

## A revision of F. R. Irvine's Ghanaian marine fishes in the collections of The Natural History Museum, London

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Some 180 species of marine fish were reported from Ghana in F. R. Irvine's *The Fishes and Fisheries of the Gold Coast*, an important milestone in West African ichthyology published in 1947. Although the book has been a major source of records for subsequent workers, the underpinning collections have been largely ignored. Two hundred and ninety-two specimens from 139 species collected by Irvine and colleagues were located within The Natural History Museum collections and are reported here with notes on their zoogeography. These were re-identified in the light of the intervening half century of research and have allowed us to examine the basis for most of Irvine's records by matching Irvine's collection numbers (referred to in his book) to BMNH registration numbers. In addition to registered material some 26 jars of unregistered material containing 46 specimens were discovered. About 20% of the species were found to have been misidentified. Six of the marine species collected by Irvine were described by J. R. Norman as new species between 1930 and 1935. These remain valid as: *Rhinobatos albomaculatus* Norman, 1930; *Rhinobatos irvinei* Norman, 1931; *Serranus accraensis* (Norman, 1931); *Spicara nigricauda* (Norman, 1931); *Branchiostegus semifasciatus* (Norman, 1931) and *Pontinus accraensis* Norman, 1935. A further nine species collected by Irvine were at the time unknown to science and have since been described by others as new species. Of particular interest is a specimen of *Panturichthys isognathus* Poll, 1953 which appears to be only the second adult specimen reported. Most of the 39 species for which material could not be located represented uncontentious records. However, there were eight species listed by Irvine, for which no voucher specimens could be located, which are unlikely to occur off Ghana, and a further two species (*Carcharodon carcharias* and *Alopias vulpinus*) for which Irvine's records cannot be considered a basis for a Ghana record. Five species (*Conger conger*, *Umbrina cirrosa*, *Scorpaena scrofa*, *Chaetodon striatus* and *Liza ramada*) are considered as doubtful records based on misidentifications. Three other species (*Dentex macrophthalmus*, *Sphyrna zygaena* and *S. tudes*) appear unlikely records for Ghana but cannot be totally dismissed. *Inter alia* this study demonstrates the critical importance of voucher specimens in museum collections to support biodiversity research.

KEYWORDS: Marine fishes, Ghana, Gulf of Guinea, Irvine, Norman, *Panthurichthys isognathus*, zoogeography.

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### Introduction

Dr Frederick Robert Irvine's *The Fishes and Fisheries of the Gold Coast* was published in 1947. The book was based on 16 years experience as a science teacher in the then Gold Coast (now Ghana) from 1924 until the Second World War and collections of over 420 fish specimens by the author and some 250 specimens by his friends and colleagues. It was a wide-ranging book which, apart from being the first attempt to catalogue the marine and freshwater fishes of Ghana, included detailed accounts of artisanal fishing techniques, methods for curing fish by drying, smoking and salting, the use of local plants for fish poisons, the seasonal occurrence of commercially important species and a fascinating record of the history and workings of the fishery in the Labadi district near Accra by a fellow teacher, Mr A. P. Brown.

Dr Irvine's work was encouraged by Mr J. R. Norman and Dr Ethelwynn Trewavas of the then British Museum (Natural History), now The Natural History Museum, in London, who helped to identify, respectively, the marine and freshwater specimens he sent back. In both groups were found several species new to science (Norman, 1930, 1931, 1935a, 1935b; Trewavas, 1943a, 1943b). The *Marine Fishes* section of Irvine's book (Norman and Irvine, 1947) covered about 180 species in almost 60 families with identifications being based on about 280 collections of specimens made by Irvine and collaborators in Ghana. Collections were deposited both at The Natural History Museum and at Achimota College in Ghana.

Fowler (1936) remarked in the introduction to his monumental compilation of what was then known about the marine fishes of the region, 'the marine fishes of West Africa have been little noticed by ichthyologists'. Compared to other geographical regions this was true, particularly for tropical West Africa, although several major studies had been carried out during the latter half of the 19th century (Bleeker, 1863; Troschel, 1866; Rochebrune, 1883; Steindachner, 1894) and early 20th century (Pellegrin, 1914; Ehrenbaum, 1915; Fowler, 1919; Metzelaar, 1919). Irvine's systematic collections in Ghana came between these studies and the explosion of ichthyological work by French (e.g. Cadenat, 1951; Roux, 1957; numerous references by Bauchot, Blache and Blanc cited below), Belgian (e.g. Poll, 1951–1959), Danish (e.g. Nielsen, 1961, 1963) and other scientists in the 1950s and 1960s (e.g. Williams, 1968), both at research centres in West Africa (e.g. Dakar, Senegal and Pointe-Noire, Congo) and as a result of oceanographic expeditions in the region (e.g. the Danish *Atlantide* (1945–1946) and *Galathea* (1950–1952) expeditions, the Belgian Oceanographic Expedition of 1948–1949, and the international Guinean Trawling Survey from Cape Roxo (12°30'N) to the mouth of the Congo (6°S) of the *Thierry* and *La Rafale* in 1963–1964). As one of the earlier marine fish faunas published from the region, Norman and Irvine (1947) has been an important source of records for later workers, from the ichthyologists cited above to the major multi-author review for the region edited by Quéro *et al.* (1990). Surprisingly, however, the supporting collections have, apart from a few specimens examined in family revisions, been largely ignored.

The voucher specimens deposited in The Natural History Museum by Irvine have now allowed us to examine the basis for most of his records. This has been possible because Irvine assigned to each specimen a collection number which he explicitly referred to in his book and which, for most specimens located, remains legible on paper tags tied to the specimens. By this means we have been able to match his collection numbers to The Natural History Museum registration numbers and thus check the majority of his records. This paper presents a re-examination of all those Irvine specimens that could be located in The Natural History Museum collections. In addition we append notes concerning the basis for his other records for which voucher material was not found.

### Materials and methods

The marine fish collections (about 225 jars of spirit-preserved specimens) made by Irvine and colleagues in Ghana and deposited at The Natural History Museum in London have been re-examined and re-identified. Some 26 jars of unregistered Irvine material containing 46 specimens were found in the collections and have now been registered. These were labelled simply as 'Duplicates' and other such unregistered material may be present. Enquiries have failed to reveal whether any of Irvine's collection of duplicate specimens (stored in formalin) deposited in Ghana at Achimota College (later the University of Ghana) has survived although it was extant in 1986 (B. Hughes, personal communication). Measurements of specimens were made with dial calipers (except for large specimens which were measured on a measuring board) and the following abbreviations are used: standard length, SL; total length, TL; fork length, FL; body length (horizontal distance from posterior margin of opercular membrane to caudal base), BL; head length (horizontal distance from tip of snout to hind margin of opercular membrane), HL; disc width (greatest width of disc of rajiform fishes), DW.

### Format

Order of families and species within families follows that in Norman and Irvine (1947) for ease of comparison but family-level taxonomy and spelling follows Nelson (1994).

For each species for which specimens were located in The Natural History Museum (BMNH) collections the following information is given (where available):

- (1) Currently accepted scientific name with authority. An asterisk preceding a specific name denotes material used to describe a new species.
- (2) The scientific name used by Irvine where this differs from the currently accepted name (listed *verbatim*, except that abbreviated authorities are given in full).
- (3) A list of all the material cited by Irvine with BMNH registration numbers and measurements added for those specimens which are extant in the Natural History Museum collections. Localities are shown in figure 1.
- (4) A note of the zoogeographical distribution of the species.
- (5) For species described from Irvine's specimens the original description is also cited. Details of the original descriptions of the other species can be found in Eschemeyer (1998).

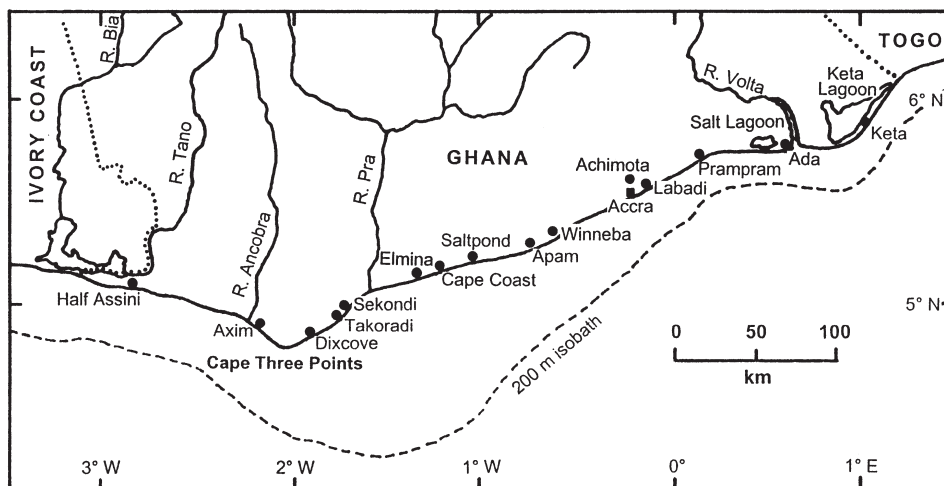


FIG. 1. Map of Ghana to show location of sites along coast where Irvine's fish specimens were collected. Based on Irvine (1947: figure 1).

- (6) A brief note of the fisheries importance of the species compiled from *FAO Yearbook. Fishery Statistics. Capture Production 1998* (FAO, 2000) and average annual landings in tonnes calculated for principal fisheries species for the years 1993–1998.

Species recorded by Irvine for which voucher specimens could not be located are included in two tables, one for species where he collected specimens which do not appear to be extant but may yet be found (table 1), and one for species which he expected to occur in Ghana or had seen but not collected (table 2). To avoid unnecessary repetition within the References and text, details of page numbers and authors of family sections in Quéro *et al.* (1990) are given only at first citation within each family.

#### Marine fishes of Ghana collected by F. R. Irvine

##### Class CHONDRICHTHYES Subclass ELASMOBRANCHII CARCHARHINIDAE

Up to 18 species of carcharhinids may occur off the coast of Ghana (Compagno, 1984) and four were recorded by Irvine. On average about 29 500 tonnes of 'other' sharks are recorded as being caught in the region each year (FAO, 2000), the majority of which are probably in this family. For two species of Sphyrninae collected by Irvine see table 1.

##### *Galeocerdo cuvier* (Péron and Lesueur, 1822)

*Irvine name.* *Galeocerdo arcticus* (Faber). A junior synonym.

*Reference material.* Accra (Irvine 155)—BMNH 1934.10.10.1 (one: 680 mm TL, 444 mm precaudal length).

*Distribution.* All tropical seas (Compagno, 1984).

Table 1. Species collected by Irvine and colleagues and recorded in Norman and Irvine (1947) but for which specimens could not be located.

FAMILY/Species	Reference material	Comments
<b>CARCHARHINIDAE</b>		
<i>Sphyrna zygaena</i> (Linnaeus, 1758).	August 1938 (Irvine 295). Irvine also noted that a 210 cm male specimen was seen at Accra in May 1938.	No specimens were found which could confirm Irvine's record. <i>Distribution</i> : off West Africa known from Morocco to Senegal. It is unclear whether reports from Ivory Coast (Compagno, 1984) and Ghana, such as Irvine's, refer to this species or <i>S. lewini</i> or perhaps <i>S. mokarran</i> , both of which are reported from the Gulf of Guinea area. On average about 120 tonnes of hammerheads are recorded as being caught in the region each year (FAO, 2000). The main fishery species is <i>S. lewini</i> .
<i>Sphyrna tudes</i> (Valenciennes, 1822). Probably a misidentification of <i>Sphyrna couardi</i> Cadenat, 1950.	Tema, December 1935 (Irvine 298, <i>p.p.</i> M. J. Field).	<b>Doubtful record.</b> <i>S. tudes</i> is a western Atlantic species that is not recorded from the area although there is a doubtful record from the Mediterranean (Cadenat and Blache, 1981; Compagno, 1984). No specimens were found which could confirm Irvine's record. We suggest that he may have collected <i>S. couardi</i> which is known in the eastern Atlantic from Senegal to Congo (Compagno, 1984).
<b>SQUATINIDAE</b>		
<i>Squatina oculata</i> Bonaparte, 1840.	Skin at Achimota (from Christiansborg), August 1938 (Irvine).	No specimen available to examine. <i>Distribution</i> : Mediterranean and eastern Atlantic from Morocco to Angola (Kreffit, 1968; Compagno, 1984).
<b>PRISTIDAE</b>		
<i>Pristis microdon</i> Latham, 1794. Listed as <i>Pristis perotteti</i> Müller and Henle. A junior synonym.	No specimens, but 'saws' at Achimota.	The 'saws' should have allowed identification but could not be located. <i>Distribution</i> : Senegal to Angola: sometimes enters rivers (Quéro <i>et al.</i> , 1990). Irvine also noted that <i>P. pectinata</i> Latham and <i>P. pristis</i> (Linnaeus) had both been often recorded from the coast of tropical West Africa (see also Poll, 1951), and probably occurred on the coast of Ghana.
<b>ELOPIDAE</b>		
<i>Elops senegalensis</i> Regan, 1909.	Sekumu Lagoon, near Accra, November 1938 (Irvine 383 pt).	No specimens found. <i>Distribution</i> : coasts of West Africa from Senegal to Congo: entering rivers (Quéro <i>et al.</i> , 1990).

Table 1. (Continued).

FAMILY/Species	Reference material	Comments
<b>ALBULIDAE</b> <i>Albula vulpes</i> (Linnaeus, 1758).	Accra, March 1930 (Irvine 67).	No specimens found. <i>Distribution:</i> in the eastern Atlantic from Senegal to Angola. Elsewhere found in almost all warm seas (Whitehead in Quéro <i>et al.</i> , 1990: 122–124). On average about 30 tonnes of this species have been recorded as being caught in the region each year although in 1997 and 1998 catches in the order of 1500 tonnes were reported (FAO, 2000).
<b>CLUPEIDAE</b> <i>Cynothrissa ansorgii</i> (Boulenger, 1916).	In estuary of River Volta, Ada, November 1938 (Irvine 370); Keta, November 1938 (Irvine 381).	No specimens found. <i>Distribution:</i> from Senegal to Angola: in rivers and estuaries (Whitehead, 1985). Primarily a freshwater species.
<b>MURAENIDAE</b> <i>Muraena melanotis</i> (Kaup, 1859). <i>Echidna peli</i> (Kaup, 1856).	Accra, January 1930 (Irvine 36). Sakumo Lagoon, Accra (Irvine 201, <i>p.p.</i> J. Lester).	Specimen not found. <i>Distribution:</i> west coast of Africa from Mauritania to Angola; also from islands of the Canaries, Cape Verde, Ascension and Gulf of Guinea (Blache, 1967a). No specimen found. <i>Distribution:</i> West Africa from Mauritania to Angola, also from the islands of Cape Verde and the Gulf of Guinea (Blache, 1967b).
<b>CONGRIDAE</b> <i>Conger conger</i> (Linnaeus, 1758).	Prampram, July 1938 (Irvine 270). [Typed list of Irvine (September 1938) indicates specimen was 30–38 cm TL.]	<b>Doubtful record.</b> No specimen found. The European conger, <i>Conger conger</i> has not been reliably recorded further south than Senegal (north of Dakar). It is likely that Irvine's specimen was the Guinean conger, <i>Paraconger notialis</i> Kanazawa, 1961 which can reach a length of 63 cm and is known from the coast of West Africa from Senegal to Angola (Blache and Bauchot, 1976). It could, however, have been a large <i>Ariosoma balearicum</i> (Delaroche, 1809).

Table 1. (Continued).

