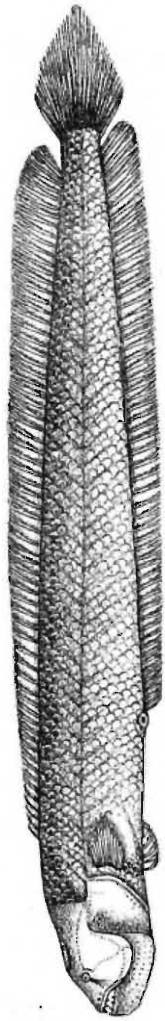
EXPLANATION OF PLATE XVIII.

BUCHANAN'S DRAWINGS OF INDIAN FISH.

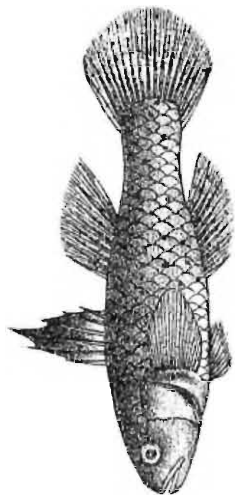
- Fig. 1. Lateral view of *Trichiurus lepturus* Lacepede. *A. S. B.*, IV, 77.  
Fig. 2. Lateral view of *Gobioides ruber* Ham. Buch. *A. S. B.*, IV, 76.  
Fig. 3. Lateral view of *Gobius sadanundio* Ham. Buch. *A. S. B.*, IV, 73.  
Fig. 4. Lateral view of *Cyprinodon cuninga* Ham. Buch. *Ind. Office Lib.*, 101 ; slightly reduced.



