

MUNGO PARK'S CONTRIBUTION TO THE ICHTHYOLOGY OF THE EAST INDIES*

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ABSTRACT

Mungo Park visited Sumatra in 1792 making a collection of marine fishes, some of which were later described as new to Science. Part of this collection has recently been re-discovered in the British Museum (Natural History) collection.

These specimens are listed, the types redescribed and some original manuscript notes and paintings by Park are also listed. A short account of his contribution to the early development of ichthyology in the region is given.

INTRODUCTION

MUNGO PARK (1771-1806) has always been remembered for his explorations in western Africa especially his two expeditions to trace the course of the River Niger, but his single brief expedition to the East Indies is little known. This visit to Benkulen, Sumatra, during 1791-92 nevertheless resulted in a contribution to the ichthyology of that country (Park, 1797) and certainly had an impact on the development of his later career.

Mungo Park was born in Scotland at Fowlshiels, Selkirk, on September 10th 1771 (Park, 1815). His father who bore the same names, was a farmer evidently of some means for his children were educated by a private tutor resident at their home. Park's later education was at Selkirk Grammar School until at the age of fifteen years he was apprenticed to a local surgeon, Mr. Thomas Anderson, to receive a basic training in medicine. In 1789 he entered the University of Edinburgh to read medicine, and after the completion of his studies he travelled to London to commence his medical career.

While at University Park took up the study of botany and in company with his brother-in-law James Dickson, a botanist and gardener, made a number of botanical expeditions in Scotland. Dickson had worked as a gardener in the London area and later became a seedsman, but his knowledge and ability had brought him into contact with Sir Joseph Banks who allowed him the use of his extensive library and collections. With the patronage of Banks who was one of the leading men of science in his time, and certainly the most influential, Dickson rose to an eminent position as a botanist, the author of several important publications and a reputation in botanical circles throughout Europe. It was through the influence of Dickson that Park was introduced to Sir Joseph Banks soon after his arrival in London, and with Banks's patronage Park obtained an appointment as Assistant Surgeon to the East India Company's ship 'Worcester'.

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Park sailed on the 'Worcester' in February 1792 for Benkulen on the south west coast of Sumatra. Benkulen was at that time the chief establishment of the British East India Company in Sumatra and was in their possession from 1685 until 1824. During the nine-week stay of the 'Worcester' he collected and painted a number of the fishes found on the coast. Park returned to England in 1793 taking with him his collection of paintings and the dried skins of some thirty-two Sumatran fishes. He later published a description of several undescribed species (Park, 1797). His contribution to the natural history of Sumatra was limited to this one paper, but no doubt it served as a further recommendation to his patron, Sir Joseph Banks, whose continued interest led to Park's African journeys under the aegis of the 'Association for Promoting Discoveries in the Interior of Africa'. It was on his second expedition to the River Niger that Park died in 1806.

THE SUMATRAN FISH COLLECTION

Park's collection of fishes contained specimens of eight species considered by him to be undescribed. These he described, proposing binominal names in a paper read to the Linnean Society of London on 4th November 1794. This paper was published in 1797 (Raphael, 1970). The account he gave is strictly confined to the descriptions, being prefaced only by an introductory paragraph which refers to it as 'The fruit of my leisure hours during nine weeks stay on the coast of Sumatra: it contains a very small specimen of the ichthyological riches of that shore, and, being my first attempt, the descriptions may in many places be inaccurate'.

His collection, however, consisted of a number of other specimens in addition to these eight new species, and these he presented to the Linnean Society, which at that time maintained a general museum collection in addition to the original collections of Carl Linnaeus. However, in the mid-nineteenth century it was decided by the Council of the Linnean Society to dispose of the non-Linnean collections, and after certain donations had been made the Society's general collection was sold (Gage, 1938). The sale took place in the 'great rooms' of J. C. Stevens, a dealer and auctioneer of Covent Garden, London, on the 10th November 1863. Park's collection of fishes was included in the sale and was purchased by the British Museum. It was accessioned in the Zoology Department's register on 12th November 1863 and at that time comprised 32 specimens. All were recorded as being skins (rather, prepared half skins). The specimens were examined by Albert Günther who identified some of them, and wrote his identification on the original labels with the register number. At that time the first four volumes of Günther's *Catalogue of Fishes in the British Museum* had been published, which meant that most of the percomorph fishes had been catalogued before Park's collection had been received. Only the plectognaths and the moray eels from Park could have been listed by Günther in the eighth volume of the *Catalogue* (1870). As a consequence the existence of Park's collection has not been widely known to ichthyologists, even though it contains the type specimens of several Indian Ocean fishes.

Although Günther examined Park's fishes on their arrival at the British Museum it can only have been cursorily, for most of them had not been identified beyond the names given by Park. The existence of several specimens from this collection in the British Museum (Natural History) has been known to the author for a number of years, but although the fish skin collection had been completely re-examined most of Park's material was still missing. Only recently has the greater part of Park's collection been discovered in a box marked 'duplicate stuffed fishes' during

curation of the stuffed mounted dry collection of fishes. Most of these recently discovered specimens seem not to have been examined by Günther, nor from their condition by anyone else since their purchase in 1863**.

Twenty-seven specimens from Mungo Park's Sumatran collection have now been recognised, out of the presumed total of thirty-two received. This collection includes type specimens of seven of the eight species described by Park as new to science in 1794. Details of the extant specimens are given hereafter.

PARK'S MANUSCRIPT AND PAINTINGS

The Zoological Department Library of the British Museum (Natural History) also contains some manuscript notes and a small collection of paintings of fishes made by Park in Sumatra.

The manuscript is not of great interest consisting of six sheets of paper, four of them small (153 mm wide by 124 mm high) probably cut from a single larger sheet of paper as they are of uniform texture and parts of the watermark in some can be matched with others. Two other sheets are of much thinner, larger, pencil ruled paper (187 mm by 231 mm).