FAMILY/Species	Reference material	Comments
SYNGNATHIDAE <i>? Hippocampus punctulatus</i> Guichenot, 1853. Listed as <i>Hippocampus deani</i> Duméril. A junior synonym.	Labadi, January 1936 (A. P. Brown 2); Accra, September 1938 (Irvine 345). The Labadi specimen was caught in a local bottom-net, and the one from Accra was taken over a mile from the shore in floating brown seaweeds.	Specimens not found. We tentatively place Irvine's specimen in <i>H. punctulatus</i> on the basis that <i>H. deanei</i> of Duméril is a junior synonym. Irvine's text shows that he recognized that <i>H. deanei</i> was a synonym of <i>H. punctulatus</i> but he did not give Guichenot's name priority. <i>Distribution:</i> in the eastern Atlantic known from Cape Blanc to Angola (including the Cape Verde Islands and islands of the Gulf of Guinea). Also occurs in the western central Atlantic (Dawson in Quéro <i>et al.</i> , 1990: 658–664).
POMATOMIDAE <i>Pomatomus saltatrix</i> (Linnaeus, 1766).	Prampram, September 1938 (Irvine 326).	No specimen found. <i>Distribution:</i> in the eastern Atlantic found from Madeira, Canary Islands and Morocco southwards to South Africa. Also occurs in the Mediterranean and warm seas of the western Atlantic and Indo-West Pacific (Dooley in Quéro <i>et al.</i> , 1990: 721–722). On average about 2400 tonnes of this species are recorded as being caught in the region each year (FAO, 2000).
LUTJANIDAE <i>Lutjanus dentatus</i> (Duméril, 1858). Listed as <i>Lutjanus eutactus</i> Bleeker. A junior synonym (type locality: Ashantee).	Ningo Lagoon, May 1930 (Irvine 91).	No specimens found. <i>Distribution:</i> coast of tropical West Africa from Sierra Leone to Angola (Allen, 1985).

Table 1. (Continued).

FAMILY/Species	Reference material	Comments
<b>HAEMULIDAE</b> <i>Pomadasys jubelini</i> (Cuvier, 1830).	Ada, estuary of River Volta, November 1938 (Irvine 372). [Other specimens listed under <i>P. jubelini</i> appear to be <i>P. rogerii</i> .]	Specimen not found. <i>Distribution</i> : coast of tropical West Africa from Mauritania to Angola, entering estuaries (Quéro <i>et al.</i> , 1990). On average about 950 tonnes of this species are caught in the region each year (FAO, 2000), making it a significant fishery species.
<b>SCIAENIDAE</b> <i>Pseudotolithus</i> ( <i>Pseudotolithus</i> ) <i>senegalla</i> (Cuvier, 1830). Listed as <i>Cynoscion</i> <i>brachygnathus</i> (Bleeker). A junior synonym.	Keta, November 1938 (Irvine 382).	No specimens found. We follow Sasaki (1993) in accepting <i>P. senegalla</i> (Cuvier, 1830) as a senior synonym of <i>P. brachygnathus</i> Bleeker (1863). <i>Distribution</i> : coast of tropical West Africa from Senegal to Angola: entering hypersaline lagoons (Quéro <i>et al.</i> , 1990). On average about 630 tonnes of this species are caught in the region each year (FAO, 2000), making it quite an important fishery species.
<i>Umbrina cirrosa</i> (Linnaeus, 1758).	Accra, January 1930 (Irvine 33); ? Ningo Lagoon, May 1930 (Irvine 106).	<b>Doubtful record.</b> No specimens found. <i>Distribution</i> : Mediterranean and eastern Atlantic from Bay of Biscay to southern Morocco and perhaps Senegal (Fischer <i>et al.</i> , 1981; Quéro <i>et al.</i> , 1990). This species is <b>not</b> reliably recorded south of Senegal. Irvine's specimens may have been <i>U. steindachneri</i> Cadenat, 1951, which is reported to be common in Ghana, or <i>U. ronchus</i> Valenciennes, 1843.
<b>SPARIDAE</b> <i>Dentex canariensis</i> Steindachner, 1881. Listed under <i>Dentex</i> <i>cuninghami</i> [ <i>sic</i> ] Regan. Misidentification.	Accra, November 1930 (Irvine 128).	Specimens not found. Bauchot and Hureau, in Quéro <i>et al.</i> (1990), consider <i>Dentex cunninghamii</i> Regan, 1905 as a synonym of <i>Pagellus bellottii</i> Steindachner, 1882 but also indicated that Irvine used the name wrongly for <i>Dentex canariensis</i> . <i>Distribution</i> : coast of tropical West Africa from Morocco to Angola. Absent from the offshore islands, including the Canaries. The only specimens of ' <i>Dentex cunninghami</i> ' found (Irvine 115) appear to be <i>D. congoensis</i> .



Table 1. (Continued).

FAMILY/Species	Reference material	Comments
<b>LABRIDAE</b> <i>Coris atlantica</i> (Günther, 1862). Listed as <i>Coris julis</i> (Linnaeus). Probably a misidentification.	Prampram, June 1930 (Irvine 88); Prampram, July 1938 (Irvine 279).	No specimens found. <i>Distribution</i> : <i>C. atlantica</i> is known from the coast of West Africa from the Cape Verde Islands to Congo. Guillemaud <i>et al.</i> (2000) in a molecular study show the West African populations of <i>Coris</i> to be clearly distinct from <i>Coris julis</i> populations in the Mediterranean, Azores and European waters northwards to the British Isles.
<b>PERCOPHIDAE</b> <i>Bembrops</i> sp.	Irvine reported a specimen 22 cm long (landed at Prampram by fishermen who had taken their canoes out of sight of land), which was sent to the BM(NH) by Miss V. J. Foote.	The specimen could not be located in The Natural History Museum collections. Das and Nelson (1996) reported four species of <i>Bembrops</i> off West Africa, namely, <i>Bembrops caudimacula</i> Steindachner, 1876, <i>B. heterurus</i> (Ribeiro, 1903), <i>B. greyi</i> Poll, 1959 and <i>B. cadenati</i> Das and Nelson, 1996. However, Bruce Thompson (personal communication) indicates that the West African form of <i>B. heterurus</i> is a distinct species which he is currently describing. The reported occurrence off West Africa of the Indo-Pacific species <i>B. caudimacula</i> is surprising and needs confirming.
<b>TRICHIURIDAE</b> <i>Trichiurus lepturus</i> Linnaeus, 1758.	Accra, January 1930 (Irvine 25).	Specimen not found. <i>Distribution</i> : off coast of West Africa from Morocco to Namibia. Elsewhere found in tropical and temperate waters of most oceans (Nakamura and Parin, 1993). About 30 000 tonnes of this species are caught in the region each year (FAO, 2000), making it an important fishery species.
<b>GOBIIDAE</b> <i>Bathygobius soporator</i> (Valenciennes, 1837).	Ada, estuary of River Volta, November 1938 (Irvine 365); mouth of River Ancobra, January 1939 (Akpabla A 21).	No specimens found. <i>Distribution</i> : shores of both sides of the tropical Atlantic: entering brackish water. In the eastern Atlantic known from Senegal to Angola, including offshore islands (Quéro <i>et al.</i> , 1990). <i>Bathygobius casamancus</i> (Rochebrune, 1880) is also present in the region (Brito and Miller, 2001).

Table 1. (Continued).

FAMILY/Species	Reference material	Comments
SCORPAENIDAE <i>Scorpaena scrofa</i> Linnaeus, 1758.	Accra, July 1938 (Irvine 310); 'Gold Coast' (Irvine).	<b>Doubtful record.</b> No specimens found. <i>Distribution:</i> Mediterranean and eastern Atlantic from British Isles to Senegal and Cape Verde Islands (Eschmeyer, 1969). Unlikely to occur in Ghana.
BOTHIDAE <i>Citharichthys stampflii</i> (Steindachner, 1894).	Estuary of the River Volta (Ada), November 1938 (Irvine 364 pt).	No specimens found. <i>Distribution:</i> coast of tropical West Africa from Senegambia to Angola: entering fresh water (Nielsen, 1961).
DIODONTIDAE <i>Diodon hystrix</i> Linnaeus, 1758.	Beraku, April 1930 (Irvine 124, <i>p.p.</i> M. J. Field).	No specimens found. <i>Distribution:</i> circumglobal in tropical seas (Duron and Quéro in Quéro <i>et al.</i> , 1990: 1073–1076).

Table 2. Species listed by Norman and Irvine (1947) but for which no specimens were collected or in many cases even seen.

FAMILY/Species	Comments
<b>HEXANCHIDAE</b> <i>Hexanchus griseus</i> (Bonnaterre, 1788).	Irvine noted that this species had been found in West African waters, and might well occur on the coast of Ghana. <i>Distribution:</i> in the eastern Atlantic known from Norway to Namibia. Also widespread in the western Atlantic, Mediterranean and Indo-Pacific (Compagno, 1984).
<i>Heptranchias perlo</i> (Bonnaterre, 1788).	Irvine noted that this species had been found in West African waters, and might well occur on the coast of Ghana. <i>Distribution:</i> in the eastern Atlantic known from Morocco to Angola. Also recorded from the Mediterranean, western Atlantic, SW Indian Ocean and the western Pacific (Poll, 1951; Compagno, 1984).
<b>ODONTASPIDIDAE</b> <i>Eugomphosus taurus</i> (Rafinesque, 1809). Listed as <i>Odontaspis taurus</i> (Rafinesque).	Irvine noted 'This species has been found in West African waters, but so far I have discovered no records of its occurrence from fishermen on the coast of Ghana.' <i>Distribution:</i> in the eastern Atlantic ranges from Morocco to Cameroon. Also occurs in the Mediterranean, western Atlantic, western Pacific and off South Africa (Compagno, 1984).
<b>LAMNIDAE</b> <i>Isurus oxyrinchus</i> Rafinesque, 1810. Listed as <i>Isurus</i> <i>oxyrinchus</i> Rafinesque.	Irvine reported seeing this species at Accra in July 1938. <i>Distribution:</i> cosmopolitan in tropical and temperate seas. On average about 30 tonnes of <i>Isurus</i> are recorded as being caught in the region each year (Compagno, 1984).
<i>Carcharodon carcharias</i> (Linnaeus, 1758). Listed as <i>Carcharodon rondeletii</i> Müller and Henle. A junior synonym.	Irvine noted that this shark had been found in West African waters and probably occurred off Ghana. He noted that local fishermen had recorded huge specimens of sharks, almost too large to haul into the boats and fierce enough to attack men, which were identified on the spot as belonging to this species, but that the description might equally well apply to one of the larger pelagic sharks of the genus <i>Carcharhinus</i> . <i>Distribution:</i> in the tropical eastern Atlantic recorded off Senegal and Angola (Springer in Quéro <i>et al.</i> , 1990: 87–89), and Congo (Poll, 1951). Elsewhere widespread in subtropical and temperate seas. The source of the Ghana occurrence given by Compagno (1984) is unclear but Irvine is not a reliable basis for a Ghana record.
<b>ALOPIIDAE</b> <i>Alopias vulpinus</i> (Bonnaterre, 1788). Listed as <i>Alopias vulpes</i> (Gmelin). A junior synonym.	Irvine noted that this species was likely to occur in West African waters, but, that so far, he had been unable to obtain any record for Ghana, and that Ablo stated that it did not occur in the region. <i>Distribution:</i> in the eastern Atlantic recorded from Norway to Ghana (Compagno, 1984). Elsewhere wide ranging in temperate and tropical seas. The source of the Ghana occurrence given by Compagno (1984) is unclear but Irvine is not a reliable basis for a Ghana record.

Table 2. (Continued).

FAMILY/Species	Comments
GINGLYMOSTOMATIDAE <i>Ginglymostoma cirratum</i> (Bonnaterre, 1788).	Irvine noted: 'This species has been recorded from various parts of the West African coast, and almost certainly occurs off the coast of the Gold Coast [Ghana]' and so did not himself see this species. <i>Distribution</i> : in the tropical eastern Atlantic recorded from the Cape Verde Islands to Gabon. Also occurs in the western Atlantic and eastern Pacific (Compagno, 1984).
CHAETODONTIDAE <i>Chaetodon striatus</i> Linnaeus, 1758.	<b>Doubtful record.</b> <i>C. striatus</i> is a western Atlantic species which does not occur off West Africa (Allen, 1981). Irvine most likely was referring to <i>Chaetodon robustus</i> Günther, 1860 as it is the most common butterflyfish in Ghana. Irvine noted that he did not collect <i>C. striatus</i> and his colour description (which is correct for <i>C. striatus</i> , but does not fit any of the three tropical West African butterflyfish) must have been taken from a book. The two other butterflyfishes which occur off Ghana are <i>C. marcellae</i> Poll, 1950 and <i>C. hoefleri</i> Steindachner, 1883.
LABRIDAE <i>Thalassoma pavo</i> (Linnaeus, 1758).	Irvine noted that this species had been recorded from the 'Guinea coast' by Bleeker and from various parts of the coast of tropical West Africa and suggested that it would almost certainly be found eventually on the coast of Ghana. <i>Distribution</i> : Mediterranean and eastern Atlantic from Portugal southwards to Gabon (Quéro <i>et al.</i> , 1990).
XIPHIIDAE <i>Xiphias gladius</i> Linnaeus, 1758.	Irvine had no doubt that this species was to be found off Ghana. He reported specimens up to 1.5 m in length having been caught at Prampram, and noted it was sometimes taken in seines near Kpone. He also noted that to the east of Accra, between the years 1934 and 1937, a swordfish was reported in the local papers to have transfixed a man through the head and killed him. On average about 4300 tonnes of this species are caught in the region each year (FAO, 2000). <i>Distribution</i> : cosmopolitan in warm seas (Nakamura, 1985).
<i>Istiophorus albicans</i> (Latreille, 1804). Listed as <i>Istiophorus            americanus</i> Cuvier and Valenciennes. A junior synonym.	Specimens were seen by Irvine in 1936 (January), and at the same time three lorry loads, each fish estimated to be about 1.5 m in length, were seen by Mr A. P. Brown at Labadi. <i>Distribution</i> : tropical and subtropical Atlantic (Nakamura, 1985). On average about 1100 tonnes of this species are caught in the region each year (FAO, 2000).
GOBIIDAE <i>Porogobius schlegelii</i> (Günther, 1861). Listed as <i>Acentrogobius schlegelii</i> (Günther).	No specimens deposited by Irvine although he described its coloration in some detail. He noted that the type of the species in the Leiden Museum [Nationaal Natuurhistorisch Museum], Holland, came from Boutry, Ghana. <i>Distribution</i> : coast of tropical West Africa from Cape Verde Islands and Guinea-Bissau to Congo: entering rivers (Quéro <i>et al.</i> , 1990).

Table 2. (Continued).

FAMILY/Species	Comments
<i>Chonophorus lateristriga</i> (Duméril, 1858). Listed as <i>Awaous guineensis</i> (Peters). A junior synonym.	Irvine reported it as being seen in the River Tano and River Volta. <i>Distribution</i> : brackish and freshwaters; lagoons, estuaries from Senegal to Angola (Quéro <i>et al.</i> , 1990).
MUGILIDAE <i>Liza ramada</i> (Risso, 1826). Listed as <i>Mugil capito</i> Cuvier. A junior synonym.	<b>Doubtful record.</b> Irvine noted: 'This species has not been collected, and may not actually occur in Ghana, but young specimens recorded by Fowler [Fowler, 1919: 251] from Ashanti as <i>Liza ramada</i> (Risso) may belong here'. <i>Distribution</i> : Mediterranean and eastern Atlantic from Scandinavia to Cape Verde: entering freshwater (Quéro <i>et al.</i> , 1990). Unlikely to occur in Ghana.
<i>Liza grandisquamis</i> (Valenciennes, 1836). Listed as <i>Mugil grandisquamis</i> Cuvier and Valenciennes.	Irvine noted that 'This species was not collected, but Bleeker [Bleeker, 1863: 92, as <i>Mugil schlegeli</i> ] and Fowler [Fowler, 1919: 253] have both recorded specimens from "Ashanti"'. <i>Distribution</i> : coast of tropical West Africa from Senegal to Cameroon: entering rivers (Quéro <i>et al.</i> , 1990).

***Rhizoprionodon acutus* (Rüppell, 1837)**

*Irvine name.* *Scoliodon terrae-novae* (Richardson). Misidentification.

*Reference material.* Accra, January 1929 (Irvine 14)—BMNH 1930.3.24.1 (one: 440 mm precaudal length); Accra, 1935 (Irvine 297); Prampram, September 1938 (Irvine 322)—BMNH 1939.7.12.1 (one: 610 mm precaudal length); Accra, September 1938 (Irvine 337).

*Distribution.* In the eastern Atlantic recorded from Madeira and Mauritania to Angola. Also found in the Indo-West Pacific from South Africa and the Red Sea eastwards to Japan and Australia (Krefft, 1968; Compagno, 1984).

**TRIAKIDAE**

The smooth-hounds were included in the Carcharhinidae by Irvine but are generally considered a separate family (Nelson, 1994). One species was recorded by Irvine (see below); another species *Galeorhinus galeus* (Linnaeus, 1758) may also occur off the mainland coast of tropical West Africa, although primarily an anti-tropical species (Compagno, 1984).