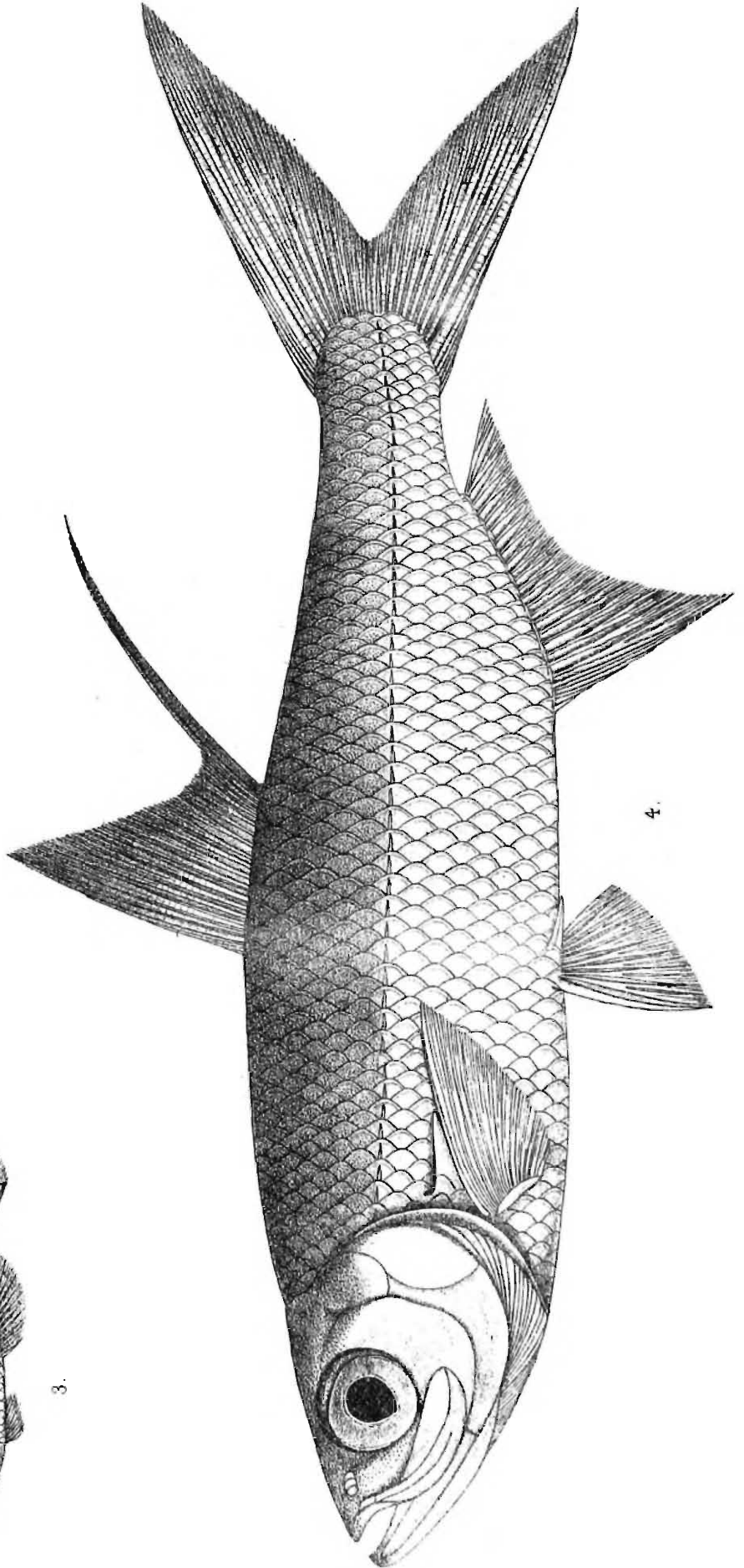
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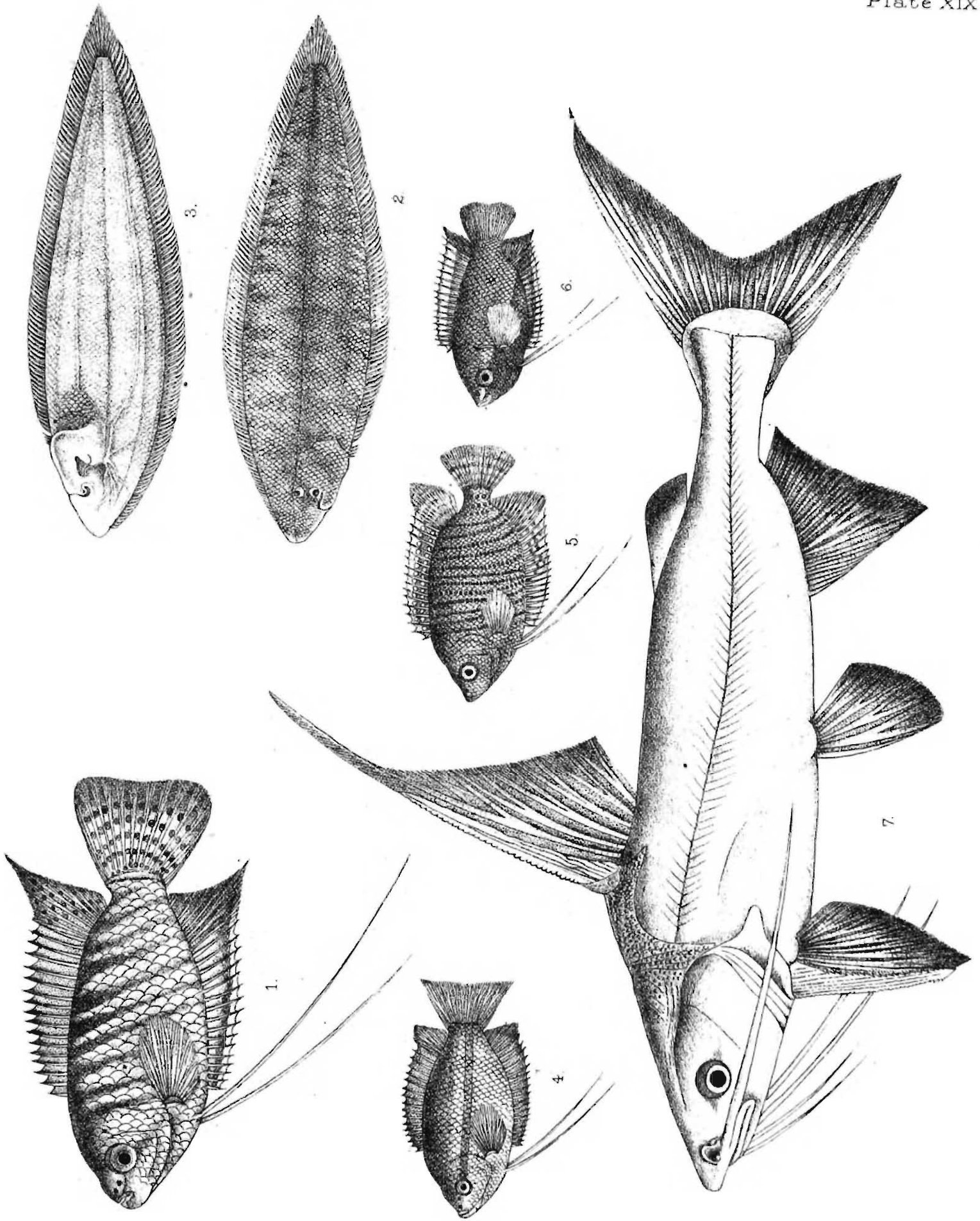


4

EXPLANATION OF PLATE XIX.