The notes on the small sheets are evidently rough notes for the descriptions of four of the fish described in Park's (1797) paper. The species concerned were *Chaetodon canaliculatus*, *Balistes undulatus*, *Perea [aurata]*, and *Scomber filamentosus* (on numbered sheets 1, 2, 3 and 4 respectively). All these sheets have notes or figures on the *verso*, mostly referring to the proportional formulae Park employed in his descriptions. Sheet 4 *verso*, however, has in addition a pencil description and notes on *Chaetodon canaliculatus*, evidently the earliest draft of his description.

The two larger sheets of paper (5 and 6) from the care with which they are written are evidently fair copies intended for submission to the Linnean Society. One of them bears a pencil insertion, but neither is in the final form as printed. The two species concerned are *Chaetodon [canaliculatus]* and *Chaetodon trifasciatus*.

The descriptions on all these six sheets are similar to those published by Park (1797). They omit, however, the meristic and proportional formulae which appear in the published version, although as noted above there are rough notes on these on the *verso* of each sheet. They contain some details, however, which did not appear in the published version notably the vernacular name of the fish in 'Mallay'. Thus the ms version (Sheet 1) of *Chaetodon canaliculatus* bears the name 'Ikan Chabii Bowlang' (Park's orthography is followed here), and on Sheet 5 the note appears 'This fish is very common and much esteemed by the Mallays who give it the name of Ekan chapbee Bowlang, signifying that when it is full moon the fish is full of spawn'. The manuscript notes (Sheet 2) on *Balistes undulatus* also contain a vernacular name 'Ikan Babi Jarboon eetam. Mal [ay]'.

**It is perhaps of some interest to note that the collection of fins of fishes made by J. W. Bennett in Ceylon and described in his *Fishes of Ceylon* (Bennett, 1830) was also presented by the collector to the Linnean Society and thence purchased by the British Museum. They were registered immediately subsequent to Park's collection but despite extensive searches of the dry fish collection in this Museum during the last twenty years have not been found.

A Park manuscript preserved in the archives of the Linnean Society of London is the final draft of his paper as published in the *Transactions* of that Society. It consists of nine sheets of paper each 185 mm by 235 mm, the first sheet gives the title of the contribution and the introduction and is sewed to the stub of an earlier sheet. The succeeding eight sheets bear the body of the text of the note one per species. These are written on plain paper lightly ruled with pencil lines. This paper is similar in size and texture to the two sheets of fair copy preserved in the British Museum (Natural History).

The Park paintings consist of twenty studies of fish all sketches in pencil coloured with water-colour paints. Most of the sheets are of the general dimensions of 300 mm by 190 mm; painting 19, is 208 by 172 mm; paintings 2, 4 and 8 are on paper ca 270 mm by 170 mm; and one (16) is much larger, 416 mm by 276 mm. The paper used for these paintings is of Dutch manufacture, bearing watermarks L V G, I V; and of English manufacture with a Britannia figure. Both types of paper were widely used in the late eighteenth century (Heawood, 1924).

As paintings they are of reasonably good standard although plainly amateur in execution. However, they show the colour patterns of the fish well and thus have considerable value for the identification and description of the species. Most of the sheets also bear meristic data in an abbreviated form, thirteen of the paintings bear vernacular names, some bear scientific names, and three are unlabelled.

Of the twenty paintings seventeen are represented by specimens still extant. These show that the drawing was made at exactly life size from the specimens preserved. It is not known if Park had painted all the specimens he brought back, if so some paintings have been subsequently lost. Certainly the figure of *Perca lunulata* Park, 1797, published with his description of the species is not now to be found amongst the paintings preserved in the British Museum (Natural History).

According to Sawyer (1970) the Park manuscript and paintings probably came to the British Museum from Sir Joseph Banks's collection.

THE FISH COLLECTION

The collection of fishes comprises the dried half skins of a number of fish. This form of preparation of fish skins was in widespread use in the eighteenth and nineteenth centuries, and was not finally abandoned until the use of formaldehyde provided a practical preservative for use in tropical conditions. The fish was skinned in such a way that the vertical fins and one of each paired fin (sometimes both) remained attached to the skin. The operculum and head bones of the one side were retained with the skin although as much flesh as possible was removed before the skin was dried in the sun or before a fire. Some collectors treated the skin with preservative, often an arsenical compound, to discourage insect attacks, others varnished the skins. Park's skins do not appear to have been treated in either way, and several of them have the marks of old insect attack.

This method of preservation was clearly inferior to the immersion of the whole specimen in alcohol, as was possible on occasions as when Alexander Russell collected fishes at Aleppo (Syria) as early as 1750 (Wheeler, 1956), or on James Cook's first voyage (1768-1771). The use of such a volatile (and potable) liquid, however, posed problems and the preparation of dried skins was probably the only practical

method open to the naturalist—traveller such as Park. Although it had disadvantages, most notably in the destruction of all internal organs, to a less extent the damage to fins and scales during the skinning of the fish, and the virtual loss of all but the densest pigment, this method of preservation had much to recommend it. When supplemented with a collection of paintings which showed the fresh coloration of the specimens it forms a valuable early record of the fishes of the region.

Identification of dried half skins presents problems, however, and the names given to several of the specimens can only be regarded as tentative determinations. These are mostly indicated with a question mark beside the binomen.

In the following list all measurements are given in millimetres; S.L.=standard length (measured from the tip of the snout to the origin of the caudal fin rays), T.L.=total length overall from snout tip to extremity of the tail; all measurements were taken between verticals. The British Museum (Natural History) register number for each specimen is given, and the number of any painting in the Park mss in that institution is indicated. Park's original labels are also quoted, but the later additions by Günther are not given; these labels are written on stiff card and tied to the caudal peduncle by twine, they all bear the very distinctive monogram used by Park (see plate II).

BERYCIFORMES

HOLOCENTRIDAE

Holocentrus ruber (Forskål, 1775)

Left half skin; S.L. 105, T.L. 127; BM (NH) 1863.11.12.21.

Original label 'Holocentrus rubens'; this is probably used in reference to Forskal's description.

PERCIFORMES

CARANGIDAE

Alectis ciliaris (Bloch, 1787) Plate IA and B.