***Mustelus mustelus* Linnaeus, 1758**

*Irvine name.* *Mustelus canis* (Mitchill). Misidentification.

*Reference material.* Accra, July to August 1938 (Irvine 294)—BMNH 1938.12.15.1 (one: 556 mm precaudal length); Accra, August 1938 (Irvine)—BMNH 2001.5.2.10 (one: 222 mm precaudal length).

*Distribution.* Recorded in the eastern Atlantic from the British Isles to South Africa and the Mediterranean (Compagno, 1984).

On average about 180 tonnes of *Mustelus* spp. are recorded as being caught in the region each year (FAO, 2000).

**TORPEDINIDAE**

At least four species occur off the coast of tropical West Africa (Capapé and Desoutter in Quéro *et al.*, 1990: 55–58). One was collected by Irvine.

***Torpedo (Tetronarce) mackayana* Metzelaar, 1919**

*Irvine name.* *Torpedo nobiliana* Bonaparte. Misidentification.

*Reference material.* Accra, March 1930 (Irvine 60)—BMNH 1930.8.26.1 (one: 291 mm TL); Accra, September 1938 (Irvine 340). Axim, Ghana, presented by Willoughby P. Lowe—BMNH 1911.6.30.5 (one: 160 mm TL).

*Distribution.* Coast of West Africa from Senegal to Angola (Poll, 1951; Quéro *et al.*, 1990).

**RHINOBATIDAE**

Five species appear to occur off the coast of tropical West Africa (Poll, 1951; Stehmann in Quéro *et al.*, 1990: 23–27). Irvine recorded three species from Ghana and noted [correctly] that the Mediterranean species *Rhinobatos rhinobatos* (Linnaeus, 1758) had been recorded several times from West Africa and might well occur off the coast of Ghana.

***Rhinobatos cemiculus* Geoffroy Saint-Hilaire, 1817**

*Irvine name.* *Rhinobatus rarus* Garman. A junior synonym.

*Reference material.* Accra, May 1930 (Irvine 79)—BMNH 1930.8.26.2 (one: 360 mm TL).

*Distribution.* Eastern Atlantic from Portugal to Angola and in the Mediterranean Sea (Quéro *et al.*, 1990).

**\**Rhinobatos albomaculatus* Norman, 1930**

*Irvine name.* *Rhinobatus albomaculatus* Norman.

*Reference material.* Accra, 1930 (Irvine 10), (Irvine 32)—BMNH 1930.3.24.2 (HOLOTYPE: 570 mm TL), BMNH 1930.8.26.4-5 (one: 562 mm TL), BMNH 1930.8.26.6-7 (three embryos: 160–168 mm TL); Accra, March 1930 (Irvine 98)—BMNH 1930.8.30.1 (one: 191 mm TL); Accra, March 1938 (Irvine 290).

*Distribution.* Gulf of Guinea to Angola (Quéro *et al.*, 1990).

Described as a new species by Norman (1930) on the basis of Irvine's material. He used *-us* rather than *-os* as the generic ending and Irvine followed his precedent.

**\**Rhinobatos irvinei* Norman, 1931**

*Irvine name.* *Rhinobatus irvinei* Norman.

*Reference material.* Prampram (Irvine 87)—BMNH 1930.8.26.3 (HOLOTYPE: 573 mm TL, male); Winneba, March 1933 (Irvine 178)—BMNH 1934.10.12.1 (one female: 674 mm TL); Prampram, July 1938 (Irvine 271).

*Distribution.* Coast of West Africa from Mauritania to Angola (Quéro *et al.*, 1990).

Described by Norman (1931: 352, figure 1) on the basis of Irvine's material, again using *-us* for the generic ending.

**RAJIDAE**

Some four or five species occur in coastal waters in the Gulf of Guinea area of tropical West Africa (Stehmann in Quéro *et al.*, 1990: 29–50). Several other species in the family occur offshore in deep water (over 200 m depth) on the continental slope. On average about 10 500 tonnes of Rajiformes are recorded as being caught in the region each year (FAO, 2000).

***Raja (Raja) miraletus*** Linnaeus, 1758

*Reference material.* Accra, August 1938 (Irvine 292)—BMNH 1938.12.15.2 (one male: 465 mm TL).

*Distribution.* Mediterranean and eastern Atlantic from the Bay of Biscay to South Africa (Krefft, 1968; Quéro *et al.*, 1990).

**DASYATIDAE**

About eight species in three genera occur on the coast of tropical West Africa (Capapé and Desoutter in Quéro *et al.*, 1990: 59–63), two of which were collected by Irvine.

***Dasyatis margarita*** (Günther, 1870)

*Irvine name.* *Trygon margarita* Günther.

*Reference material.* Accra, January 1930 (Irvine 12 A); Accra, February 1929 (Irvine 12 B)—BMNH 1930.3.24.3 (one: 711 mm TL, 211 mm DW); Accra, January 1938 (Irvine 394).

*Distribution.* Coasts of West Africa from Mauritania to Angola (Quéro *et al.*, 1990).

***Dasyatis pastinaca*** (Linnaeus, 1758)

*Irvine name.* *Trygon pastinaca* (Linnaeus).

*Reference material.* Accra, January 1939 (Irvine 393)—BMNH 1939.7.12:2 (one: 910 mm TL, 361 mm DW).

*Distribution.* Coast of West Africa from Morocco to Angola and the Cape Verde Islands. Also known from the Mediterranean and northwards along the coast of Europe to southern Ireland and the western Baltic as well as from South Africa (Quéro *et al.*, 1990).

**GYMNURIDAE**

The butterfly rays were included in the Dasyatidae by Irvine but are generally considered a separate family (Nelson, 1994). Two species occur off tropical West Africa (Poll, 1951; McEachran and Séret in Quéro *et al.*, 1990: 64–66) and both were recorded by Irvine.

***Gymnura micrura*** (Bloch and Schneider, 1801)

*Irvine name.* *Pteroplatea micrura* (Schneider).

*Reference material.* Accra, January 1930 (Irvine 31)—BMNH 1930.3.24.4 and BMNH 1930.8.26.9 (two: 133 mm TL, 183 mm DW; 170 mm TL, 235 mm DW);

Accra, October 1938 (Irvine 353)—BMNH 1963.8.9.3 (one: 234 mm TL, 338 mm DW).

*Distribution.* Off the mainland coast of West Africa from Senegal to the Congo (Quéro *et al.*, 1990). Also known from New England to Rio Janeiro in the western Atlantic.

***Gymnura altavela* (Linnaeus, 1758)**

*Irvine name.* *Pteroplatea altavela* (Linnaeus).

*Reference material.* Accra, October 1938 (Irvine 352, *p.p.* Nortey)—BMNH 1939.7.12.3 (one: 376 mm TL, 544 mm DW).

*Distribution.* Mediterranean and eastern Atlantic from Portugal to Angola (Quéro *et al.*, 1990). Also known from Massachusetts to La Plata River in the western Atlantic.

**MYLIOBATIDAE**

At least four species occur off the coast of tropical West Africa (McEachran and Séret in Quéro *et al.*, 1990: 67–70), one of which was definitely recorded from Ghana by Irvine, who thought that two others might also occur. Irvine listed his specimen of the Bull ray, *Pteromylaeus bovinus*, as *Myliobatis aquila* (Linnaeus, 1758) but noted that the former species had been recorded from Senegal and probably occurred on the coast of Ghana. He further suggested [correctly] that it was possible that the spotted eagle ray, *Aetobatus narinari* (Euphrasen, 1790), would also be found.

***Pteromylaeus bovinus* (Geoffroy Saint-Hilaire, 1817)**

*Irvine name.* *Myliobatis aquila* (Linnaeus). Misidentification, despite correct key and figure which is clearly *P. bovinus*.

*Reference material.* Ghana (Irvine 55)—BMNH 1930.8.26.8 (one: 691 mm TL, 304 mm DW).

*Distribution.* In the eastern Atlantic from Portugal to South Africa. Also recorded from the Mediterranean and SW Indian Ocean (Quéro *et al.*, 1990).

**Class ACTINOPTERYGII**

**Division TELEOSTEI**

**ELOPIDAE**

Two species occur off the coast of tropical West Africa (Poll, 1953; Whitehead in Quéro *et al.*, 1990: 118–119) and both were recorded from Ghana by Irvine (see also table 1).

***Elops lacerta* Valenciennes, 1846**

*Reference material.* Accra, January 1930 (Irvine 19)—BMNH 1930.3.24.5 (one: 232 mm SL); Ada, October 1938 (Irvine 362)—BMNH 2001.5.2.11 (one: 158 mm SL); Sekumu Lagoon, near Accra, November 1938 (Irvine 383 pt)—BMNH 2001.5.2.12 (one: 217 mm SL). Angaswi, Volta estuary, Ghana, coll. Buxton—BMNH 1949.10.20.2 (one: 109.4 mm SL).



*Distribution.* Coasts of West Africa from Mauritania to Angola: entering rivers (Quéro *et al.*, 1990).

#### MEGALOPIDAE

This family was included in the Elopidae by Irvine. A single species occurs off the coast of West Africa (Poll, 1953; Saldanha and Whitehead in Quéro *et al.*, 1990: 120–121).

##### *Megalops atlanticus* Valenciennes, 1847

*Reference material.* Sekumu Lagoon, near Accra, May 1930 (Irvine 129 B)—BMNH 1932.2.27.1-2 (one specimen only: 105 mm SL).

*Distribution.* Both sides of the tropical Atlantic. Regular occurrence from Senegal to Angola in the eastern Atlantic (Quéro *et al.*, 1990).

#### CLUPEIDAE

Five marine species occur off the coast of Ghana and neighbouring countries (Poll, 1953; Whitehead, 1985) and four were recorded by Irvine along with a primarily freshwater species (see table 1). On average about 830 000 tonnes of clupeids are recorded as being caught in the region each year (FAO, 2000) making this family the most important in terms of catch.

##### *Sardinella aurita* Valenciennes, 1847

*Reference material.* Accra, January 1930 (Irvine 23); Teshi, June 1930 (Irvine 104)—BMNH 1930.8.26.25 (one: 188 mm SL); Prampram, September 1939 (Irvine 406)—BMNH 1939.7.12.4 (one: 106.5 mm SL), BMNH 2001.5.2.13 (one: 77.5 mm SL); off shore at Tema, Ghana, coll. D. Pennack—BMNH 1973.4.26.11–13 (three: 115.5–149.6 mm SL).

*Distribution.* In the eastern Atlantic known from southern Portugal to Angola. Also found in the Mediterranean, western Atlantic and Japan (Whitehead, 1985).

On average about 360 000 tonnes of this species are caught in the region each year (FAO, 2000), making it the most important fishery species in terms of catch. Catches have risen substantially in recent years and current catch rates may not be sustainable.

##### *Sardinella maderensis* (Lowe, 1839)

*Irvine name.* *Sardinella cameronensis* Regan. A junior synonym.

*Reference material.* Teshi, June 1930 (Irvine 103)—BMNH 1930.8.26.24 (one: 174 mm SL).

*Distribution.* Coast of West Africa from Morocco to Angola (Whitehead, 1985). Also occurs in the Mediterranean.

On average about 105 000 tonnes of this species are caught in the region each year (FAO, 2000), making it the one of the most important fishery species in terms of catch. Catches have recently doubled and current catch rates may not be sustainable.

***Ethmalosa fimbriata* (Bowdich, 1825)**

*Irvine name.* *Ethmalosa dorsalis* (Cuvier and Valenciennes). A junior synonym.

*Reference material.* Accra, March 1930 (Irvine 69)—BMNH 1930.8.26.14 (one: 112.7 mm SL); Ningo lagoon, May 1930 (Irvine 89)—BMNH 1930.8.26.11–13 (three: 64.2–71.2 mm SL); Prampram, September 1938 (Irvine 327); Keta, November 1938 (Irvine 377); Accra, August 1938 (Irvine 256)—BMNH 2001.5.2.40 (one: 152 mm SL); Freetown, Sierra Leone (no Irvine number)—BMNH 1930.8.26.10 (one: 195 mm SL).

*Distribution.* Coast of West Africa from western Sahara to Angola; lagoons and brackish water (Whitehead, 1985).

On average about 148 000 tonnes of this species are caught in the region each year (FAO, 2000), making it one of the most important fishery species in the region.

***Ilisha africana* (Bloch, 1795)**

*Irvine name.* *Ilisha melanota* Derscheid A junior synonym.

*Reference material.* Accra, March 1930 (Irvine 71)—BMNH 1930.8.26.15–17 (three: 96.7–114.2 mm SL).

*Distribution.* Coasts and estuaries of tropical West Africa from Senegal to Angola (Whitehead, 1985).

On average about 7800 tonnes of this species are caught in the region each year (FAO, 2000), making it an important fishery species.

**ENGRAULIDAE**

A single species is known from the West African coast (Whitehead *et al.*, 1988) and was reported under the Clupeidae by Irvine.

***Engraulis encrasicolus* (Linnaeus, 1758)**

*Irvine name.* *Engraulis encrasicolus* (Linnaeus).

*Reference material.* Prampram, September 1938 (Irvine 405)—BMNH 1939.7.12.5–7 (four: 63.2–77.0 mm SL).

*Distribution.* Mediterranean and eastern Atlantic from Norway to Angola (Whitehead *et al.*, 1988).

On average about 109 000 tonnes of this species are recorded as being caught in the region each year (FAO, 2000), making it one of the most important fishery species.

**SYNODONTIDAE**

One species (see below) was recorded by Irvine and appears to occur all along the mainland Gulf of Guinea coast of West Africa. Another, *Saurida brasiliensis* Norman, 1935, appears to be anti-tropical in the eastern Atlantic and is recorded from Gabon to Angola and Mauritania to Senegal (Sulak in Quérou *et al.*, 1990: 365–370).

***Trachinocephalus myops* (Forster, 1801)**

*Reference material.* Winneba, March 1933 (Irvine 166)—BMNH 1934.10.12.3 (one: 223 mm SL); Prampram, July 1938 (Irvine 277)—BMNH 1938.12.15.5 (one: 167 mm SL); Accra, February 1939 (Irvine 404).

*Distribution.* Warm parts of the Atlantic, Indian and Pacific oceans (except eastern Pacific). In eastern Atlantic found from Cape Verde Islands and Senegal to Namibia (Quéro *et al.*, 1990).

**ARIIDAE**

Three species (*Arius heudeloti* Valenciennes, 1840, *A. latiscutatus* (discussed below) and *A. parkii* Günther, 1864) occur in the sea off tropical West Africa and one was recorded by Irvine. On average about 22 000 tonnes of sea catfishes are recorded as being caught in the region each year (FAO, 2000).

***Arius latiscutatus* Günther, 1864**

*Reference material.* Accra, December 1929 (Irvine 5); Accra, September 1938 (Irvine 340)—BMNH 1944.2.9.8 (one: 255 mm SL).

*Distribution.* Coast of West Africa, from northern Senegal to the Congo and Angola; often entering rivers (Taylor in Quéro *et al.*, 1990: 230–234).

Irvine also collected the freshwater *Arius gigas* Boulenger, 1911 (Atimpoku, River Volta, May (Irvine 233)—BMNH 1969.3.17.8 (one: 185 mm SL).

**MURAENIDAE**

At least six species occur along the mainland coast of tropical West Africa (Blache, 1967a, 1967b, 1967c) and four were recorded by Irvine (see also table 1).

***Muraena robusta* Osorio, 1909**

*Irvine name.* *Muraena helena* Linnaeus. Misidentification.

*Reference material.* Accra, July 1938 (Irvine 251)—BMNH 1938.12.15.3 (one: approx. 830 mm TL, 152 vertebrae).

*Distribution.* Eastern Atlantic from Mauritania to Angola (Blache, 1967a).

***Lycodontis afer* (Bloch, 1795)**

*Irvine name.* *Gymnothorax vicinus* (Castelnau). Misidentification.

*Reference material.* Accra, January 1930 (Irvine 15)—BMNH 1930.3.24.6 (one: 618 mm TL); Prampram, September 1938 (Irvine 320)—BMNH 1939.7.12.9 (one: approx. 753 mm TL).

*Distribution.* Found off the coast of West Africa from Mauritania to Angola and at the Cape Verde Islands (Blache, 1967c).