BUCHANAN'S DRAWINGS OF INDIAN FISH.

- Fig. 1. Lateral view of *Trichopodus bejeus* Ham. Buch. *A. S. B.*, IV, 36.  
Fig. 2. Dorsal view of *Achirus cynoglossus* Ham. Buch.  
Fig. 3. Ventral view of the same. *A. S. B.*, IV, 42.  
Fig. 4. Lateral view of *Trichopodus chuna* Ham. Buch. *A. S. B.*, IV, 38.  
Fig. 5. Lateral view of *Trichopodus lalius* Ham. Buch. *A. S. B.*, IV, 37.  
Fig. 6. Lateral view of *Trichopodus sota* Ham. Buch. *A. S. B.*, IV, 39.  
Fig. 7. Lateral view of *Pimelodus sona* Ham. Buch. *A. S. B.*, IV, 16.

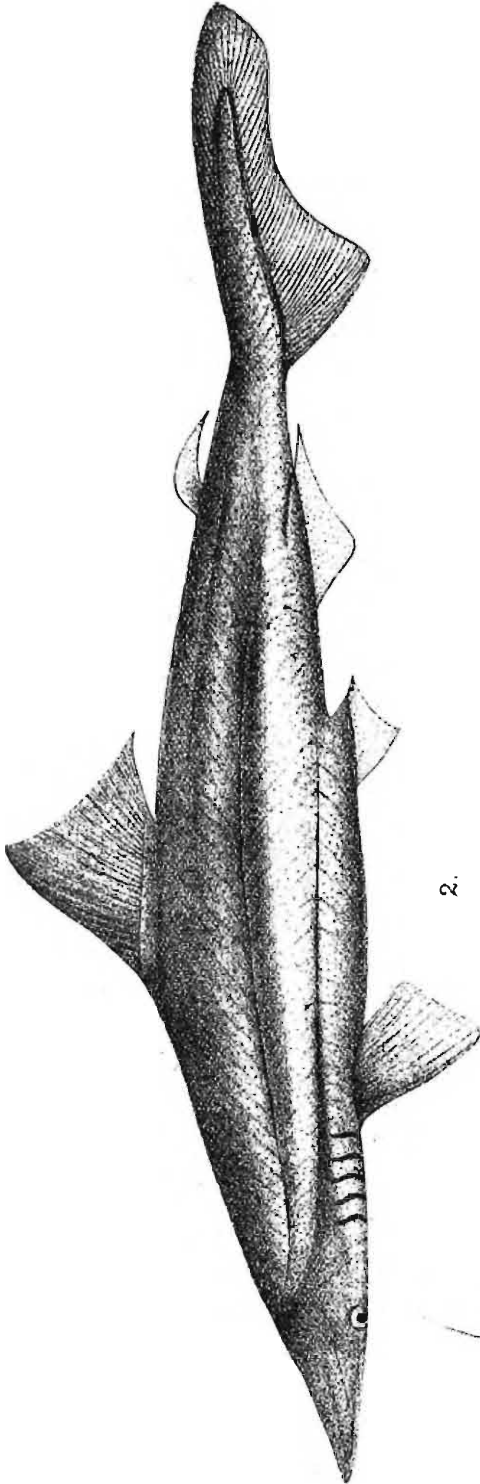


BUCHANAN'S DRAWINGS OF INDIAN FISH.

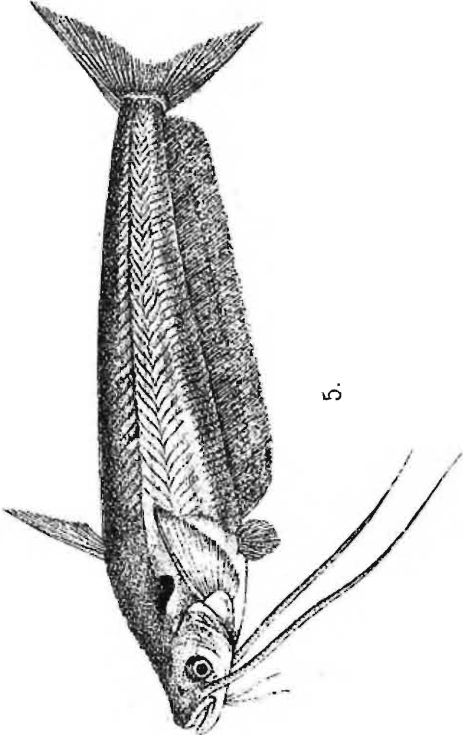
## EXPLANATION OF PLATE XX.