Left half skin; S.L. 177, T.L. 212; BM (NH) 1863.11.12.26.

Original label 'Scomber filamentosus'.

Painting No. 18, Park collection BM (NH).

Right half skin; S.L. 165, T.L. 205; BM (NH) 1863.11.12.18.

Original label 'Scomber filamentosus/Different sex—female'?. on verso, 'NB. These two are certainly the same species they are always taken together, one has fewer filaments'.

Painting No. 6, Park Collection BM. (NH).

Syntypes of *Scomber filamentosus* Park, 1797: 36.

Caranx sp. (near *melampygus* Cuvier, 1833).

Left half skin; S.L. 155, T.L. 190; BM (NH) 1863.11.12.15.

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Original label 'Scomber ignobilis'.

Painting No. 7, Park Collection BM (NH).

Scomber ignobilis was a name proposed by Forskal (1775) for a Red Sea carangid.

LUTJANIDAE

Lutjanus? fulviflamma (Forsk., 1775)

Left half skin; S.L. 136, T.L. 170; BM (NH) 1863.11.12.30.

Original label missing. Labelled on accession, 'Purchased at Stevens sale rooms'.

Painting No. 4, Park Collection BM (NH).

Lutjanus lunulatus (Park, 1797) Plate II-B.

Left half skin; S.L. 160, T.L. 195; BM (NH) 1863.11.12.16.

Original label, 'Percalunulata'.

Holotype of *Perca lunulatus* Park, 1797: 35 (tab 6). This species was described by Park in his paper read to the Linnean Society. The figure published with that paper is reproduced at life size but has been reversed in engraving. The original drawing is not now in the Park Collection at the BM (NH), nor is it with the Park manuscript in the Linnean Society's archives.

Lutjanus? vaigiensis (Quoy and Gaimard, 1824).

Left half skin; S.L. 179, T.L. 214; BM (NH) 1863.11.12.27.

Original label, 'Labrus'.

Painting No. 1, Park Collection BM (NH).

Lutjanus? rufolineatus (Valenciennes, 1830)

Right half skin; S.L. 90, T.L. 108; BM (NH) 1863.11.12.14.

Original label, 'Perca nova species?'

Painting No. 10, Park Collection BM (NH).

SCOLOPSIDAE

Scolopsis sp. Plate II-A.

Left half skin; S.L. 147, T.L. 187; BM (NH) 1863.11.12.7.

Original label, 'Perca aurata'.

Holotype of *Perca aurata* Park, 1797: 35. Weber and de Beaufort (1936: 341) referred *Perca aurata* to the synonymy of *Scolopsis vosmeri* (Bloch, 1792), although they do not appear to have examined Park's type specimen. The complete lack of coloration on the specimen, and the absence of a painting, make it difficult to identify this specimen positively.

LEIOGNATHIDAE

Equula equula (Forsk., 1775).

Left half skin, S.L. 132, T.L. 160 ; BM (NH) 1863.11.12.19.

Original label, 'Chaetodon argenteus'.

Painting No. 8, Park Collection BM (NH).

Park's manuscript use of 'argenteus' as a specific epithet predates its first formal publication by Lacépède (1803 : 448) in the combination *Leiognathus argenteus*. The silvery coloration of this fish when fresh is, however, so noticeable that it is not surprising that this adjectival name was used by both authors independently.

POMADASYIDAE

Pomadasyus ? maculatus (Bloch, 1797).

Right half skin ; S.L. 156, T.L. 182 ; BM (NH) 1863.11.12.13.

Original label 'Perca nobilis'.

Painting No. 2. Park Collection BM (NH).

DREPANIDAE

Drepane punctata (Linnaeus, 1758).

Left half skin ; S.L. 142, T.L. 183 ; BM (NH) 1863.11.12.8.

Original label 'Chaetodon punctatus'.

Painting No. 9. Park Collection BM (NH).

CHAETODONTIDAE

Chaetodon citrinellus Cuvier, 1831.

Right half skin ; S.L. 92, T.L. 110 ; BM (NH) 1863.11.12.11.

Original label 'Chaetodon Nova species'.

Painting No. 15. Park Collection BM (NH).

Chaetodon lunula (Lacépède, 1803).

Right half skin ; S.L. 89, T.L. 95 ; BM (NH) 1863.11.12.12.

Original label missing. Labelled on accession 'Purch[ased] at Stevens Sale Rooms/Chaetodon lunula Sumatra Mungo Park'.

Painting No. 11, Park Collection BM (NH).

Chaetodon trifasciatus Park, 1797, Plate III A and B.

Right half skin ; S.L. 92, T.L. 109 ; BM (NH) 1863.11.12.4.

Original label 'Chaetodon trifasciatus'.

Painting No. 19, Park Collection BM (NH).

Holotype of *Chaetodon trifasciatus* Park, 1797 : 34.

Anisochaetodon rafflesii (E. T. Bennett, 1830).
 Right half skin ; S.L. 94, T.L. 110 ; BM (NH) 1863.11.12.5.
 Original label 'Chaetodon vagabundus'.

Anisochaetodon vagabundus (Linnaeus, 1758).
 Right half skin ; S.L. 117, T.L. 142 ; BM (NH) 1863.11.12.3.
 Original label 'Chaetodon vagabundus'.

AMPHIPRIONIDAE

Amphiprion percula (Lacépède, 1802).
 Left half skin ; S.L. 43, T.L. 53 ; BM (NH) 1863.11.12.29.
 Original label 'Perca polymna'.

Park evidently recognised the affinity of this clown fish with Linnaeus' description of *Perca polymna*, but there is no doubt that this specimen is referable to *A. percula*, which name had not been published at the date Park's collection was studied.

CORIDAE

Hemigymnus melapterus (Bloch, 1791).
 Right half skin ; S.L. 170, T.L. 201 ; BM (NH) 1863.11.12.28.
 Original label missing. Labelled on accession. 'Purch [ased] at Stevens sale'.

Cheilinus oxycephalus Bleeker, 1853.
 Right half skin ; S.L. 142, T.L. 175 ; BM (NH) 1863.11.12.20.
 Original label 'Sparus'.