**HETERENCHELYIDAE**

At least five species of heterenchelyid eels are known from the tropical eastern Atlantic, of which two, in the genus *Pythonichthys* and two in the genus *Panturichthys* are reported to occur in the Gulf of Guinea area (Poll, 1953; Blache, 1968). These eels grow to 0.5–1.5 m in length but are rarely caught and reported. A single Irvine

specimen, which Irvine did not mention in his book, was found in the Natural History Museum collections in London.

***Panturichthys isognathus* Poll, 1953**

*Irvine name.* Species omitted from book. Specimen in collections originally labelled as *Pythonichthys microphthalmus* (Regan, 1912) but later re-identified as a *Panturichthys* species by A. Ben-Tuvia.

*Reference material.* Accra, Ghana, from stomach of Blue shark (*Prionace glauca*), January 1938, coll. V.J. Foote—BMNH 1938.12.15.4 (one: 300 mm SL).

*Distribution.* Known from the coast of West Africa from Ghana to Angola (Blache, 1968).

This specimen, which is in poor condition having been in a shark stomach, appears to be only the second adult example of this species reported. The dentition very closely matches that of *Panturichthys isognathus* illustrated by Blache (1968: figure 20) and the number of vertebrae (148) is close to that of the holotype (141). *Panturichthys longus*, which also occurs in the Gulf of Guinea has 209–227 vertebrae, whilst *P. mauritanicus*, which is known from Morocco to Guinea, has 164–176 vertebrae.

**OPHICHTHIDAE**

At least 16 species occur in shallow waters on the coast of mainland West Africa and further species are recorded from deep waters (200–500 m depth) offshore (Blache, 1971; Blache and Cadenat, 1971; Blache and Bauchot, 1972; Blache and Saldanha, 1972). Two were collected by Irvine.

***Pisodonophis semicinctus* (Richardson, 1848)**

*Irvine name.* *Ophichthus semicinctus* (Richardson).

*Reference material.* Accra, January 1930 (Irvine 11)—BMNH 1930.3.24.7–10 (four: 504–675 mm TL); Accra, 1934 (Irvine 300, *p.p.* Woodward); Accra, January 1939 (Irvine 398).

*Distribution.* Coast of West Africa from Morocco to Angola (Blache and Saldanha, 1972). Also in the Mediterranean.

***Dalophis cephalopeltis* (Schlegel MS, in Bleeker, 1863)**

*Irvine name.* *Sphagebranchus cephalopeltis* Bleeker.

*Reference material.* Near mouth of River Densu, 1936 (Irvine 211, *p.p.* Mr Lester)—BMNH 1937.2.6.4 (one: 347 mm TL, 185 vertebrae).

*Distribution.* Coast of West Africa from Liberia to Pointe Noire, Congo (Blache and Bauchot, 1972).

**BELONIDAE**

Four species may occur off the coast of Ghana (Collette and Parin, 1970), although only one of these (*Ablennes hians*) was reported by Irvine. The other species which may be expected along the West African mainland coast are *Strongylura senegalensis* (Valenciennes, 1846), *Tylosurus acus rafale* Collette and Parin, 1970 and *Tylosurus crocodilus crocodilus* (Péron and Lesueur, 1821) (Collette and Parin

in Quéro *et al.*, 1990: 592–597). On average about 1000 tonnes of needlefishes are caught in the region each year (FAO, 2000).

*Ablennes hians* (Valenciennes, 1846)

*Reference material.* Accra, November 1930 (Irvine 117)—BMNH 1932.2.27.3 (one: 685 mm SL, 524 mm BL).

*Distribution.* In the eastern Atlantic known for the Cape Verde Islands and Dakar to southern Angola. Elsewhere found in all tropical and subtropical seas (Collette and Parin, 1970).

#### HEMIRAMPHIDAE

Three species are found in coastal waters off the tropical West African mainland (Collette, 1965). A further two species are found in offshore waters (Collette and Parin in Quéro *et al.*, 1990: 579–582). On average about 300 tonnes of halfbeaks are recorded as being caught in the region each year (FAO, 2000).

*Hemiramphus brasiliensis* (Linnaeus, 1758)

*Irvine name.* Material listed under both *Hemirhamphus brasiliensis* and *Hyporhamphus calabaricus* (Günth.)=*H. picarti* (Valenciennes, 1847). The only material listed by Irvine under *H. calabaricus* (Irvine 59) is a specimen of *Hemiramphus brasiliensis*.

*Reference material.* Keta, November 1938 (Irvine 376)—BMNH 1939.7.12.8 (one: 211 mm SL, 137 mm BL); Accra, March 1930 (Irvine 59, listed as *Hyporhamphus calabaricus*)—BMNH 1930.8.26.18 (one: 220 mm SL, 143 mm BL). Both BMNH specimens were listed in Collette (1965); the first with an incorrect registration number (1939.7.17.8).

*Distribution.* In the eastern Atlantic known from Cape Verde Islands and Senegal to Angola. Also known in the western Atlantic from Massachusetts to Rio de Janeiro (Collette, 1965).

*Hemiramphus balao* Lesueur, 1821

*Irvine name.* Not listed in book although specimen found.

*Reference material.* Prampram, July 1938 (Irvine 269)—BMNH 1963.10.18.1 (one: 297 mm SL, 173 mm BL). Listed in Collette (1965) as 'probably Ghana'. (Provenance of specimen was found on a typed list from Irvine dated September 1938, which is in the Fish Section correspondence archives.)

*Distribution.* In the eastern Atlantic known from the Canary Islands and also from Ivory Coast southwards to Angola. Also known in the western Atlantic from New York to Brazil (Collette, 1965).

#### EXOCOETIDAE

Seven species would be expected to occur off the mainland coast of tropical West Africa (Parin and Gibbs in Quéro *et al.*, 1990: 583–591) but only one was collected by Irvine. On average about 800 tonnes of flyingfishes are recorded as being caught in the region each year (FAO, 2000).

***Cheilopogon melanurus*** (Valenciennes, 1847)

*Irvine name.* *Cypsilurus lutkeni* (Jordan and Evermann). A junior synonym.

*Reference material.* Accra, January 1930 (Irvine 37)—BMNH 1930.3.24.11 (one: 236 mm SL); Accra, January 1939 (Irvine 389).

*Distribution.* In the eastern Atlantic known from Senegal to Nigeria. Also occurs in the western central Atlantic (Gibbs and Staiger, 1970).

**FISTULARIIDAE**

Two species occur along the coast of tropical West Africa (Poll, 1953; Fritzsche in Quéro *et al.*, 1990: 654–655). In addition to *Fistularia tabacaria* reported by Irvine, there is *F. petimba* Lacepède, 1803.

***Fistularia tabacaria*** Linnaeus, 1758

*Reference material.* Accra, 1936 (Irvine 207); Teshi, February 1936 (A. P. Brown 6)—BMNH 1937.2.6.1 (one: 587 mm SL, 829 mm TL).

*Distribution.* In the eastern Atlantic known from Cape Blanc to Angola (including the Cape Verde Islands and islands of the Gulf of Guinea). Also occurs in the western central Atlantic (Quéro *et al.*, 1990).

**HOLOCENTRIDAE**

One or possibly two species occur on the coast of mainland tropical West Africa (Poll, 1954; Ben-Tuvia in Quéro *et al.*, 1990: 627–628) of which one was recorded by Irvine.

***Sargocentron hastatum*** (Cuvier, 1829)

*Irvine name.* *Holocentrus hastatus* Cuvier and Valenciennes.

*Reference material.* Locality? (Irvine 119); Winneba, March 1933 (Irvine 173)—BMNH 1934.10.12.8 (one: 201 mm SL); Accra, 1936 (Irvine 205)—BMNH 2001.5.2.14 (one: 171 mm SL); Prampram, September 1938 (Irvine 323), Irvine (no number or locality).

*Distribution.* Along the coast of tropical West Africa from Senegal to Angola, including the Cape Verde Islands (Quéro *et al.*, 1990).

**SERRANIDAE**

About 18 species occur off the mainland coast of tropical West Africa (Smith in Quéro *et al.* 1990: 695–706; Maugé in Quéro *et al.*, 1990: 707–710; Heemstra, 1991; Heemstra and Randall, 1993) and 10 were recorded by Irvine. On average about 16 500 tonnes of serranids are recorded as being caught in the region each year (FAO, 2000).

***Cephalopholis nigri*** (Günther, 1859)

*Irvine name.* *Petrometopon nigri* (Günther).

*Reference material.* Accra, January 1930 (Irvine 34)—BMNH 1930.3.24.12 (one: 90.0 mm SL); Winneba, March 1930 (Irvine 172)—BMNH 1934.10.12.10 (one:

188 mm SL). Accra, February 1939 (Irvine 403)—BMNH 1939.7.12.11 (one: 172 mm SL), BMNH 1969.2.17.23 (one: 108.6 mm SL).

*Distribution.* Coast of West Africa from Senegal to Angola (Heemstra, 1991).

*Cephalopholis taeniops* (Valenciennes, 1828)

*Reference material.* Prampram, 35 miles east of Accra, May 1930 (Irvine 82)—BMNH 1930.8.26.26 (one: 218 mm SL); Kpone, September 1936 (*p.p.* M. J. Field); Prampram, July 1938 (Irvine 280).

*Distribution.* Coast of West Africa from West Sahara to Angola, including islands of Cape Verde and the Gulf of Guinea (Heemstra, 1991).

*Epinephelus costae* (Steindachner, 1878)

*Irvine name.* *Epinephelus alexandrinus* (Cuvier and Valenciennes). Misidentification; holotype of *Serranus Alexandrinus* Valenciennes, 1828 was fairly recently found (Heemstra, 1991) to be a specimen of *Epinephelus fasciatus* (Forsskål, 1775).

*Reference material.* Accra, June 1931 (Irvine 142); Accra, May 1938 (Irvine 249)—BMNH 1938.12.15.6 (one: 445 mm SL); Accra, January 1939 (Irvine 402)—BMNH 1939.7.12.10 (one: 258 mm SL).

*Distribution.* Mediterranean, Cape Verde Islands and coast of West Africa from Morocco to Angola (Heemstra, 1991). Widely recorded as *Epinephelus alexandrinus*, for example, Bauchot and Blanc (1961b).

*Epinephelus goreensis* (Valenciennes, 1830)

*Reference material.* Accra, April (?) 1930 (Irvine 43)—BMNH 1930.8.26.23 (one: 270 mm SL); Prampram, May 1930 (Irvine 83); Accra, July 1938 (Irvine 284)—BMNH 1938.12.15.9 (specimen not found in BMNH collections).

*Distribution.* Coast of West Africa from Senegal to Angola as well as Canary and Cape Verde Islands (Heemstra, 1991).

*Epinephelus aeneus* (Geoffroy Saint-Hilaire, 1809)

*Reference material.* Botiano Lagoon, near Accra, March 1930 (Irvine 73); Accra, June 1931 (Irvine 140); Accra, May 1938 (Irvine 250)—BMNH 1938.12.15.7 (one: 294 mm SL).

*Distribution.* Coast of West Africa from Morocco to Angola. Also occurs in the Mediterranean, along the Atlantic coasts of southern Spain and Portugal and at the Canary and Cape Verde Islands (Heemstra and Randall, 1993).

*Epinephelus marginatus* (Lowe, 1834)

*Irvine name.* *Epinephelus gigas* (Brünnich). Species described by Brünnich not clear (*nomen dubium*) as no type specimen (Heemstra, 1991). Specimens of '*E. gigas*' from West Africa reported by Poll (1954) are *E. haifensis* Ben-Tuvia, 1953 with which *E. marginatus* has often been confused (Heemstra and Randall, 1993).

*Reference material.* Accra, July 1938 (Irvine 283)—BMNH 1938.12.15.8 (one: 278 mm SL).



*Distribution.* Mediterranean and eastern Atlantic from southern British Isles to South Africa. Also known from Brazil (Heemstra and Randall, 1993).

Widely recorded under the name '*Epinephelus guaza*' (e.g. Bauchot and Blanc, 1961b), however, this name is now regarded as a *nomen dubium* (Heemstra, 1991). On average about 575 tonnes of this species are recorded as being caught in the region each year (FAO, 2000).

***Serranus cabrilla*** (Linnaeus, 1758)

*Reference material.* Accra, March 1930 (Irvine 42)—BMNH 1930.8.26.27 (one: 227 mm SL); Accra, June 1930 (Irvine 105); Accra, May 1938 (Irvine 253)—BMNH 1938.12.15.10 (one: 187 mm SL).

*Distribution.* Mediterranean and eastern Atlantic from British Isles to Angola; Red Sea (Quéro *et al.*, 1990).

**\**Serranus accraensis*** (Norman, 1931)

*Irvine name.* *Neanthias accraensis* Norman. The HOLOTYPE specimen (Irvine 66) was reported separately in the book under 'Sea perch—*Anthias* (?) sp.' which suggests some failure of communication between Norman and Irvine.

*Reference material.* Accra, March 1930 (Irvine 66)—BMNH 1930.8.26.28 (HOLOTYPE: 117.7 mm SL); Accra, May 1938 (Irvine 263); Accra, July 1938 (Irvine 312)—BMNH 1938.12.15.11–12 (two: 97.1, 102.6 mm SL); Accra, October 1938 (Irvine 349, *p.p.* Mr Nortey).

*Distribution.* Coast of tropical West Africa from Ghana to Angola (Poll, 1954; Bauchot and Blanc, 1961b).

Described by Norman (1931: 354, figure 2) as a new species *Neanthias accraensis* from Irvine's material.

***Anthias anthias*** (Linnaeus, 1758)

*Reference material.* Accra, November 1930 (Irvine 126)—BMNH 1932.2.27:4 (one: 171 mm SL); Accra, September 1938 (Irvine 335)—BMNH 2001.5.2.15 (one: 166 mm SL), BMNH 2001.5.2.16 (one: 157 mm SL).

*Distribution.* Mediterranean and eastern Atlantic from Portugal to Angola (Quéro *et al.*, 1990).

**GRAMMISTINI**

The soapfishes have been classed in the family Grammistidae in many recent texts but are now considered to belong within the serranid subfamily Epinephelinae (Baldwin and Johnson, 1993) with the genus *Rypticus* being placed in the tribe Grammistini. They were included in the Serranidae by Irvine. Two species are known from the mainland coast of tropical West Africa, of which one, *Rypticus saponaceus*, was collected by Irvine. The other, *R. subbifrenatus* Gill, 1861, is small (up to 16 cm) and rarely observed.



***Rypticus saponaceus* (Bloch and Schneider, 1801)**

*Reference material.* Winneba (Irvine 171)—BMNH 1934.10.12.9 (one: 161 mm SL); Prampram, July 1938 (Irvine 278); (Irvine 51)—BMNH 1930.8.30.2 (one: 177 mm SL).

*Distribution.* Both sides of the tropical Atlantic and on the tropical central Atlantic islands. Occurs from Senegal to the Congo and in the Cape Verde Islands in the eastern Atlantic (Quéro *et al.*, 1990).

**PRIACANTHIDAE**

Two species may occur off the mainland coast of West Africa (Bauchot and Blanc, 1961b). In addition to *Priacanthus arenatus* reported by Irvine from Ghana, *Heteropriacanthus cruentatus* Lacepède, 1801 may also be present in the region (Bauchot and Blanc, 1961b), although Starnes (1988) noted that it was 'not definitely recorded from African continental waters'. On average about 15 tonnes of priacanthids are recorded as being caught in the region each year (FAO, 2000).

***Priacanthus arenatus* Cuvier, 1829**

*Reference material.* Prampram, 35 miles east of Accra, May 1930 (Irvine 81)—BMNH 1930.8.26.29 (one: 218 mm SL); Christiansborg, Accra, July 1938 (Irvine 311)—BMNH 2001.5.2.17 (one: 129.8 mm SL).

*Distribution.* Coast of West Africa from Western Sahara to Namibia. Also occurs in the tropical and subtropical western Atlantic (Starnes, 1988).

**MALACANTHIDAE**

Listed under the Blanquillos (Latilidae) by Irvine and more recently by others in the Branchiostegidae. Now this group is generally combined with the Malacanthinae in the family Malacanthidae (Nelson, 1994). A single species is found on the coast of West Africa (Poll, 1954; Dooley in Quéro *et al.*, 1990: 719).

**\**Branchiostegus semifasciatus* (Norman, 1931)**

*Irvine name.* *Latilus semifasciatus* Norman.