### BUCHANAN'S DRAWINGS OF INDIAN FISH.

- Fig. 1. Lateral view of *Chanda phula* Ham. Buch. *A. S. B.*, IV, 1.  
Fig. 2. Lateral view of *Squalus carcharias?* Ham. Buch. *A. S. B.*, IV, 35.  
Fig. 3. Lateral view of *Chanda bogoda* Ham. Buch. *A. S. B.*, IV, 3.  
Fig. 4. Lateral view of *Trichopodus cotra* Ham. Buch. *A. S. B.*, IV, 40.  
Fig. 5. Lateral view of *Silurus canio* Ham. Buch. *A. S. B.*, IV, 5.  
Fig. 6. Lateral view of *Cheilodipterus panijus* Ham. Buch. *A. S. B.*, I, 33.  
Fig. 7. Lateral view of *Chanda baculis* Ham. Buch. *A. S. B.*, IV, 2.



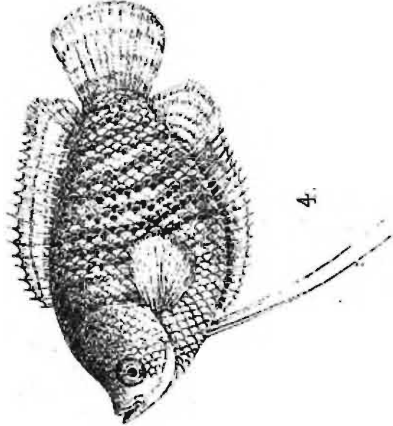
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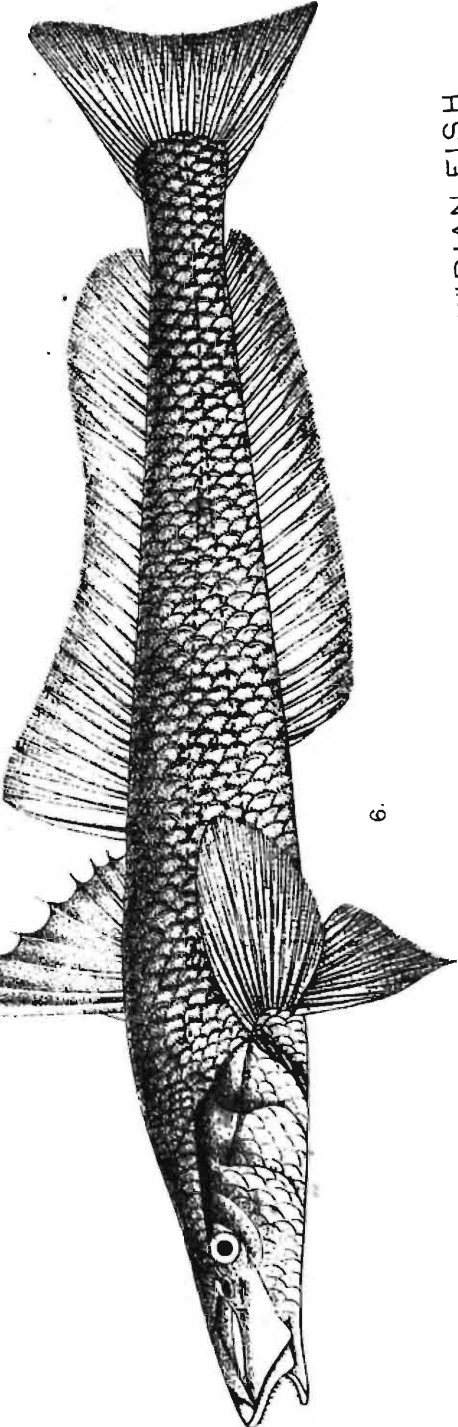
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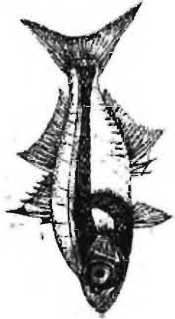
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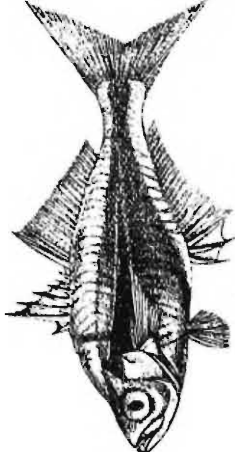
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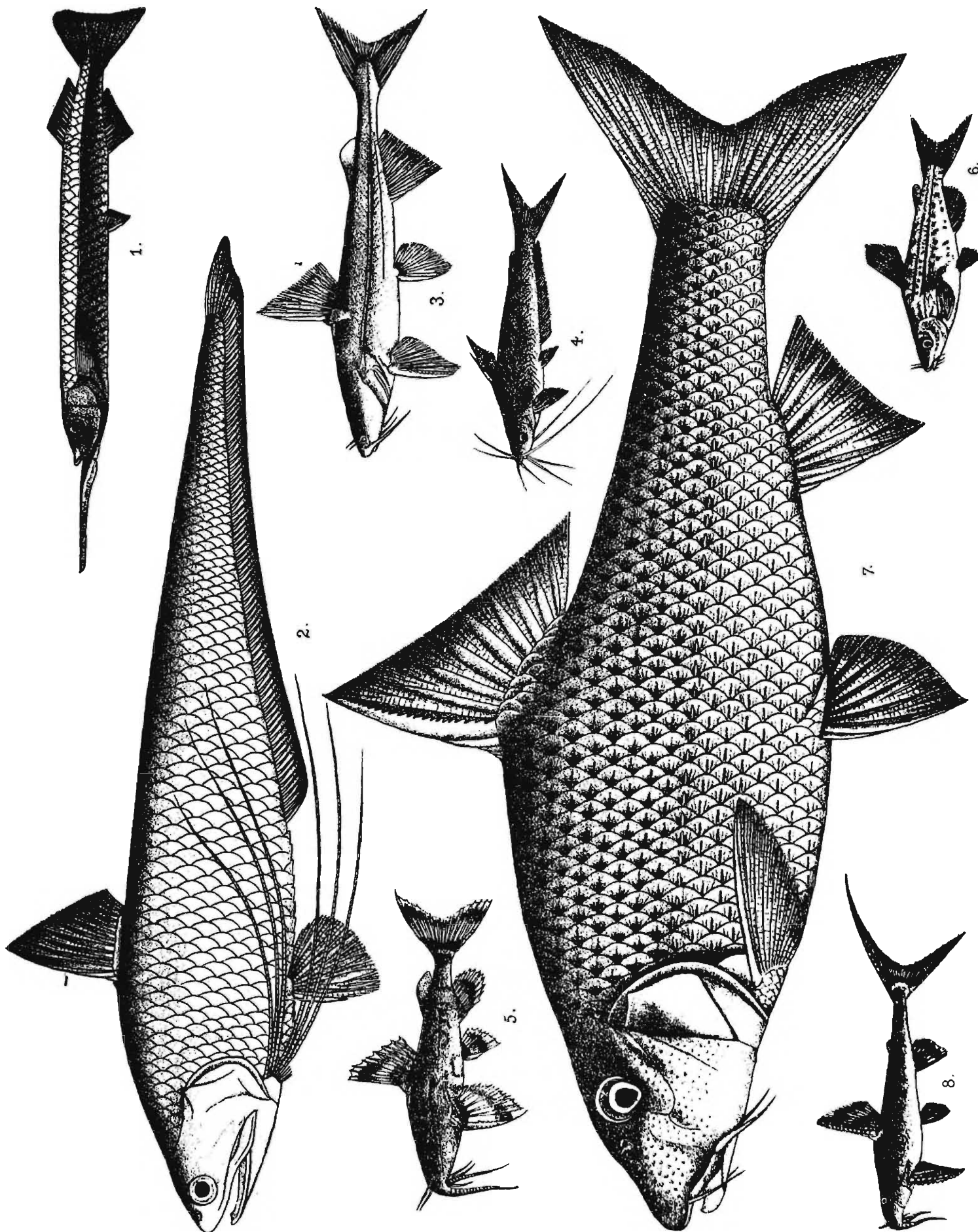
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BUCHANAN'S DRAWINGS OF INDIAN FISH.