ACANTHURIDAE

Acanthurus triostegus (Linnaeus, 1758).
 Left half skin ; S.L. 118, T.L. 147 ; BM (NH) 1863.11.12.23.
 Original label 'Chaetodon triostegus'.
 Painting No. 3, Park Collection BM (NH).

SIGANIDAE

Siganus canaliculatus (Park, 1797), Plate IV A and B.
 Right half skin ; S.L. 169, T.L. 210 ; BM (NH) 1863.11.12.17.
 Original label 'Chaetodon canaliculatus'.
 Painting No. 5, Park Collection BM (NH).

Holotype of *Chaetodon canaliculatus* Park, 1797 : 33. The status of Park's *Chaetodon canaliculatus* was discussed by Bleeker (1852 : 580) and de Beaufort and Chapman (1951) followed his lead in recognising it as a good species, although they point out that Park's description was too brief to be diagnostic, and Bleeker's specimen was the only other specimen to have been described. Examination of the type

specimen, and also the Park painting, leads me to suggest that it is probably referable to *Siganus fuscescens* (Houttuyn, 1872), of which species it is a senior and available synonym. It is to be hoped that any future revision of this group will include an examination of Park's type specimen and will verify this tentative determination.

PLATYCEPHALIDAE

Platycephalus ? malayanus Bleeker, 1853.

Left half skin ; S.L. 128, T.L. 155 ; BM (NH) 1863.11.12.25.

Original label, 'Cottus scorpius. A singular variety/an species distincta'.

Painting No. 12, Park Collection BM (NH).

SCORPAENIDAE

Pterois volitans (Linnaeus, 1758).

Right half skin ; S.L. 147, T.L. 185 ; BM (NH) 1863.11.12.6.

Original label, 'Scorpaena volitans'.

TETRAODONTIFORMES

BALISTIDAE

Balistapus undulatus (Park, 1797), Plate V A and B.

Left half skin ; S.L. 221, T.L. 260 ; BM (NH) 1863.11.12.1.

Original label, 'Balistes undulatus'.

Painting No. 20, Park Collection BM (NH).

Holotype of *Balistes undulatus* Park, 1797 : 37.

Hemibalistes chrysopterus (Bloch and Schneider, 1801), Plate VI A and B.

Right half skin ; S.L. 133, T.L. 155 ; BM (NH) 1863.11.12.10.

Original label, 'Balistes niger'.

Painting No. 17, Park Collection BM (NH).

Holotype of *Balistes niger* Park, 1797 : 37.

Park's use of *Balistes niger* was antedated both by Bloch (1786) and by Bonaterre (1788) according to de Beaufort (1962), and is thus not available for use.

Rhinecanthus verrucosus (Linnaeus, 1758).

Left half skin ; S.L. 185, T.L. 212 ; BM (NH) 1863.11.12.9.

Original label, 'Balistes aculeatus'.

Park was presumably identifying this specimen with *Balistes aculeatus* Linnaeus, 1758.

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DISCUSSION

Mungo Park's contribution to the ichthyology of South-east Asia was considerable in view of the short time that he spent on the coast of Sumatra. He appears to have been one of the first Europeans to have studied the fish fauna of that country, predating the collections of Sir Thomas Stamford Raffles by more than twenty years, and the later researches of Pieter Bleeker by half a century. Admittedly the collection of some thirty-two species of fish on the coast of Sumatra represented only a small fraction of the fauna of the area, but each specimen had to be prepared and paintings of many of them were also made, both time-consuming operations. Perhaps the best measure of Park's success is that three (possibly four) of the eight names he proposed for undescribed fishes are still recognised as valid, and that ten further of his specimens were undescribed species at the time he collected them.

Park's method of describing his specimens requires some explanation. Indeed the description of fish by what amounted to formulae for meristic and morphometric data has clearly proved too enigmatic for many workers, and has led to some of them claiming that his descriptions were too brief to be of value as diagnoses (see, for example, the discussion on *Siganus canaliculatus*, above). In fact the formulae provided by Park are informative and make a reconstruction of body form and proportions possible. To take the description of *Chaetodon canaliculatus* as an example of Park's method of presenting data. He wrote:—

B.4.	D.	$\frac{13}{23}$	P. 18.	V.	$\frac{2}{7}$	A. $\frac{7}{7}$	C. 18.
LC : A	:: 66	:	26	LC : VI	:: 66	:	22
LC : DI	:: 66	:	18	LC : VF	:: 66	:	40
LC : DF	:: 66	:	60	LC : AI	:: 66	:	35
LC : PI	:: 66	:	16	LC : AF	:: 66	:	60
LC : PF	:: 66	:	27	LC : PC	:: 66	:	82
R. 5. P.2. D.2.3.4. V.2. A.3.4. C. 5.							

The first line is a relatively clear statement of meristic data, B=branchiostegals, D=dorsal, P=pectoral, V=pelvic, A=anal, and C=caudal rays. There are two apparent anomalies here, however, the dorsal count is given as 13 spines (the first procumbent spine not being counted), while the 23 represents the total number of ray elements in the fin. The dorsal fin count is therefore to be interpreted as 13 spines in a total of 23 (i.e. XIII. 10 in modern notation). The anal count is not given in this way in this example, but in the other species described by Park it follows this method. In those fish in which there are two dorsal fins the data is given D. $\frac{2}{7}$. 27 (*Balistes niger*) which is in each case the total count for both fins, but in the first dorsal fin all the rays are spinous.

The morphometric data are presented in tenths of an inch. LC represents the length of the fish from snout tip to the base of the caudal rays (the equivalent of the modern standard length). Other measurements are made from the tip of the snout apparently in a direct line (that is, not between verticals). A is the length from snout to anus, DI to the first dorsal rays, DF to the base of the last dorsal ray, where there are two dorsals the first is designated DP, the second DS, PI to the base of the pectoral fin, PF to the tip of that fin, VI, VF, AI, and AF indicate the same

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measurements on pelvic and anal fins respectively, both PC, and CF represent the measurement of total length.