*Reference material.* Accra, February 1930 (Irvine 44)—BMNH 1930.8.26.44 (HOLOTYPE: 246 mm SL); Accra, BMNH 1938.12.15.14–15 (two: 214, 228 mm SL).

*Distribution.* Coast of West Africa from Morocco to Angola Africa (Quéro *et al.*, 1990).

Described as a new species, *Latilus semifasciatus*, from Irvine's material by Norman (1931: 356, figure 3).

**CARANGIDAE**

At least 22 species occur on the mainland coast of tropical West Africa (Poll, 1954; Bauchot and Blanc, 1963; Smith-Vaniz *et al.* in Quéro *et al.*, 1990: 729–755). Some 12 of these were reported by Irvine from Ghana. On average about 40 000 tonnes of carangids are recorded as being caught in the region each year (FAO, 2000).

**'Decapterus' rhonchus** (Geoffroy Saint-Hilaire, 1817)

*Reference material.* Accra, January 1930 (Irvine 38)—BMNH 1930.3.24.16–17 (three: 79.1–92.9 mm SL); no locality or date (Irvine 156)—BMNH 1934.10.10.15 (one: 308 mm FL); Prampram, September 1938 (Irvine 317).

*Distribution.* Coast of West Africa from Morocco to southern Angola. Also occurs in the Mediterranean (Bertin and Dollfus, 1948).

The genus name is placed in quotes because this species has characters which distinguish it from both *Decapterus* and *Caranx* (Smith-Vaniz *et al.*, 1979) and it may merit a monotypic genus of its own (Smith-Vaniz *et al.* in Quéro *et al.*, 1990: 729–755). On average about 3300 tonnes of this species are caught in the region each year (FAO, 2000), making it an important fishery species.

***Hemicaranx bicolor*** (Günther, 1860)

*Reference material.* Accra, January 1930 (Irvine 29)—BMNH 1930.8.26.47–48 (two: 44.5, 47.5 mm SL); Accra, September 1938 (Irvine 344).

*Distribution.* Coast of tropical West Africa from at least Sierra Leone to Angola (Quéro *et al.*, 1990).

***Caranx senegallus*** Cuvier, 1833

*Irvine name.* *Caranx africanus* Steindachner. A junior synonym.

*Reference material.* Accra, May 1930 (Irvine 94)—BMNH 1930.8.26.53–54 (two: 93.8, 104.9 mm FL).

*Distribution.* Coast of West Africa from Mauritania to Angola (Quéro *et al.*, 1990).

***Caranx hippos*** (Linnaeus, 1766)

*Reference material.* Accra, March 1930 (Irvine 53)—BMNH 1930.8.26.49–50 (two: 91.5, 139.1 mm SL); Amedica, River Volta, May 1938 (Irvine 237); Prampram, September 1938 (Irvine 316)—BMNH 1939.7.12.12 (specimen not found in the BMNH collections); mouth of Ancobra River, January 1939 (Akpabla A 9).

*Distribution.* Coast of West Africa from Morocco to southern Angola. Also known from the Mediterranean and western Atlantic (Quéro *et al.*, 1990).

On average about 3700 tonnes of this species are caught in the region each year (FAO, 2000), making it an important fishery species.

***Caranx crysos*** (Mitchill, 1815)

*Reference material.* Accra, March 1930 (Irvine 95); mouth of Ancobra River, January 1939 (Akpabla A 16)—BMNH 1939.7.12.14 (one: 134 mm FL).

*Distribution.* Coast of West Africa from Senegal to Angola. Also found in the Mediterranean and western Atlantic (Quéro *et al.*, 1990).

***Alectis alexandrinus*** (Geoffroy Saint-Hilaire, 1817)

*Irvine name.* *Scyris alexandrinus* (Geoffroy Saint-Hilaire).

*Reference material.* Accra, January 1930 (Irvine 21)—BMNH 1930.3.24.18–19 (two: 75.5, 80.6 mm SL); Accra, May 1938 (Irvine 258); Keta, November 1938 (Irvine 375)—BMNH 1939.7.12.13 (one: 170 mm SL).

*Distribution.* Mediterranean and coast of West Africa from Morocco to southern Angola (Quéro *et al.*, 1990).

***Selene dorsalis*** (Gill, 1862)

*Irvine name.* *Vomer setapinnis* (Mitchill). Misidentification.

*Reference material.* Accra, January 1930 (Irvine 22)—BMNH 2001.5.2.18–19 (two: 68.5, 75.0 mm SL).

*Distribution.* In the eastern Atlantic recorded from Cape Verde Islands and coast of West Africa from Senegal to Namibia. Also reported from Madeira and Portugal (Quéro *et al.*, 1990).

On average about 2100 tonnes of this species are caught in the region each year (FAO, 2000), making it an important fishery species.

***Chloroscombrus chrysurus*** (Linnaeus, 1776)

*Reference material.* Accra, January 1930 (Irvine 27)—BMNH 1930.3.24.21–24 (six: 55.5–66.5 mm SL); Accra, 1935 (Irvine 307); mouth of River Ancobra, January 1939 (Akpabla A 14)—BMNH 1939.7.12.15 (one: 193 mm SL).

*Distribution.* Coast of West Africa from Mauritania to Angola. Also occurs in subtropical and tropical western Atlantic (Quéro *et al.*, 1990).

On average about 6100 tonnes of this species are caught in the region each year (FAO, 2000), making it an important fishery species in terms of catch.

***Lichia amia*** (Linnaeus, 1758)

*Reference material.* Accra, May 1930 (Irvine 96)—BMNH 1930.8.30.7 (one: 201 mm SL).

*Distribution.* Mediterranean and eastern Atlantic from Morocco to Angola (Quéro *et al.*, 1990).

On average about 1700 tonnes of this species are caught in the region each year (FAO, 2000), making it an important fishery species.

***Trachinotus ovatus*** (Linnaeus, 1758)

*Irvine name.* *Trachinotus glaucus* (Linnaeus). A junior synonym (based on page priority).

*Reference material.* Accra, January 1929 (Irvine 8) ?—BMNH 1934.10.12.15 (one: 88.2 mm SL), BMNH 2001.5.2.20 (one: 135 mm SL).

*Distribution.* Mediterranean and coast of West Africa from Morocco to Angola and offshore islands (Quéro *et al.*, 1990).

***Trachinotus teraia*** Cuvier, 1832

*Irvine name.* *Trachinotus falcatus* (Linnaeus). Misidentification.

*Reference material.* South of Amedica, Volta River (Irvine 243)—BMNH 1938.12.15.27 (one: 104 mm SL).

*Distribution.* Known from the Cape Verde Islands southward to Gabon (Quéro *et al.*, 1990).

***Trachinotus goreensis* Cuvier, 1832**

*Reference material.* Accra, January 1929 (Irvine 9)—BMNH 1930.3.24.20 (one: 135 mm SL); Accra, March 1930 (Irvine 63)—BMNH 1930.8.26.55–57 (three: 65.2–124.2 mm SL); Prampram, September 1938 (Irvine 325)—BMNH 1939.7.12.16 (one: 97.4 mm SL); mouth of Ancobra River, January 1939 (Akpabla A 13).

*Distribution.* Coast of tropical West Africa from Senegal to the Gulf of Guinea (Quéro *et al.*, 1990).

***Selar crumenophthalmus* (Bloch, 1793)**

*Irvine name.* Not mentioned in Irvine's book although he collected specimens.

*Reference material.* Accra, January 1930 (Irvine 28)—BMNH 1930.8.26.51–52 (two: 138, 142 mm FL).

*Distribution.* In the eastern Atlantic recorded from the Cape Verde Islands and along the coast of West Africa from southern Senegal to Angola. Elsewhere, worldwide in tropical and subtropical seas (Quéro *et al.*, 1990).

**CORYPHAENIDAE**

Two species probably occur along the West African coast (Tortonese in Quéro *et al.*, 1990: 756–757) and Irvine recorded one species (see below) from Ghana. The other species is *C. equiselis* Linnaeus, 1758.

***Coryphaena hippurus* Linnaeus, 1758**

*Reference material.* Accra, April 1930 (Irvine 47)—BMNH 1930.8.26.80 (one: 424 mm SL); Accra, January 1939 (Irvine 392)—BMNH 1939.7.12.17 (one: 276 mm SL).

*Distribution.* Cosmopolitan in warm seas (Quéro *et al.*, 1990).

**LUTJANIDAE**

Six species occur on the mainland coast of tropical West Africa (Allen, 1985) and Irvine recorded all six (see also table 1) although specimens of only four species were located. On average about 4800 tonnes of snappers are caught in the region each year (FAO, 2000).

***Lutjanus agennes* Bleeker, 1863**

*Irvine name.* Listed partly under the correct name above and also (Irvine 276) as *Lutjanus modestus* Bleeker. There appears to be some confusion over whether *L. modestus* Bleeker, 1863 is a junior synonym of *L. endecacanthus* Bleeker, 1863 (Lloris and Rucabado in Quéro *et al.*, 1990: 773–779) or of *L. agennes* as suggested by Allen (1985).

*Reference material.* Ningo, May 1930 (Irvine 97)—BMNH 1930.8.26.32 (one: 109 mm SL). Prampram, July 1938 (Irvine 276)—BMNH 1938.12.15.20 (one: 272 mm SL, listed as *L. modestus*).

*Distribution.* Coast of tropical West Africa from Senegal to Angola (Allen, 1985).

***Lutjanus fulgens*** (Valenciennes, 1830)

*Irvine name.* *Lutjanus maltzani* (Steindachner). A junior synonym.

*Reference material.* Prampram, May 1930 (Irvine 86)—BMNH 1930.8.26.33 (one: 144 mm SL); Accra, November 1930 (Irvine 118)—BMNH 1932.2.27.6 (one: 203 mm SL); Winneba (Irvine 174)—BMNH 1934.10.12.11 (one: 172 mm SL).

*Distribution.* Coast of tropical West Africa from Senegal to Angola (Allen, 1985).

***Lutjanus goreensis*** (Valenciennes, 1830)

*Irvine name.* *Lutjanus guineensis* Bleeker. A junior synonym (type locality: Ashantee).

*Reference material.* Ningo Lagoon (Irvine 92)—BMNH 1930.8.26.34 (one: 59.1 mm SL).

*Distribution.* Coast of tropical West Africa from Senegal to Angola (Allen, 1985).

***Apsilus fuscus*** Valenciennes, 1830

*Reference material.* Prampram, September 1938 (Irvine 313)—BMNH 1939.7.12.21 (one: 272 mm SL), BMNH 1939.7.12.22 (one: 113.5 mm SL).

*Distribution.* Coast of West Africa from Mauritania to Angola. Also Cape Verde Islands and islands of the Gulf of Guinea (Allen, 1985).

**GERREIDAE**

Irvine placed the mojarras in the Leiognathidae. Two species are known from the mainland coast of tropical West Africa (Roux in Quéro *et al.*, 1990: 781–782) and one was recorded from Ghana by Irvine.

***Eucinostomus melanopterus*** (Bleeker, 1863)

*Irvine name.* *Gerres melanopterus* Bleeker.

*Reference material.* Ningo Lagoon (Irvine 58)—BMNH 1930.8.26.79 (one: 111.8 mm SL), (Irvine 90); Keta, November 1938 (Irvine 379)—BMNH 1939.7.12.23 (one: 126 mm SL).

*Distribution.* Coast of tropical West Africa from Senegal to Angola.

Irvine also noted that *Gerres nigri* Günther, 1859 had been recorded from 'Guinea' and from the Ivory Coast, and probably occurred on the coast of Ghana. The latter species is believed to be present along the coast of West Africa from Senegal to the Congo (Quéro *et al.*, 1990).

**HAEMULIDAE**

Placed in Pomadasidae [*sic*], which is a junior synonym of Haemulidae, by Irvine. On average about 45 000 tonnes of grunts are caught in the region each year (FAO, 2000). Ten species have been recorded from the mainland coast of tropical West Africa (Roux in Quéro *et al.*, 1990: 783–788), of which five were reported by Irvine from Ghana (see also table 1). The characters separating species do not appear to be well quantified and this family needs to be revised for the eastern Atlantic.

***Pomadasys incisus*** (Bowdich, 1825)

*Reference material.* Accra, January 1930 (Irvine 30); Accra, March 1930 (?) (Irvine 57)—BMNH 1930.8.26.31 (one: 119 mm SL); Accra, September 1938 (Irvine 342)—BMNH 1939.7.12.18 (one: 180 mm SL).

*Distribution.* Western Mediterranean and eastern Atlantic from Morocco to Angola including the offshore islands (Quéro *et al.*, 1990).

***Pomadasys rogerii*** (Cuvier, 1830)

*Irvine name.* *Pomadasys jubelini* (Cuvier and Valenciennes). Misidentification.

*Reference material.* Accra, April (?) 1930 (Irvine 48)—BMNH 1930.8.26.30 (one: 150 mm SL); mouth of River Ancobra, January 1939 (Akpabla A 19 pt)—BMNH 2001.5.2.21 (one: 123.2 mm SL); locality? (Irvine 195)—BMNH 2001.5.2.22 (one: 218.7 mm SL).

*Distribution.* Coast of tropical West Africa from Senegal to Angola (Quéro *et al.*, 1990).

All the specimens listed by Irvine under *P. jubelini*, which could be located, appear to be *P. rogerii*. The latter species is stated to have about 55 lateral-line scales whereas *P. jubelini* is reported to have about 45 (Roux, 1981). This character and the arrangement of chin pores (a pair of small pores preceding a larger median one) place the specimens in *P. rogerii* rather than *P. jubelini*.

***Pomadasys peroteti*** (Cuvier, 1830)

*Reference material.* Mouth of River Ancobra, January 1939 (Akpabla A 19 pt)—BMNH 1939.7.12.19 (one: 128.5 mm SL).

*Distribution.* Coast of tropical West Africa from Senegal to Angola, entering estuaries (Quéro *et al.*, 1990).

***Brachydeuterus auritus*** Valenciennes, 1831

*Reference material.* Locality ? (Irvine 52)—BMNH 1930.8.26.36–38 (four: 54.2–90.9 mm SL); Prampram, May 1930 (Irvine 93)—BMNH 1930.8.26.39–40 (two: 115.2, 129.4 mm SL); locality ? (Irvine 157)—BMNH 1934.10.10.13–14 (two: 123.3, 139.4 mm SL).

*Distribution.* Coast of tropical West Africa from Mauritania to Angola: entering estuaries (Quéro *et al.*, 1990).

On average about 23 000 tonnes of this species are caught in the region each year (FAO, 2000), making it an important fishery species.

***Parakuhlia macrophthalmus*** (Osorio, 1894)

*Irvine name.* *Parakuhlia boulengeri* Pellegrin. A junior synonym.

*Reference material.* Accra, September 1938 (Irvine 343)—BMNH 1939.7.12.20 (one: 94.4 mm SL).

*Distribution.* Coast of tropical West Africa from Guinea to Angola (Maugé and Desoutter in Quéro *et al.*, 1990: 711).

This species has been placed in the family Kuhliidae by several recent authors but is now thought to be a haemulid (Nelson, 1994).

## SCIAENIDAE

Many members of the family are of considerable economic importance, and are known in Ghana as 'Cassava fishes'. On average about 67 000 tonnes of sciaenids are caught in the region each year (FAO, 2000), making them very important demersal fishery species. Eight species were recorded from Ghana by Irvine (see also table 1) and some 14 species occur along the Gulf of Guinea coast of West Africa (Chao and Trewavas in Quéro *et al.*, 1990: 813–826; Bauchot, 1966a).

*Pseudotolithus (Pseudotolithus) senegalensis* (Valenciennes, 1833)

*Irvine names.* *Cynoscion senegalla* (Cuvier and Valenciennes)—misidentification. *Cynoscion macrognathus* (Bleeker)—a junior synonym.

*Reference material.* Accra, January 1930 (Irvine 35)—BMNH 1930.8.26.35 (one: 165 mm SL, listed under *Cynoscion senegalla*); Accra, November 1930 (Irvine 122)—BMNH 1930.3.24.15 (one: 378 mm SL, listed under *Cynoscion macrognathus*); Accra, May 1938 (Irvine 260); Accra, May 1938 (Irvine 262).

*Distribution.* Coast of West Africa from Western Sahara to Angola, rare north of Senegal (Quéro *et al.*, 1990).