## EXPLANATION OF PLATE XXI.

### BUCHANAN'S DRAWINGS OF INDIAN FISH.

- Fig. 1. Lateral view of *Esox ectuntio* Ham. Buch. *A. S. B.*, IV, 95.
- Fig. 2. Lateral view of *Mystus ramcarati* Ham. Buch. *A. S. B.*, IV, 92.
- Fig. 3. Lateral view of *Pimelodus telchitta* Ham. Buch. *A. S. B.*, IV, 10.
- Fig. 4. Lateral view of *Pimelodus urua* Ham. Buch. *A. S. B.*, IV, 15.
- Fig. 5. Lateral view of *Pimelodus hara* Ham. Buch. *A. S. B.*, IV, 12.
- Fig. 6. Lateral view of *Pimelodus chandromara* Ham. Buch. *A. S. B.*, IV, 13.
- Fig. 7. Lateral view of *Cyprinus (Cyprinus) chagunio* Ham. Buch. *A. S. B.*, 1, 39.
- Fig. 8. Lateral view of *Pimelodus conta* Ham. Buch. *A. S. B.*, IV, 17.

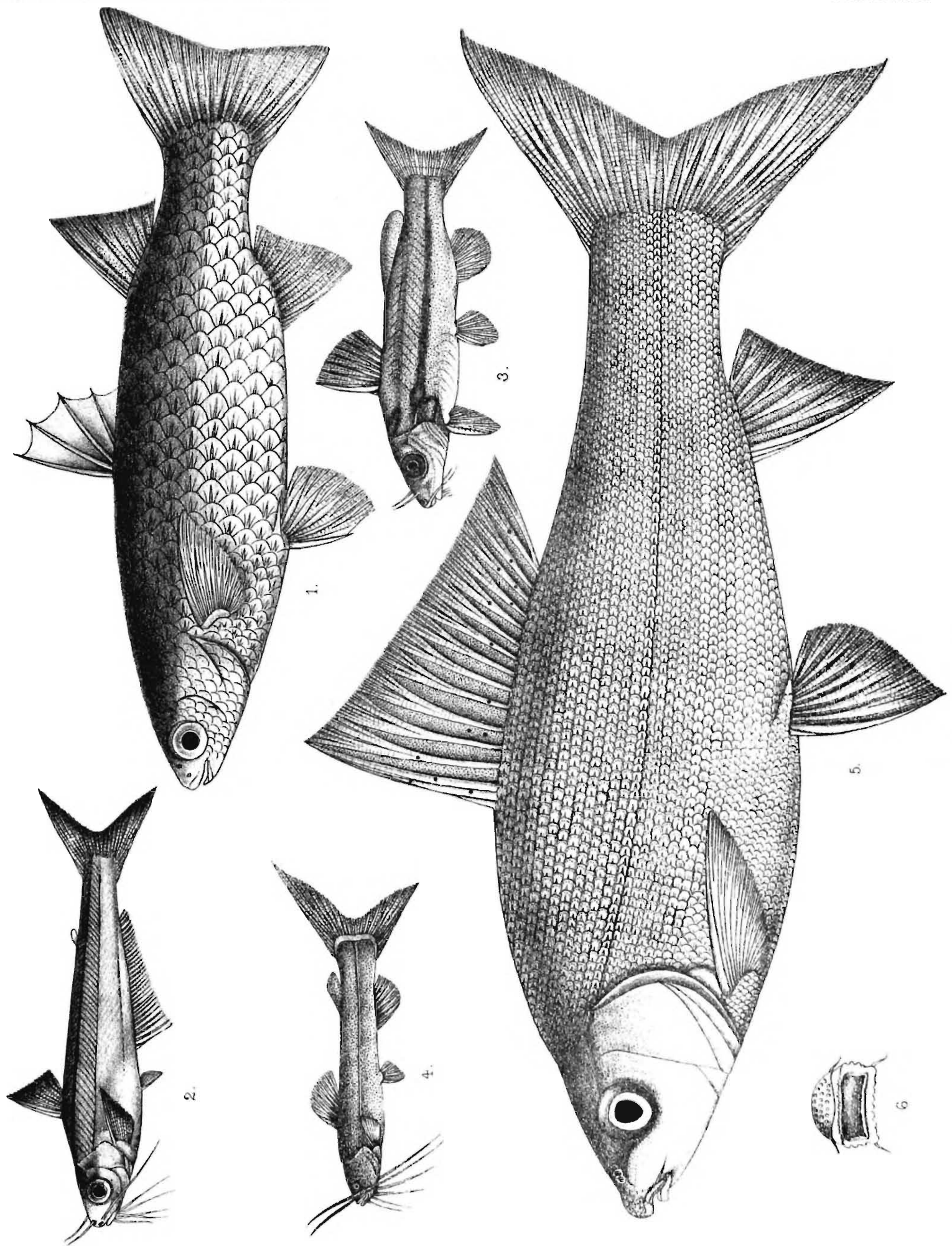


BUCHANAN'S DRAWINGS OF INDIAN FISH

EXPLANATION OF PLATE XXII.

BUCHANAN'S DRAWINGS OF INDIAN FISH.

- Fig. 1. Lateral view of *Mugil albula* ? Ham. Buch. *A. S. B.*, IV, 69.  
Fig. 2. Lateral view of *Pimelodus murius* Ham. Buch. *A. S. B.*, IV, 14.  
Fig. 3. Lateral view of *Pimelodus batasio* Ham. Buch. *A. S. B.*, IV, 11.  
Fig. 4. Lateral view of *Pimelodus mangois* Ham. Buch. *A. S. B.*, IV, 9.  
Fig. 5. Lateral view of *Cyprinus (Cyprinus) cursis* Ham. Buch.  
Fig. 6. Structure of mouth of the same. *A. S. B.*, IV, 119.