Finally, the last line of the descriptive formula is concerned with the position of the fins. The R indicates the number of parts into which the body is to be hypothetically divided. In the case of *Siganus canaliculatus* this is 5, the pectoral fin (P.2) lies wholly within the second division, the dorsal fin (D.2.3.4) origin lies in the second and the fin continues through the third and into the fourth division. The pelvics (V.2) lie in the second division, the anal (A.3.4.) in the third and fourth, and the caudal (C.5.) in the fifth.

In the case of some of the species described R is given as including a fraction (in *Perca aurata* $R=3\frac{1}{2}$), and this may be simply because as the fish is seven inches in total length $3\frac{1}{2}$ is a convenient ratio, each unit representing two inches. It is clear that if this method is adopted as an approximate guide to the situation of the fins, R must be a relatively low number, preferably not more than five, for the division of the total length into any greater number than five would result in a number of complications, not least of which would be the necessity to measure the divisions as opposed to judging them by eye.

Park's method of giving meristic data in the manner described above followed the system of Linnaeus who used a similar notation in the *Systema Naturae*. It stems directly from the usage of Artedi (1738), notably in his *Philosophia Ichthyologica*, and by example in his *Descriptiones Specierum Piscium*, in which he gives the total count of fin ray elements in the fin, adding when appropriate that a certain number are spiny. Artedi's descriptions were also discursive, but Linnaeus reduced them to the level of a formula, which was later used by other authors in the late eighteenth century.

It is even possible to trace an indirect connexion which would explain why Park adopted this Linnean method when so many of his contemporaries were abandoning it. Daniel Solander (1733-1782), formerly a pupil of Linnaeus, lived in London and was closely involved with Joseph Bank's scientific circle. Several of Solander's existing manuscripts are concerned with fishes, chiefly those originating from Cook's first voyage, and they show how closely he followed the Artedi-Linnean method. Although by reason of his early death he could not have directly advised Park, and he left only manuscripts as an example of the method, Solander probably influenced him indirectly through the work of Broussonet. P. M. Auguste Broussonet was associated with Banks in a number of projects, but his most relevant contribution was his *Ichthyologia* of 1782 in which he described ten species of fish all either in the British Museum or Bank's own collection.

Broussonet worked in London from 1780-82 and had been advised by Solander in his work on fishes, for indeed he acknowledges the help given him by Solander. It is not therefore surprising to find that Broussonet adopted the Linnean method of presenting meristic data, and seems to have first employed the formula-Linnean of expressing body proportions. Broussonet actually refers to 'volumine 81 *Actorum Anglicorum*' in connexion with this method, but I have been unable to trace the volume of this title bearing any reference to fish proportions. It is thus not surprising that Mungo Park, a later and perhaps peripheral member of Banks's scientific circle, should have followed the methods employed by Broussonet little more than a decade earlier. That his descriptions had little of the detail that Broussonet had incorporated perhaps shows that without the assistance of an experienced mentor

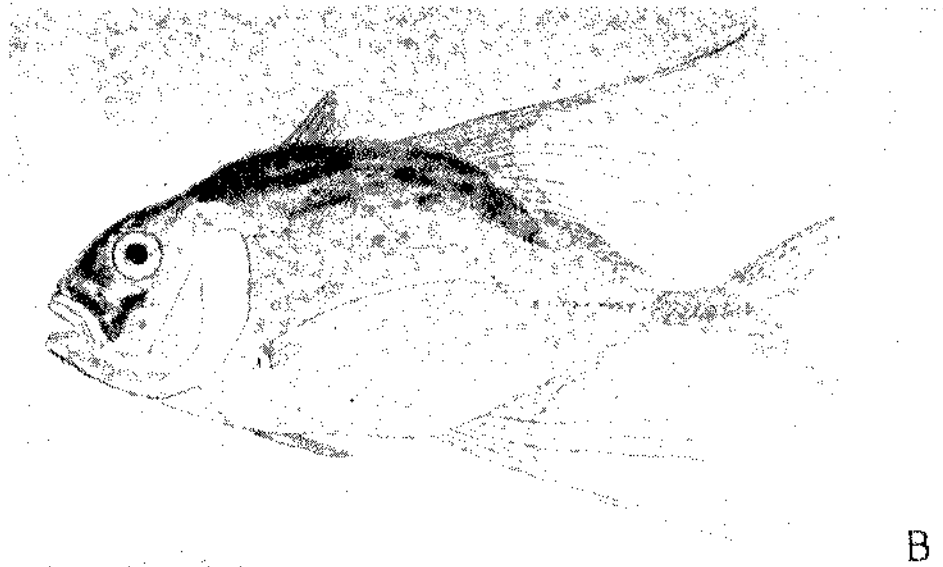


PLATE I. A. *Aeetis ciliaris*. Syntype of *Scomber filamentosus* Park, 1797, specimen B.M.N.H. 1863. H.12.26 and B. Unpublished watercolour painting of *S. filamentosus*.