On average about 2500 tonnes of this species are caught in the region each year (FAO, 2000), making it an important fishery species.

*Pseudotolithus (Pseudotolithus) typus* Bleeker, 1863

*Irvine name.* Not listed but the specimen (Irvine 259) is referred to in notes to the previous species as follows: 'A specimen from Accra, taken in May 1938 (Irvine 259), was identified at the British Museum as *Cynoscion nebulosus* (C. & V.). It is doubtful, however, whether this American species occurs in West Africa, and the specimen in question probably belonged either to this species [*Cynoscion senegalla* (Cuvier), valid as *Pseudotolithus senegalla*: Sasaki (1993)] or to the succeeding one [*Cynoscion macrognathus* (Bleeker), a junior synonym of *P. senegalensis*']. Irvine was right in rejecting the British Museum identification but wrong in linking it to either of the other two species.

*Reference material.* Accra, May 1938 (Irvine 259)—BMNH 1939.7.12.42 (one: 201 mm SL).

*Distribution.* Coast of West Africa from Morocco to Angola (scarce north of Cape Verde).

*Pteroscion peli* (Bleeker, 1863)

*Irvine name.* *Larimus peli* Bleeker.

*Reference material.* Accra, March 1930 (Irvine 68)—BMNH 1930.8.26.41–43 (three: 80.1–102.1 mm SL).

*Distribution.* Coast of tropical West Africa from Senegal to Angola (Bauchot, 1966a).

On average about 1000 tonnes of this species are caught in the region each year (FAO, 2000), making it an important fishery species.



***Pseudotolithus (Fonticulus) elongatus*** (Bowdich, 1825)

*Irvine name.* *Sciaena nigrata* (Cuvier and Valenciennes). A junior synonym.

*Reference material.* Accra, November 1930 (Irvine 123)—BMNH 1932.2.27.8 (one: 270 mm SL); Accra, May 1938 (Irvine 261); Labadi, January 1936 (A. P. Brown 5).

*Distribution.* Coast of tropical West Africa from Senegal to Angola: entering estuaries (Quéro *et al.*, 1990).

On average about 10 500 tonnes of this species are caught in the region each year, making it an important fishery species.

***Pseudotolithus (Pinnacorvina) epipercus*** (Bleeker, 1863)

*Irvine name.* *Sciaena epipercus* (Bleeker).

*Reference material.* Anomabu, June 1930 (Irvine 108)—BMNH 1930.8.30.4 (one: 258 mm SL); Accra, January 1939 (Irvine 391)—BMNH 1939.7.12.24 (one: 201 mm SL); mouth of River Ancobra, January 1939 (Akpabla A 20)—BMNH 1939.7.12.41 (one: 164 mm SL). All three specimens are stored in a single jar.

*Distribution.* Coast of tropical West Africa from Guinea to Angola (Quéro *et al.*, 1990).

***Umbrina canariensis*** Valenciennes, 1843

*Reference material.* Accra, February 1930 (Irvine 54)—BMNH 1930.8.30.5 (one: 163 mm SL), BMNH 1930.3.24.14 (one: 152 mm SL).

*Distribution.* Coast of tropical West Africa from Morocco to Angola (Quéro *et al.*, 1990). Also found in the western Mediterranean and along coast of Europe northwards to the Bay of Biscay (Bauchot, 1966a).

**MULLIDAE**

Only one species appears to be known from the mainland coast of tropical West Africa (Bauchot, 1966a).

***Pseudupeneus prayensis*** (Cuvier, 1829)

*Irvine name.* *Upeneus prayensis* Cuvier and Valenciennes.

*Reference material.* Accra, February 1930 (Irvine 50)—BMNH 1930.8.26.45 (one: 157 mm SL); Winneba, March 1933 (Irvine 170)—BMNH 1934.10.12.13 (one: 197 mm SL), BMNH 2001.5.2.23 (one: 140 mm SL); Keta, November 1938 (Irvine 378, dried specimens from market)—BMNH 2001.5.2.24 (one: 113 mm SL); Accra, BMNH 1939.7.12.25 (one: 119.5 mm SL).

*Distribution.* Coast of tropical West Africa from Mauritania to southern Angola including offshore islands (Bauchot, 1966a).

On average about 400 tonnes of this species are caught in the region each year (FAO, 2000), making it a significant fishery species.

**LETHRINIDAE**

One species is found on the coast of West Africa, all others come from the Indo-Pacific region (Carpenter and Allen, 1989).



***Lethrinus atlanticus*** Valenciennes, 1830

*Reference material.* Accra, 1930 (Irvine 45); Winneba, 1933 (Irvine 175)—BMNH 1934.10.12.12 (one: 216 mm SL).

*Distribution.* Coast of tropical West Africa from Senegal to Gabon including Cape Verde Islands and the islands of the Gulf of Guinea (Carpenter and Allen, 1989).

In recent years the fishery for this species appears to have expanded and now about 250 tonnes on average of this species are caught in the region each year (FAO, 2000).

**SPARIDAE**

On average about 50 000 tonnes of sea breams are caught in the region each year (FAO, 2000). Some 12 species have been recorded from the mainland coast of tropical West Africa (Poll, 1954; Bauchot and Hureau in Quéro *et al.*, 1990: 790–812) of which nine were recorded from Ghana by Irvine (see also table 1). The characters separating the various species of *Dentex* do not appear to be well quantified and a review of this genus for the eastern Atlantic is required.

***Dentex gibbosus*** (Rafinesque, 1810)

*Irvine name.* *Dentex filosus* Valenciennes. A junior synonym.

*Reference material.* Prampram, July 1938 (Irvine 273)—BMNH 1938.12.15.16–17 (two: 255, 272 mm SL).

*Distribution.* Coast of West Africa from Morocco to Angola. Also occurs off Portugal and in the Mediterranean (Quéro *et al.*, 1990).

***Dentex angolensis*** Poll and Maul, 1953

*Irvine name.* *Dentex macrophthalmus* (Blocher) [*sic*] (in part). Misidentification.

*Reference material.* Accra, November 1930 (Irvine 129 A)—BMNH 1932.2.27.7 (one: 176 mm SL, redet. *D. maroccanus*).

*Distribution.* Coast of West Africa from Morocco to Angola (Quéro *et al.*, 1990).

One of the specimens listed by Irvine under *D. macrophthalmus* appears to be this species. On average about 600 tonnes of this species are caught in the region each year (FAO, 2000), making it a significant fishery species.

***Dentex congoensis*** Poll, 1954

*Irvine name.* *Dentex macrophthalmus* (Blocher) [*sic*] (in part) and *Dentex cunninghami* [*sic*] Regan (in part). Misidentifications.

*Reference material.* Accra (Irvine 39)—BMNH 1930.3.24.13 (one: 116 mm SL); Accra, June 1930 (Irvine 115)—BMNH 1930.8.26.81–82 (two: 96.1, 122.0 mm SL), BMNH 2001.5.2.25 (one: 134 mm SL).

*Distribution.* Coast of tropical West Africa from Senegal to Angola (Quéro *et al.*, 1990).

Specimens listed by Irvine under both *D. cunninghami* (a junior synonym of *Pagellus bellottii*, see table 1) and *D. macrophthalmus* appear to be this species. On average about 190 tonnes of this species are caught in the region each year (FAO, 2000), making it a significant fishery species.

**? *Dentex macrophthalmus* (Bloch, 1791)**

*Irvine name.* *Dentex macrophthalmus* (Blocher) [*sic*].

*Reference material.* Accra, October 1938 (Irvine 348, *p.p.* Mr Nortey)—BMNH 2001.5.2.26 (one damaged: 114 mm SL, not identifiable).

*Distribution.* Anti-equatorial distribution reported along the coast of West Africa from Morocco to Cape Verde and from Congo to Namibia. Also recorded from the Canary Islands, Mediterranean and off Portugal (Quéro *et al.*, 1990). This species does not appear to occur in the Gulf of Guinea and this unidentifiable material, like the rest of Irvine's '*Dentex macrophthalmus*' specimens, is probably either *D. angolensis* or *D. congoensis*, neither of which species were described at the time (Poll and Maul, 1953; Poll, 1954).

***Pagellus bellottii* Steindachner, 1882**

*Irvine name.* *Pagellus erythrinus* (Linnaeus). Misidentification.

*Reference material.* Kormantin, May 1930 (Irvine 99)—BMNH 1930.8.26.83 (one: 165 mm SL). ? Prampram, July 1938 (Irvine 275)—BMNH 1938.12.15.19 (one: 164 mm SL), BMNH 2001.5.2.27 (one: 150 mm SL).

*Distribution.* Coast of West Africa from Morocco to Angola. Also recorded from the southwestern Mediterranean (Quéro *et al.*, 1990).

On average about 7000 tonnes of this species are caught in the region each year (FAO, 2000), making it an important fishery species.

Irvine noted 'A specimen from Prampram, July 1938 (Irvine 275), was identified by the British Museum authorities as *Pagellus* sp. This seemed to be different from *P. erythrinus*, and somewhat resembled *Dentex cunninghami*'. Irvine was correct in this as *Dentex cunninghamii* Regan, 1905 (HOLOTYPE: BMNH 1905.2.24.6, 191.7 mm SL, coast of Angola) is a junior synonym of *Pagellus bellottii* Steindachner (Quéro *et al.*, 1990).

***Boops boops* (Linnaeus, 1758)**

*Reference material.* Accra, May 1938 (Irvine 264); Prampram, September 1938 (Irvine 314)—BMNH 2001.5.2.28 (one: 141 mm SL); Accra, October 1938 (Irvine 347); Labadi, January or June ? 1936 (A. P. Brown 3).

*Distribution.* Mediterranean and eastern Atlantic from Norway to Angola (Quéro *et al.*, 1990).

On average about 50 tonnes of this species are caught in the region each year (FAO, 2000).

***Pagrus africanus* Akazaki, 1962**

*Irvine name.* *Pagrus pagrus* (Linnaeus). Misidentification.

*Reference material.* Locality ?, November (?) 1930 (Irvine 127)—BMNH 1932.2.27.9 (one: 214 mm SL); Accra (?), January 1939 (Irvine 400)—BMNH 1939.7.12.26 (one: 248 mm SL).

*Distribution.* West African coast from Senegal to Angola (Quéro *et al.*, 1990).

On average about 2000 tonnes of *Pagrus*, much of which is probably this and the next species, are caught in the region each year (FAO, 2000).

***Pagrus caeruleostictus*** (Valenciennes, 1830)

*Irvine name.* *Pagrus ehrenbergi* Cuvier and Valenciennes. A junior synonym.

*Reference material.* Accra (?), March 1930 (Irvine 46)—BMNH 1930.8.26.46 (one: 148 mm SL); Prampram, July 1938 (Irvine 274)—BMNH 1938.12.15.18 (one: 181 mm SL); Accra, January 1939 (Irvine 401)—BMNH 1939.7.12.27 (one: 290 mm SL).

*Distribution.* Coast of West Africa from Morocco to Angola, including the Canary Islands. Also occurs in the Mediterranean and northwards to Portugal (Quéro *et al.*, 1990).

**CENTRACANTHIDAE**

Two species occur on the mainland coast of tropical West Africa (Poll, 1954; Heemstra in Quéro *et al.*, 1990: 768–772), both of which were collected by Irvine. On average about 5 tonnes of *Spicara* are caught in the region each year (FAO, 2000).

***Spicara alta*** (Osorio, 1917)

*Irvine name.* *Spicara* sp.

*Reference material.* Accra, May 1938 (Irvine 265)—BMNH 1938.12.15.13 (one: 113.5 mm SL).

*Distribution.* Coast of West Africa from Senegal to southern Angola (Quéro *et al.*, 1990).

Irvine thought that this fish might eventually prove to represent a species new to science, but it appears to be a species described from Morocco by the Portuguese ichthyologist Balthazar Osorio in 1917.

**\**Spicara nigricauda*** (Norman, 1931)

*Irvine name.* *Coleosmaris nigricauda* Norman.

*Reference material.* Accra, June 1930 (Irvine 101)—BMNH 1930.8.26.63–64 (two SYNTYPES: 123.0, 128.3 mm SL of *Coleosmaris nigricauda* Norman, 1931).

*Distribution.* Coast of West Africa from Ghana to Angola (Quéro *et al.*, 1990).

Described as a new species, *Coleosmaris nigricauda*, by Norman (1931: 359, figure 4) on the basis of Irvine's material.

**MONODACTYLIDAE**

One species has been recorded from the tropical West African coast (Poll, 1954; Desoutter in Quéro *et al.*, 1990: 830).

***Monodactylus sebae*** (Cuvier, 1829)

*Irvine name.* *Psettus sebae* Cuvier and Valenciennes.

*Reference material.* Onikan Pond, Lagos, Nigeria, coll. F. R. Irvine—BMNH 1949.3.17.31 (one: 38.6 mm SL).

*Distribution.* Coast of tropical West Africa from Cape Verde to Angola: entering rivers (Quéro *et al.*, 1990).

**EPHIPPIDAE**

Two species occur on the mainland coast of tropical West Africa (Desoutter in Quéro *et al.*, 1990: 834–836) and both were collected by Irvine. On average about 550 tonnes of spadefishes are caught in the region each year (FAO, 2000).

***Ephippus goreensis*** Cuvier, 1831

*Reference material.* Anomabu, June 1930 (Irvine 107)—BMNH 1930.8.30.3 (one: 190 mm SL).

*Distribution.* Coast of tropical West Africa from Cape Verde to Gabon (Bauchot and Blanc, 1961b).

***Chaetodipterus lippei*** Steindachner, 1895

*Reference material.* Accra (Irvine 132)—BMNH 1932.2.27.10 (one: 88 mm SL); Winneba (Irvine 180)—BMNH 1934.10.12.14 (one: 88.9 mm SL); Teshi, March 1936 (Irvine 208).

*Distribution.* Coast of tropical West Africa from Senegal to Angola (Quéro *et al.*, 1990).

**DREPANIDAE**

A single species occurs on the mainland coast of tropical West Africa (Poll, 1954; Desoutter in Quéro *et al.*, 1990: 834–836) and was collected by Irvine. Family name normally Drepaneidae but spelt as above in Nelson (1994).

***Drepane africana*** Osorio, 1892

*Irvine name.* *Drepane punctata* (Linnaeus). Misidentification.

*Reference material.* Accra, March 1930 (Irvine 49)—BMNH 1930.8.26.61–62 (two: 68.6, 84.1 mm SL).

*Distribution.* West African coast between about Cape Verde and Angola (Quéro *et al.*, 1990).

On average about 1300 tonnes of this species are caught in the region each year (FAO, 2000), making it an important fishery species.

**POMACENTRIDAE**

Eight species probably occur on the coast of Ghana and other Gulf of Guinea countries (Edwards, 1986). Three were reported by Irvine. The others which are present are: *Chromis limbata* (Valenciennes, 1833), *C. multilineata* (Guichenot, 1853), *Microspathodon frontatus* Emery, 1970 and *Stegastes imbricatus* Jenyns, 1842 (all photographed in Ghana by H. R. Lubbock in 1976) and probably *Abudefduf hoefleri* (Steindachner, 1881).

***Chromis cadenati*** Whitley, 1951

*Irvine name.* *Chromis chromis* (Linnaeus). Misidentification.

*Reference material.* Prampram, September 1938 (Irvine 319)—BMNH 1939.7.12.29–30 (two: 139.2, 162 mm SL), BMNH 1975.5.29.29 (one: 133.8 mm SL).

*Distribution.* Coast of West Africa from Senegal to Ghana (Edwards, 1986).

Whitley's name was a replacement for *Chromis lineatus* Cadenat, 1950 (type locality: Senegal) which was preoccupied by *Chromis lineatus* Fowler and Bean, 1928 (type locality: Philippines) (Edwards, 1986).

***Abudefduf saxatilis*** (Linnaeus, 1758)

*Irvine name.* *Glyphisodon saxatilis* (Linnaeus).

*Reference material.* Accra (?), March 1930 (Irvine 74)—BMNH 1930.8.26.59 (one: 103.2 mm SL); Accra, May 1938 (Irvine 255).

*Distribution.* Both sides of the tropical Atlantic (Allen, 1991).

***Abudefduf taurus*** (Müller and Troschel, 1848)

*Irvine name.* *Glyphisodon hoefleri* Steindachner. Misidentification.

*Reference material.* Prampram, September 1938 (Irvine 330)—BMNH 1939.7.12.28 (one: 82.7 mm SL).