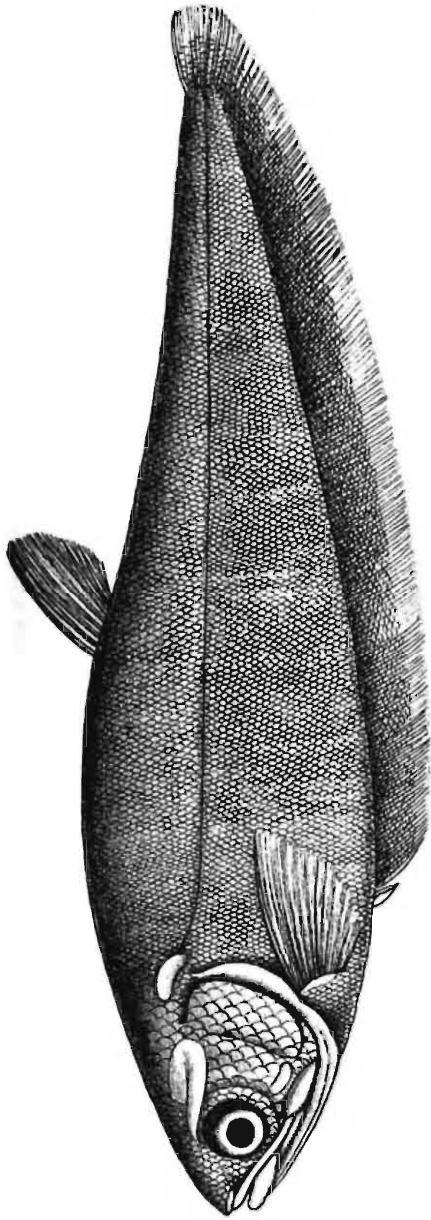


BUCHANAN'S DRAWINGS OF INDIAN FISH.

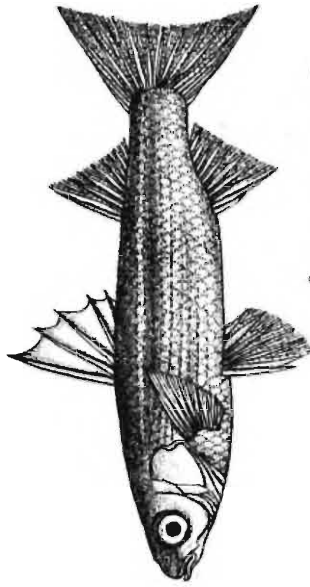
### EXPLANATION OF PLATE XXIII.

#### BUCHANAN'S DRAWINGS OF INDIAN FISH.

- Fig. 1. Lateral view of *Mystus kapirot* (Bonnaterre). *Ind. Office Lib.*, 103.  
Fig. 2. Lateral view of *Cyprinus (Danio) anjana* Ham. Buch. *A. S. B.*, IV, 136.  
Fig. 3. Lateral view of *Mugil cascasia* Ham. Buch. *A. S. B.*, IV, 68.  
Fig. 4. Lateral view of *Cyprinus (Cabdio) borelio* Ham. Buch. *A. S. B.*, IV, 104.  
Fig. 5. Lateral view of *Cyprinus (Cyprinus) sarana* Ham. Buch. *Ind. Office Lib.*, 104.  
Fig. 6. Lateral view of *Cyprinus (Puntius) tictis* Ham. Buch. *A. S. B.*, IV, 128.  
Fig. 7. Lateral view of *Atherina danius* Ham. Buch. *A. S. B.*, IV, 91.