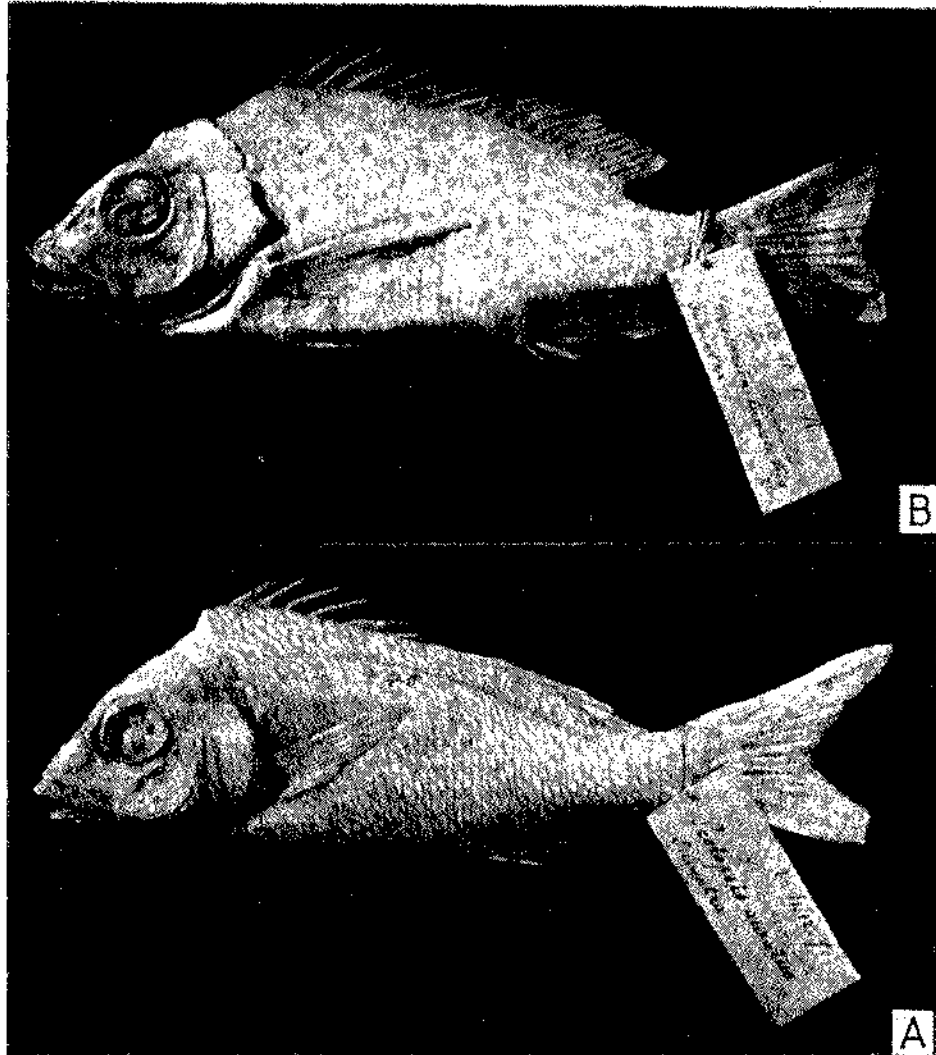


PLATE II. A. *Scolopsis* sp. Holotype of *Perca aurata* Park, 1797 and B. *Lutjanus humulatus*. Holotype of *Perca lunata* Park, 1797.

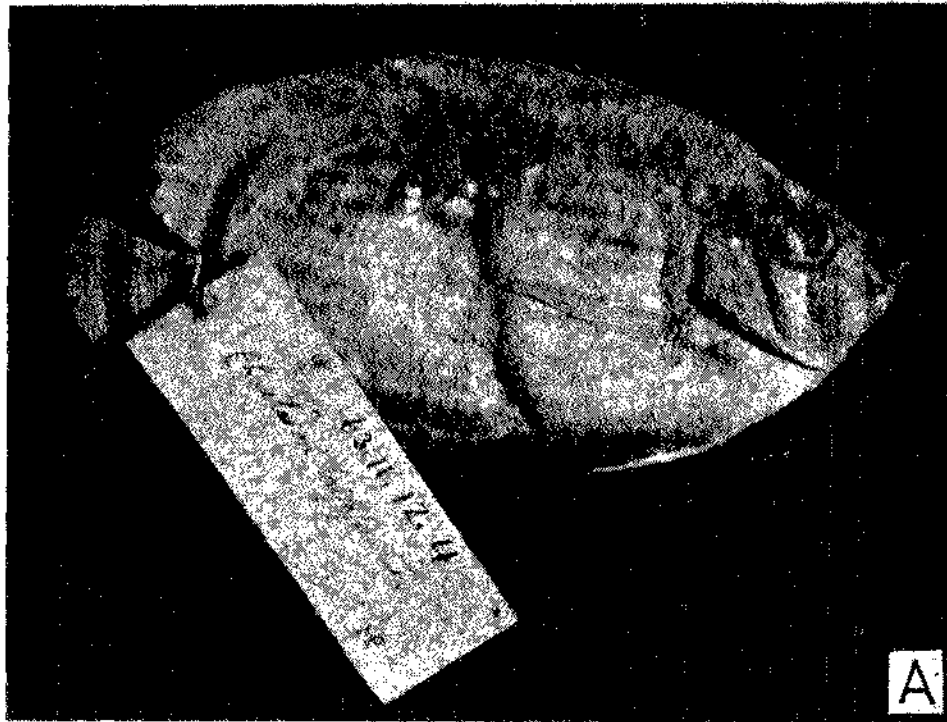
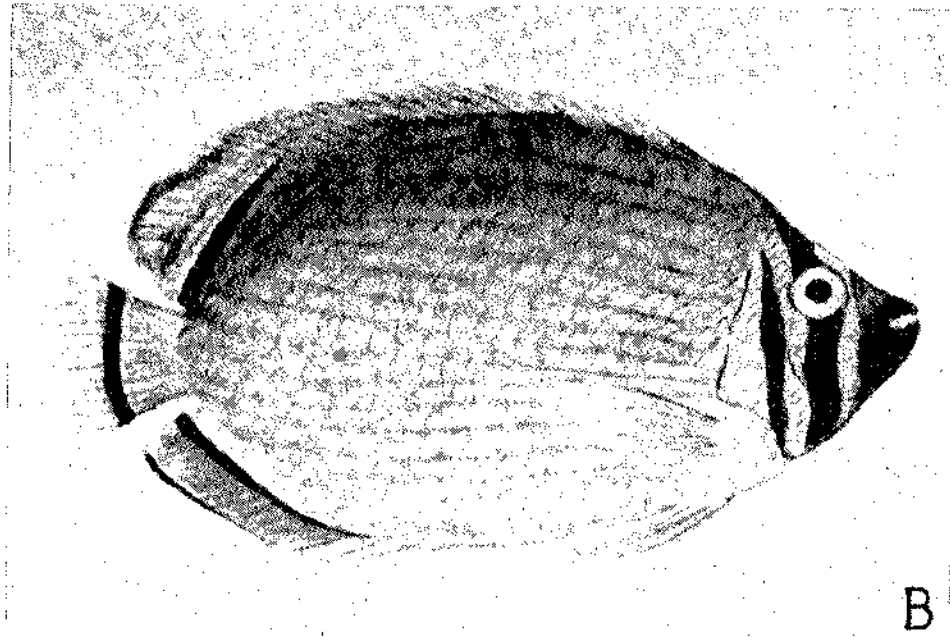


PLATE III. A. *Chaetodon trifasciatus*. Holotype of *Chaetodon trifasciatus* Park, 1797 and
B. Unpublished watercolour of *C. trifasciatus*.