*Distribution.* Coast of tropical West Africa from Senegal to Angola and the Cape Verde Islands. Also occurs in the western tropical Atlantic (Edwards, 1986).

**LABRIDAE**

About five species occur on the mainland coast of tropical West Africa (Gomon and Forsyth in Quéro *et al.*, 1990: 868–882) and four were recorded from Ghana by Irvine. See tables 1 and 2 for the other two species.

***Xyrichtys novacula*** (Linnaeus, 1758)

*Reference material.* Winneba, March 1933 (Irvine 167)—BMNH 1934.10.12.16 (one: 149 mm SL), BMNH 2001.5.2.29 (one: 155 mm SL).

*Distribution.* Mediterranean and coast of West Africa from Morocco to Gabon including the offshore islands. Also recorded in the western tropical Atlantic (Bauchot and Blanc, 1961a; Quéro *et al.*, 1990).

***Bodianus speciosus*** (Bowdich, 1825)

*Irvine name.* *Bodianus tredecimspinosus* (Günther). A junior synonym.

*Reference material.* Prampram, 35 miles east of Accra, May 1930 (Irvine 85)—BMNH 1930.8.30.8 (one: 178 mm SL); Prampram, July 1938 (Irvine 268).

*Distribution.* Coast of tropical West Africa from Guinea to Cameroon and around the Cape Verde Islands (Quéro *et al.*, 1990).

**SCARIDAE**

Three species are known from the Gulf of Guinea coast of West Africa (Schultz, 1958) of which Irvine recorded one and collected two off Ghana. The two species collected by Irvine are listed below; the third is *Nicholsina usta* (Valenciennes, 1839).

***Sparisoma rubripinne*** (Valenciennes, 1839)

*Irvine name.* *Callyodon hoefleri* (Steindachner). Irvine's specimen 56, listed under *Callyodon* (= *Scarus*) *hoefleri* is a *Sparisoma* and appears to be *Sparisoma rubripinne*.

*Reference material.* Accra, March 1930 (Irvine 56)—BMNH 1930.8.26.60 (one: 173 mm SL); Accra, March 1935 (Irvine 302), specimen not found.

*Distribution.* Coast of tropical West Africa from Senegal to the Gulf of Guinea and Cape Verde Islands. Also occurs in the tropical western Atlantic (Randall in Quéro *et al.*, 1990: 883–887).

Irvine's colour notes for *Callyodon hoefleri* (= *Scarus hoefleri*) appear to fit *S. rubripinne* more closely: 'The colour is mottled brown above and on the sides, and pinkish beneath. The anal fin is red, the pectoral fins orange-coloured, and the pelvics red'.

***Scarus hoefleri*** (Steindachner, 1882)

*Irvine name.* Specimen below was not listed in Irvine's book.

*Reference material.* Labadi, 1936, coll. K. W. Todd—BMNH 1938.12.15.21 (one: 345 mm SL).

*Distribution.* Coast of tropical West Africa from Senegal to the Congo (Quéro *et al.*, 1990).

**TRACHINIDAE**

Six species occur on the mainland coast of the Gulf of Guinea (Roux in Quéro *et al.*, 1990: 893–895) and two were recorded from Ghana by Irvine.

***Trachinus collignoni*** Roux, 1957

*Irvine name.* *Trachinus lineolatus* Fischer. Misidentification.

*Reference material.* Accra, 1936 (Irvine 210)—BMNH 1937.2.6.3 (one: 167 mm SL).

*Distribution.* Coast of tropical West Africa from Ghana to the Congo (Quéro *et al.*, 1990).

***Trachinus radiatus*** Cuvier, 1829

*Reference material.* Teshi, May 1930 (Irvine 100)—BMNH 1930.8.30.6 (one: 282 mm SL); Winneba, March 1933 (Irvine 177)—BMNH 1934.10.12.18 (one: 204 mm SL); Prampram, July 1938 (Irvine 267).

*Distribution.* Coast of West Africa from Morocco to Angola including the Canary Islands. Also occurs in the Mediterranean and on the coast of southern Portugal (Quéro *et al.*, 1990).

**URANOSCOPIDAE**

Three species probably occur along the mainland Gulf of Guinea coast (Poll, 1959; Roux in Quéro *et al.*, 1990: 897–898), one which was collected by Irvine from Ghana. The other two species which may be expected are *Uranoscopus albesca* Regan, 1915 and *U. cadenati* Poll, 1959.

***Uranoscopus polli*** Cadenat, 1951

*Irvine name.* *Uranoscopus scaber* Linnaeus. Misidentification.

*Reference material.* Anomabu, June 1930 (Irvine 111)—BMNH 1930.8.26.58 (one: 191 mm SL).

*Distribution.* Coast of West Africa from at least Ghana to Angola (Quéro *et al.*, 1990).

#### ACANTHURIDAE

Irvine used the older family name Teuthididae. A single species has been recorded from the mainland coast of West Africa (Poll, 1959; Bauchot, 1966a) and was collected by Irvine.

##### *Acanthurus monroviae* Steindachner, 1876

*Irvine name.* *Teuthis monroviae* (Steindachner).

*Reference material.* Ningo, May 1930 (Irvine 80)—BMNH 1930.8.26.69–70 (two: 93.2, 253 mm SL); Accra, 1935 (Irvine 303—det. Ach. F.R.I. 1938); Accra, May 1938 (Irvine 257)—BMNH 1938.12.15.25 (one: 92.5 mm SL).

*Distribution.* Cape Verde Islands and coast of West Africa from Morocco to Angola over hard substrata (Desoutter in Quéro *et al.*, 1990: 962–964).

#### SCOMBRIDAE

About 11 species have been recorded from the Gulf of Guinea (Collette and Nauen, 1983) and seven were recorded by Irvine from Ghana. On average about 450 000 tonnes of scombrids are caught in the region each year (FAO, 2000), making this family one of the most important fishery groups.

##### *Scomber colias* Gmelin, 1789

*Reference material.* Prampram, May 1930 (Irvine 84)—BMNH 1930.8.26.71 (one: 195 mm SL); Prampram, September 1938 (Irvine 315).

*Distribution.* In warm temperate and subtropical waters of the Atlantic Ocean and in the Mediterranean Sea (Collette and Nauen, 1983; Collette, 1999).

Until recently *S. colias* has been considered a junior synonym of a cosmopolitan species *S. japonicus* Houttyn, 1782 but recent studies by Collette (1999) indicate that Atlantic and Indo-Pacific populations of chub mackerels should be recognized as two separate species with *S. colias* being the valid name for the Atlantic species. On average about 130 000 tonnes of this species are caught in the region each year (FAO, 2000), making it a very important fishery species.

##### *Thunnus obesus* (Lowe, 1839)

*Irvine name.* *Parathunnus obesus* (Lowe).

*Reference material.* Accra, July 1938 (Irvine 282, head and tail only)—BMNH 1938.12.15.22 (one: ca 210 cm HL).

*Distribution.* Pantropical species (Collette and Nauen, 1983).

On average about 70 000 tonnes of this species are caught in the region each year (FAO, 2000), making it a very important fishery species.

##### *Sarda sarda* (Bloch, 1793)

*Irvine name.* Listed correctly under the name above apart from one specimen (A. P. Brown 1) mistakenly listed under *Scomberomorus tritor*.

*Reference material.* Accra, January 1939 (Irvine 397)—BMNH 1939.7.12.31 (one:



322 mm FL); Labadi, 27 January 1936 (A. P. Brown 1; head and tail only)—BMNH 1937.2.6.5 (1 head: 106 mm HL).

*Distribution.* In the eastern Atlantic known from Norway to South Africa including the Mediterranean and Black Seas. Also known from the western Atlantic from Massachusetts to northern Argentina (Collette and Nauen, 1983).

About 3500 tonnes of this species are caught in the region each year (FAO, 2000), making it an important fishery species. The fishery appears to have expanded greatly in the last few years.

***Euthynnus alletteratus* (Rafinesque, 1810)**

*Irvine name.* Listed correctly under the name above but one specimen (A. P. Brown 4) was misidentified as *Auxis rochei* (Risso).

*Reference material.* Accra, September 1938 (Irvine 338); Accra, January 1939 (Irvine 390)—BMNH 1939.7.12.32 (one: 290 mm SL, 311 mm FL; HOLOTYPE of *Euthynnus alletteratus aurolitoralis* Fraser-Brunner, 1949); Labadi, January 1935 (A. P. Brown 4)—BMNH 1937.2.6.2 (one: 300 mm SL, 321 mm FL; PARATYPE of *Euthynnus alletteratus aurolitoralis* Fraser-Brunner, 1949; listed under *Auxis rochei* by Irvine).

*Distribution.* Coast of West Africa from Mauritania and Cape Verde Islands to Angola. Also known from the Mediterranean Sea and the western Atlantic.

Fraser-Brunner (1949: 626, figure 2b) used Irvine's material as the basis for splitting *E. alletteratus* into two subspecies. Fraser-Brunner's subspecific designation, which separates West African ('southern' populations) of the species from 'northern' ones from the Mediterranean and North Atlantic (south to Senegal and Brazil), does not appear to have been recognized by later workers. The characters he used to separate the two subspecies were vague and the number of specimens examined very small (only the two specimens above for the 'southern' *aurolitoralis* subspecies).

On average about 3000 tonnes of this species are caught in the region each year (FAO, 2000), making it an important fishery species. Catches have declined greatly since the early 1990s.

***Auxis rochei* (Risso, 1810)**

*Irvine name.* *Auxis thazard* (Lacepède). Misidentification.

*Reference material.* Accra, June 1931 (Irvine 139)—BMNH 1932.27.17 (one: 296 mm FL; determined as *A. rochei* by B. Collette).

*Distribution.* Cosmopolitan in warm seas (Collette and Nauen, 1983).

On average about 2500 tonnes of *Auxis* spp. are caught in the region each year (FAO, 2000), making them significant fishery species. The two species of *Auxis* (*A. rochei* and *A. thazard*) are not too difficult to tell apart if you have fresh material in good condition but old museum material can be difficult to determine.

***Scomberomorus tritor* (Cuvier, 1831)**

*Irvine name.* Listed under the name above but other material listed under this species as 'Labadi (A. P. Brown 1—head and tail only)' is *Sarda sarda* (see above).

*Reference material.* Accra, January 1930 (Irvine 16)—BMNH 1930.3.24.41 (one: 266 mm FL); Accra, 1935 (Irvine 304—det. Ach. F.R.I. 1938); Prampram, September 1938 (Irvine 318).



*Distribution.* Coast of West Africa from the Canary Islands and Dakar to Angola. Enters estuaries (Collette and Nauen, 1983).

On average about 1400 tonnes of this species are caught in the region each year (FAO, 2000), making it an important fishery species.

## GOBIIDAE

At least 23 species occur on the mainland coast of tropical West Africa (Miller in Quéro *et al.*, 1990: 925–951) and five were recorded from Ghana by Irvine (see also tables 1, 2). Irvine included the mudskipper *Periophthalmus* in the Gobiidae, where it is now generally considered to belong, although it has often been placed in its own family Periophthalmidae. We consider it under the Gobiidae following Nelson (1994).

### *Gobioides africanus* (Giltay, 1935)

*Irvine name.* *Gobioides ansorgii* Boulenger. Misidentification.

*Reference material.* Accra, November 1938 (Irvine 356)—BMNH 1939.7.12.33 (one: 132.3 mm SL).

*Distribution.* Coast of West Africa from Senegal to Congo: entering estuaries (Quéro *et al.*, 1990).

*Gobioides ansorgii* Boulenger, 1909 is also present in the region and can be distinguished by its more elongate body. It has 19–21 soft dorsal rays compared to about 15 soft dorsal rays (Giltay, 1935) in *G. africanus*.

### *Periophthalmus barbarus* (Linnaeus, 1766)

*Irvine name.* *Periophthalmus koelreuteri* (Pallas). A junior synonym.

*Reference material.* Botiano Lagoon, near Accra, March 1930 (Irvine 72)—BMNH 1930.8.26.72–74 (three: 133.0–136.2 mm SL); no locality, 1931 (Plumptre) ?—BMNH 1934.10.12.19 (one: 98.2 mm SL).

*Distribution.* Coasts, lagoons and estuaries of tropical West Africa from Senegal to Angola including the Gulf of Guinea islands (Miller in Quéro *et al.*, 1990: 958–959).

A recent study by Murdy (1989) indicates that *Gobius koelreuteri* Pallas, 1770, *Periophthalmus papilio* Bloch and Schneider, 1801, *P. gabonicus* Duméril, 1861 (type locality: Gabon), and *P. erythronemus* Guichenot in Duméril, 1861 (type locality: Senegal) are all junior synonyms of *P. barbarus*. This species is the only *Periophthalmus* in West Africa and is endemic to the eastern tropical Atlantic. Murdy (1989) designated a neotype for *P. barbarus* from Liberia and also noted that the purported type locality of 'Tranquebar, India' for *P. papilio* must be presumed an error.

## LABRISOMIDAE

A single species has been recorded from the mainland coast of tropical West Africa (Bauchot, 1966b) and was collected by Irvine.

***Labrisomus nuchipinnis*** (Quoy and Gaimard, 1824)

*Reference material.* Anomabu, near Cape Coast, June 1930 (Irvine 110)—BMNH 1930.8.26.75 (one: 85.0 mm SL), BMNH 1932.2.27.21–22 (two: 87.5, 97.6 mm SL); Prampram, September 1938 (Irvine 329)—BMNH 1939.7.12.34 (one: 68.3 mm SL).

*Distribution.* Shallow coastal waters on both sides of the tropical Atlantic (Bauchot, 1966b).

**BLENNIIDAE**

No blenniids were listed by Irvine (1947) but specimens of two species collected by him were found in the Natural History Museum collections. Another dozen species of combtooth blennies may be expected off the mainland coast of tropical West Africa (Poll, 1959; Bauchot, 1966b; Bath in Quéro *et al.*, 1990: 905–915).

***Entomacrodus cadenati*** Springer, 1966

*Reference material.* Axim, Ghana, ca 1938, coll. F. R. Irvine and Miss V. J. Foote—BMNH 2002.1.19.4–14 (11: 30.9–56.3 mm SL).

*Distribution.* Coast of West Africa from Senegal to the Congo and the Cape Verde Islands (Springer, 1966).

***Scartella cristata*** (Linnaeus, 1758)

*Reference material.* Elmina, Ghana—BMNH 1935.5.20.1 (one: 48.5 mm SL); Axim, Ghana, ca 1938, coll. F. R. Irvine and Miss V. J. Foote—BMNH 2002.1.19.15 (one: 40.9 mm SL).

*Distribution.* Eastern Atlantic from the Bay of Biscay to the Congo and in the Mediterranean. Also occurs in the tropical western Atlantic (Quéro *et al.*, 1990).

**OPHIDIIDAE**

Placed in the family Brotulidae by Irvine. Only one species is likely to be found in inshore waters in the Gulf of Guinea (Nielsen and Nybelin, 1963) and this was recorded by Irvine from Ghana.

***Brotula barbata*** (Bloch, 1801)

*Reference material.* Accra, February 1930 (Irvine 41)—BMNH 1930.8.26.76 (one: 390 mm SL).

*Distribution.* Coast of tropical West Africa from southern Senegal to Angola. Also known from the tropical western Atlantic (Nielsen *et al.*, 1999).

On average about 450 tonnes of this species are caught in the region each year (FAO, 2000), making it a significant fishery species.

**STROMATEIDAE**

A single species occurs on the coast of the Gulf of Guinea (Haedrich in Quéro *et al.*, 1990: 1021) and was collected by Irvine.

***Stromateus fiatola* Linnaeus, 1758**

*Reference material.* Accra, May 1938 (Irvine 78)—BMNH 1930.8.26.68 (one: 281 mm SL).

*Distribution.* Mediterranean and eastern Atlantic from Morocco to South Africa (Quéro *et al.*, 1990).

On average about 400 tonnes of this species are caught in the region each year (FAO, 2000), making it a significant fishery species.

**SPHYRAENIDAE**

Four species occur in the Gulf of Guinea (de Sylva in Quéro *et al.*, 1990: 860–864) and two were reported from Ghana by Irvine. On average about 6000 tonnes of barracuda are caught in the region each year (FAO, 2000).