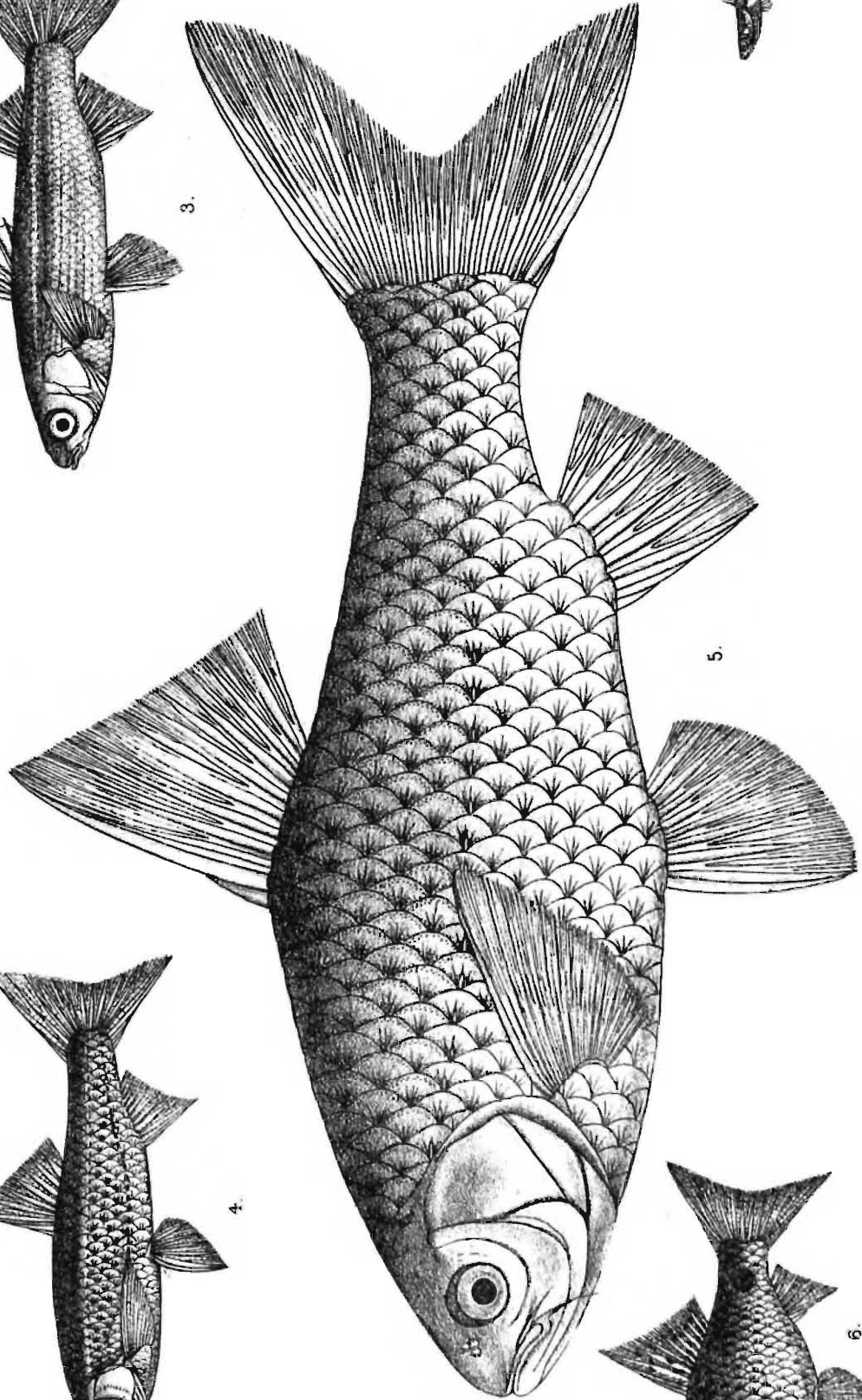
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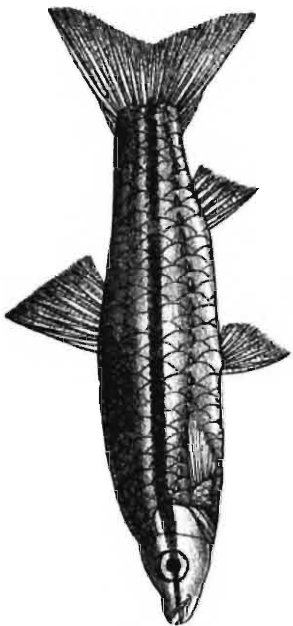
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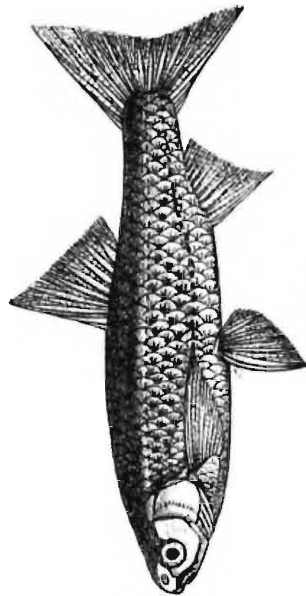
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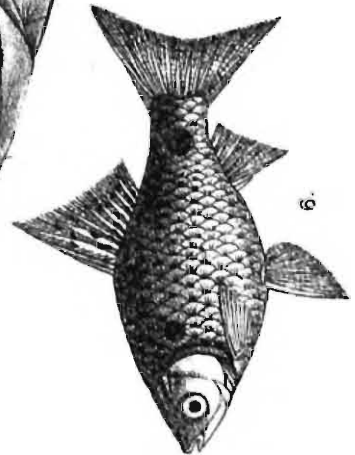
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BUCHANAN'S DRAWINGS OF INDIAN FISH.