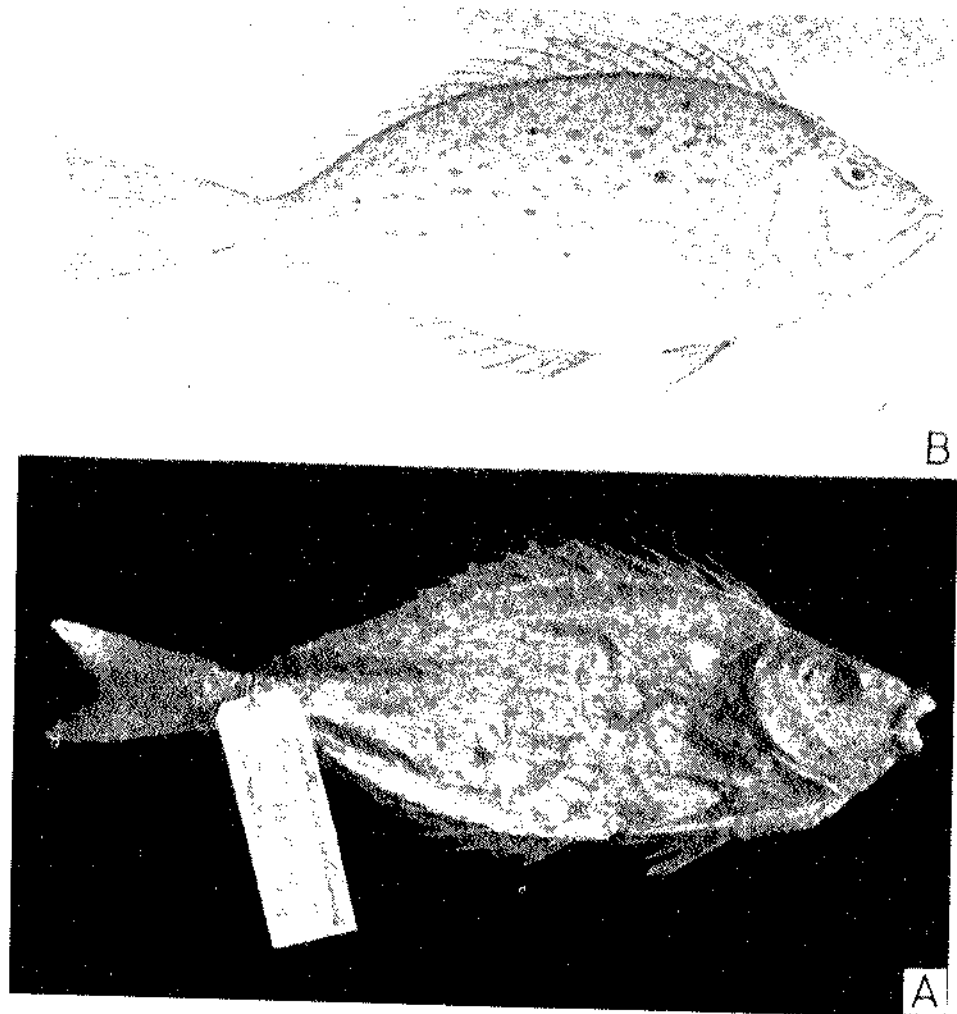
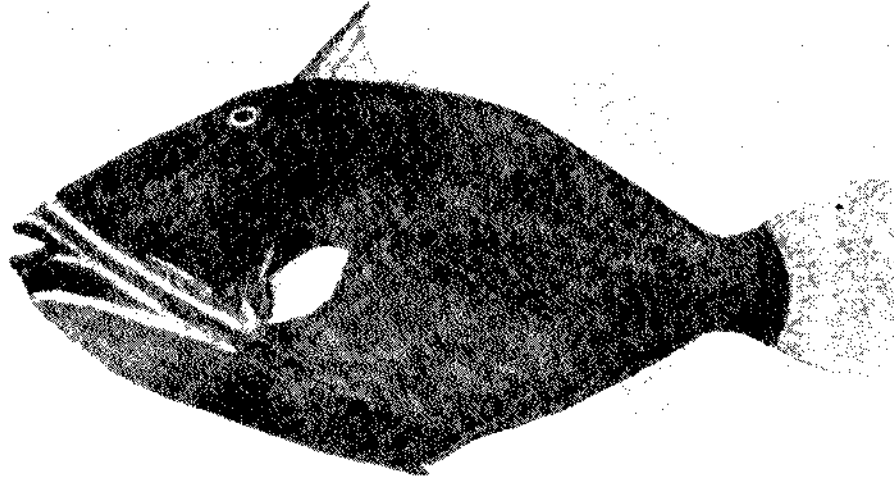
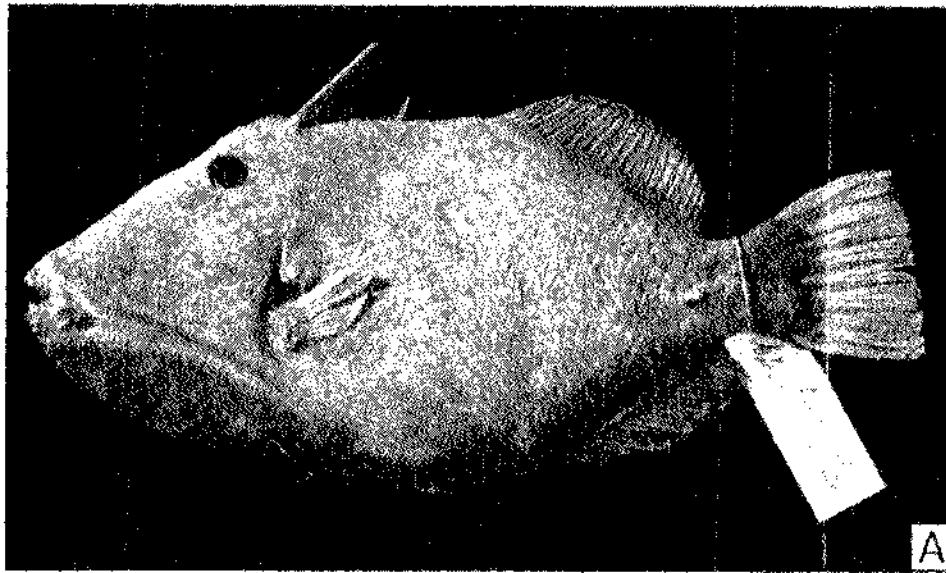


PLATE IV. A. *Siganus canaliculatus*. Holotype of *Chactodon canaliculatus* Park, 1997 and 16. Unpublished watercolour of *C. canaliculatus*.



B



A

PLATE V. A. *Balistapus undulatus*. Holotype of *Balistes undulatus* Park, 1797 and B. Unpublished watercolour of *B. undulatus*.

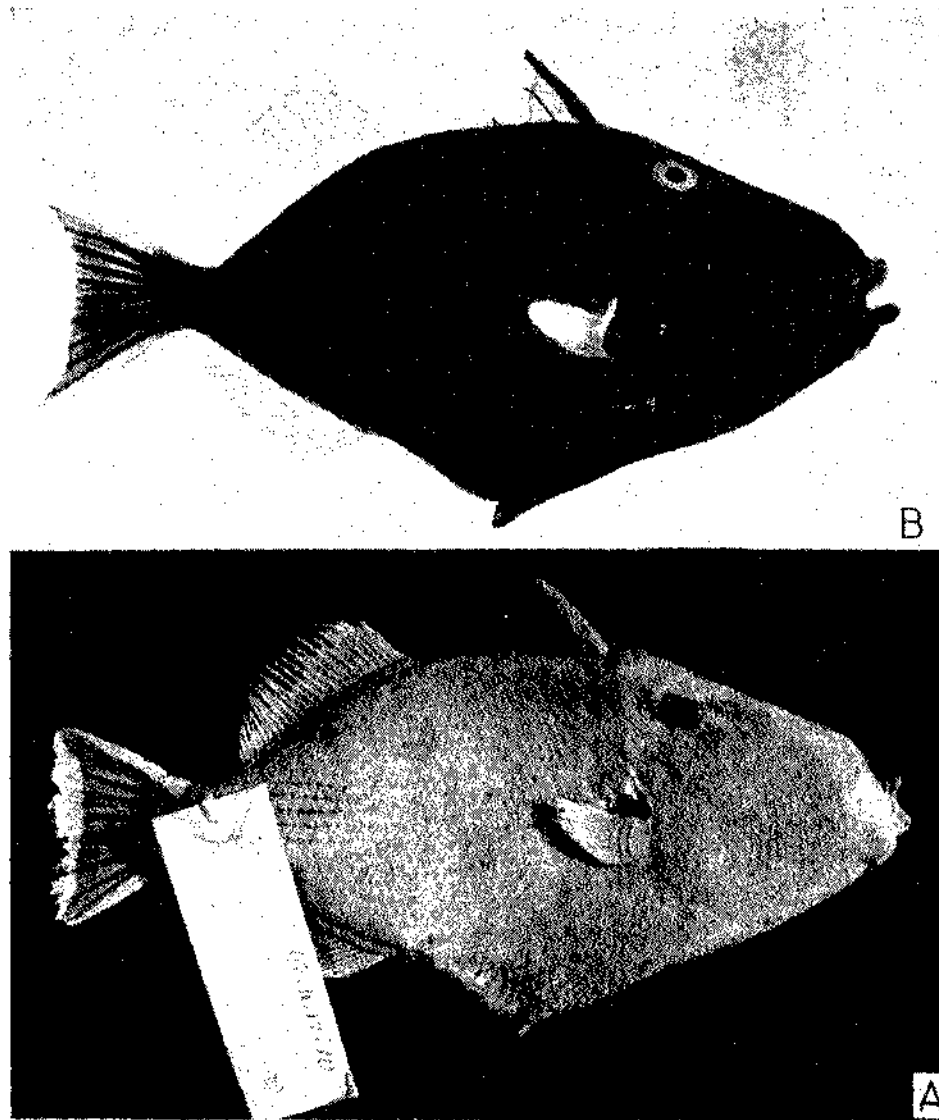


PLATE VI. A. *Hemibalistes chrysopterus*. Holotype of *Balistes niger* Park, 1797 and B. Unpublished watercolour of *B. niger*.

Park could only produce a partial description, based on the measurable features of his specimens and not entering into the discursive accounts which characterise Broussonet's work.

Park's interest in fishes appears to have ceased with this one essay into the ichthyology of Sumatra. It undoubtedly had an important bearing on his later career as an explorer, for this work would have recommended him further to Sir Joseph Banks, perhaps one of the most influential men of his time, and who was later to be instrumental in promoting Park's African journeys. On neither of these does he appear to have continued his study of fish, and it seems that ichthyology cannot have fired him with the enthusiasm it engenders in some. Besides, when reading the accounts of his journeys in Africa one must be aware of his intense energy and interest in general exploration and the appeal and dangers of the unknown; describing fishes from their preserved skins months after their death was not an exercise likely to enthrall a man of this kind.

Park's contribution to the ichthyology of Sumatra was, however, a notable one. He appears to have been the first to make a collection of fishes on the coast of that island and to describe some of them in his paper of 1797.

That some of the scientific names he proposed are still in use is a testimony to his work and a fitting memorial to this great explorer.

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