***Sphyraena sphyraena* (Linnaeus, 1758)**

*Reference material.* Winneba, March 1933 (Irvine 181)—BMNH 1934.10.12.20 (one: ca 350 mm SL); Accra, September 1938 (Irvine 339)—BMNH 2001.5.2.30 (one: 304 mm SL).

*Distribution.* Madeira, Canaries, Cape Verde Islands and coast of West Africa from Morocco to Angola. Also occurs in the Mediterranean and northwards to the Bay of Biscay, and in the western Atlantic (Quéro *et al.*, 1990).

A barracuda seen by Irvine, which was 180 cm in length and which he thought might have been this species, was likely to have been *Sphyraena afra* Peters, 1844, but could have been the Great barracuda, *S. barracuda* (Walbaum, 1792), which is uncommon in the area. *Sphyraena sphyraena* is only reported to a maximum length of 165 cm.

***Sphyraena guachancho* Cuvier, 1829**

*Reference material.* Accra, January 1930 (Irvine 18); Accra, September 1938 (Irvine 339); Accra, January 1938 (Irvine 395)—BMNH 2001.5.2.31 (one: 145 mm SL; in very poor condition and not determinable with certainty); Accra, January 1939 (Irvine 396)—BMNH 1939.7.12.38 (one: 293 mm SL).

*Distribution.* Both sides of the tropical Atlantic. On the coast of West Africa known from Senegal to Angola (Quéro *et al.*, 1990).

**MUGILIDAE**

Six species occur on the mainland coast of tropical West Africa (Thomson in Quéro *et al.*, 1990: 855–859). Although six species were recorded by Irvine, specimens of only three species were found and there was evidence of confusion in identification (see also table 2). On average about 10 000 tonnes of grey mullets are caught in the region each year (FAO, 2000).

***Mugil cephalus* Linnaeus, 1758**

*Irvine names.* *Mugil cephalus* Linnaeus and *Mugil auratus* Risso. The latter (Irvine 130) is a misidentification. *Liza aurata* is recorded in the eastern Atlantic from the British Isles as far south as Senegal but does not appear to occur in the Gulf of Guinea.

*Reference material.* Lagoons near Accra (?), 1930 (Irvine 114); Keta, November 1938 (Irvine 374 pt)—BMNH 1939.7.12.36 (one: 375 mm SL); Sakumo Lagoon, Accra, May 1931 (Irvine 130)—BMNH 1932.2.27.19–20 (two: 91.0, 91.4 mm SL; listed under *Mugil auratus* by Irvine).

*Distribution.* Most warm seas: entering fresh water (Quéro *et al.*, 1990).

***Mugil bananensis* (Pellegrin, 1928)**

*Irvine name.* *Mugil hoeferi* Steindachner [=a junior synonym of *Liza dumerili* (Steindachner, 1870)]. Misidentification (Irvine 70). Irvine also listed a specimen (Irvine 374 pt) under *Myxus* sp.

*Reference material.* Botiano Lagoon, near Accra, March 1930 (Irvine 70)—BMNH 1930.8.26.67 (one: 99.6 mm SL); Keta, November 1938 (Irvine 374 pt)—BMNH 1939.7.12.37 (one: 96.1 mm SL).

*Distribution.* Coast of tropical West Africa from Senegal to Angola (Quéro *et al.*, 1990).

***Liza falcipinnis* (Valenciennes, 1836)**

*Irvine name.* *Mugil falcipinnis* Cuvier and Valenciennes.

*Reference material.* Anamabu, June 1930 (Irvine 112)—BMNH 1932.2.27.18 (one: 170 mm SL); south of Amedica, River Volta, May 1938 (Irvine 220), near Akuse, River Volta, May 1938 (Irvine 221)—BMNH 1938.12.15.54–55 (two specimens (220 and 221): 143, 158 mm SL respectively); Prampram, September 1938 (Irvine 331)—BMNH 1969.3.17.21–22 in part (one: 72.8 mm SL); Ada, estuary of River Volta, November 1938 (Irvine 367); Keta, November 1938 (Irvine 380)—BMNH 1939.7.12.35 (one: 176 mm SL); Fana, Sekumu Lagoon, near Accra, November 1938 (Irvine 384)—BMNH 1969.3.17.21–22 in part (one: 84.7 mm SL).

*Distribution.* Coast of tropical West Africa from Senegal to Angola: entering fresh water (Quéro *et al.*, 1990).

**POLYNEMIDAE**

Three species occur off Ghana and neighbouring countries in West Africa (Poll, 1959; Njock in Quéro *et al.*, 1990: 865–867), all of which support significant local fisheries. On average about 24 000 tonnes of threadfins are caught in the region each year (FAO, 2000), making them very important to demersal fisheries.

***Pentanemus quinquarius* (Linnaeus, 1758)**

*Reference material.* Accra, January 1930 (Irvine 26)—BMNH 1930.3.24.40 and BMNH 1930.8.26.65–66 (three: 94.0–109.1 mm SL); mouth of River Ancobra, January 1939 (Akpabla A 17)—BMNH 2001.5.2.32 (one: 132.5 mm SL).

*Distribution.* Coast of West Africa from Senegal to Angola: entering rivers (Quéro *et al.*, 1990).

On average about 3600 tonnes of this species are caught in the region each year (FAO, 2000), making it an important fishery species.

*Polydactylus quadrifilis* (Cuvier, 1829)

*Reference material.* Amedica, River Volta, May 1938 (Irvine 239)—BMNH 1938.12.15.56 (one: 163 mm SL).

*Distribution.* Coast of tropical West Africa from Senegal to Angola: entering rivers (Quéro *et al.*, 1990).

On average about 4300 tonnes of this species are caught in the region each year (FAO, 2000), making it an important fishery species.

*Galeoides decadactylus* (Bloch, 1795)

*Reference material.* Accra, January 1930 (Irvine 24)—BMNH 1930.3.24.39 (one: 116 mm SL); Prampram, July 1938 (Irvine 266); mouth of River Ancobra, January 1939 (Akpabla A 18)—BMNH 2001.5.2.33 (one: 172 mm SL).

*Distribution.* Coast of West Africa from Canary Islands to Angola: entering estuaries (Quéro *et al.*, 1990).

On average about 12 300 tonnes of this species are caught in the region each year (FAO, 2000), making it a very important fishery species.

**SCORPAENIDAE**

About nine species occur in shallow (<200 m deep) waters along the mainland coast of tropical West Africa (Eschmeyer, 1969) and three were recorded by Irvine (under four names) from the coast of Ghana (see also table 1). Several other species occur in deepwater offshore. On average about 2200 tonnes of scorpionfishes are caught in the region each year (FAO, 2000).

*\*Pontinus accraensis* Norman, 1935

*Reference material.* Accra, February 1930 (Irvine 40)—BMNH 1930.3.24.42 (HOLOTYPE: 173 mm SL).

*Distribution.* Mauritania, Senegal, throughout Gulf of Guinea to Angola (Eschmeyer, 1969).

Described as a new species by Norman (1935a: 23) on the basis of Irvine material. Maximum size of specimens is 18.5 cm but Irvine indicated that it is said to grow to a length of 60–90 cm. Irvine noted that another specimen (not found) taken at Accra in 1935 (Irvine 308) might belong to this genus.

*Scorpaena laevis* Troschel, 1866

*Irvine name.* Listed both under the name above and a second specimen (Irvine 65) as *Scorpaena senegalensis* Steindachner. The latter name is a junior synonym of *S. laevis*.

*Reference material.* Prampram, July 1938 (Irvine 272)—BMNH 1938.12.15.24 (one: 136.1 mm SL); Accra, March 1930 (Irvine 65)—BMNH 1930.8.30.9 (one: 204 mm SL).

*Distribution.* Coast of West Africa from Mauritania to Congo including the Cape Verde Islands. Also reported from the Azores and Madeira (Eschmeyer, 1969).

**TRIGLIDAE**

Five species occur on the mainland coast of tropical West Africa (Richards, 1968) and one was recorded from Ghana by Irvine.

*Chelidonichthys gabonensis* (Poll and Roux, 1955)

*Irvine name.* *Trigla hirundo* Linnaeus. Misidentification.

*Reference material.* Accra, November (?) 1930 (Irvine 125)—BMNH 1932.2.27.24–25 (two: 149, 150 mm SL).

*Distribution.* Coast of West Africa from Cape Verde to Angola (Richards, 1968).

**DACTYLOPTERIDAE**

A single species is found on the coast of the Gulf of Guinea (Poll, 1959; Eschmeyer and Dempster in Quéro *et al.*, 1990: 690–691) and was collected by Irvine.

*Dactylopterus volitans* (Linnaeus, 1758)

*Irvine name.* *Cephalacanthus volitans* (Linnaeus).

*Reference material.* Winneba, March 1933 (Irvine 165)—BMNH 1934.10.12.22 (one: 240 mm SL); Accra, May 1938 (Irvine 252)—BMNH 1938.12.15.23 (one: 260 mm SL); ‘Gold Coast’ (Irvine).

*Distribution.* Both sides of the tropical Atlantic (Quéro *et al.*, 1990).

**PSETTODIDAE**

A single genus and two species are known from West Africa (Nielsen in Quéro *et al.*, 1990: 1024), of which one occurs on the coast of Ghana and other Gulf of Guinea countries (Nielsen, 1961).

*Psettodes belcheri* Bennett, 1831

*Reference material.* Accra, January 1930 (Irvine 38)—BMNH 1930.3.24.43 (one: not studied, currently on loan).

*Distribution.* Coast of tropical West Africa from Sierra Leone to Angola (Quéro *et al.*, 1990).

**BOTHIDAE**

Some 10 species have been recorded from the Gulf of Guinea, although two of these tend to occur only in waters over 100 m deep (Poll, 1959; Aldebert *et al.* in Quéro *et al.*, 1990: 1027–1036), and two were reported by Irvine from the coast of Ghana (see also table 1).

*Syacium micrurum* Ranzani, 1840

*Reference material.* Accra, November 1930 (Irvine 121 A); Winneba, March 1933 (Irvine 176)—BMNH 1934.10.12.21 (one: 240 mm SL); Keta, 1933 (Akpabla A 6).

*Distribution.* Coast of West Africa from Mauritania to Angola (Nielsen, 1961). Also in the tropical western Atlantic.

**SOLEIDAE**

At least five species occur in inshore waters in the Gulf of Guinea (Desoutter in Quéro *et al.*, 1990: 1037–1049), but only one was recorded from the coast of Ghana by Irvine. On average about 10 000 tonnes of soles appear to be caught in the region each year (FAO, 2000). Several deepwater species are also present (Nielsen, 1963).

*Synaptura lusitanica* Capello, 1868

*Reference material.* Accra, October 1930 (Irvine 120)—BMNH 1932.2.27.23 (one: 298.3 mm SL).

*Distribution.* Coast of West Africa from Morocco to Congo. Also occurs in the Mediterranean and northwards to Portugal (Quéro *et al.*, 1990).

**CYNOGLOSSIDAE**

Seven species occur in inshore waters off the mainland coast of tropical West Africa (Nielsen, 1963; Munroe, 1990; Desoutter in Quéro *et al.*, 1990: 1050–1054) and one was recorded (under two different names) from Ghana by Irvine. One or two other species occur in deepwaters (>200 m depth) offshore. On average about 5000 tonnes of tonguesoles are caught in the region each year (FAO, 2000).

*Cynoglossus senegalensis* (Kaup, 1858)

*Irvine names.* Recorded both by the name above and as *Cynoglossus goreensis* Steindachner (a junior synonym).

*Reference material.* Accra, January 1930 (Irvine 17)—BMNH 1930.3.24.44 (one: 316 mm SL); estuary of the River Volta (Ada), November 1938 (Irvine 364 pt)—BMNH 1939.7.12.39 (one: 245 mm SL).

*Distribution.* Coast of tropical West Africa from Senegal to Angola (Nielsen, 1963).

**ECHENEIDAE**

Seven species may be encountered in the Gulf of Guinea (Lachner and Post in Quéro *et al.*, 1990: 725–728) and one was reported by Irvine from the coast of Ghana.

*Echeneis naucrates* Linnaeus, 1758

*Reference material.* Accra, January 1930 (Irvine 7)—BMNH 1930.8.26.77 (one: 410 mm SL); Accra, January 1935 (Irvine 309); Accra, November 1938 (Irvine 355).

*Distribution.* Cosmopolitan in tropical and subtropical seas (Lachner, 1966).

**BALISTIDAE**

Four species are likely to be found in the Gulf of Guinea (Shipp, 1981) and two were recorded by Irvine from Ghana. On average about 75 tonnes of triggerfishes are reported to be caught in the region each year (FAO, 2000).

*Balistes punctatus* Gmelin, 1789

*Irvine name.* *Balistes forcipatus* Gmelin [= a junior synonym (on the basis of page priority) of *Balistes capriscus* Gmelin, 1789]. Misidentification.



*Reference material.* Accra, January 1930 (Irvine 13)—BMNH 1930.3.24.45 (one: 261 mm SL), BMNH 1930.8.26:78 (one: 170 mm SL); Accra, January 1939 (Irvine 399)—(?) BMNH 2001.5.2.34 (one: 200 mm SL).

*Distribution.* Both sides of the tropical Atlantic (Shipp, 1981).

***Balistes capriscus* Gmelin, 1789**

*Reference material.* Accra, 1931 (Irvine 140)—BMNH 1932.2.27.26 (one: 275 mm SL).

*Distribution.* Both sides of the tropical Atlantic (Shipp, 1981).

In some years, substantial numbers of this species are caught in the region, with a reported catch of about 50 tonnes in 1996 (FAO, 2000).

**OSTRACIIDAE**

Two species occur in the Gulf of Guinea (Tyler, 1965) and one was reported by Irvine. *Acanthostracion guineensis* Bleeker, 1865 is reported from Senegal to the Gulf of Guinea but Irvine's specimen appears to have been a stray *A. notacanthus*.

***Acanthostracion notacanthus* (Bleeker, 1862)**

*Irvine name.* *Acanthostracion quadricornis* (Linnaeus). Misidentification.

*Reference material.* Labadi, 1934 (M. J. Field 12)—BMNH 1938.12.15.26 (one: 135.1 mm SL). Label suggests October 1936 as date of collection.

*Distribution.* Established populations are known from the Azores, St Helena and Ascension (Tyler, 1965). Tyler (1965) suggests that this specimen, which he examined, is likely to have been a stray.

**TETRAODONTIDAE**

Six species are known from the Gulf of Guinea, although one is only likely to occur well offshore (Poll, 1959; Shipp in Quéro *et al.*, 1990: 1069–1072); two of these were recorded by Irvine from Ghana (one under two different names). Sporadic catches of up to around 125 tonnes per year of pufferfishes have been reported from the region (FAO, 2000).

***Lagocephalus laevigatus* (Linnaeus, 1766)**

*Reference material.* Accra, January 1930 (Irvine 20)—BMNH 1930.3.24.46–47 (two: 81.8, 101.5 mm SL); Winneba, March 1933 (Irvine 169).

*Distribution.* Both sides of the tropical and subtropical Atlantic. On the coast of West Africa from Morocco to Angola including offshore islands (Quéro *et al.*, 1990).

***Ephippion guttifer* (Bennett, 1831)**

*Irvine name.* Recorded both by the name above and as *Tetraodon pustulatus* Murray (a riverine species; SYNTYPES: BMNH 1866.6.14.5–6). The latter is a misidentification.

*Reference material.* Accra (Irvine 131)—BMNH 1932.2.27.27 (one: 114 mm SL); Accra, November 1938 (Irvine 354)—BMNH 1939.7.12.40 (one: 74.1 mm SL; listed under *Tetraodon pustulatus*).

*Distribution.* Coast of West Africa from Morocco to Angola, including offshore islands: entering estuaries (Quéro *et al.*, 1990).

#### BATRACHOIDIDAE

Four species occur in the Gulf of Guinea, one being recorded from Gabon to Angola only (Roux, 1971). Irvine recorded two from Ghana.

##### *Batrachoides liberiensis* (Steindachner, 1867)

*Reference material.* Accra, June 1930 (Irvine 102)—BMNH 1930.8.30.11 (1 specimen: 173 mm SL).

*Distribution.* Coast of tropical West Africa from Senegal to northern Angola (Roux, 1971; Collette and Russo, 1981).

Irvine correctly noted that *B. beninensis* Regan, 1915 is a junior synonym (Collette and Russo, 1981).

##### *Halobatrachus didactylus* (Schneider, 1801)

*Reference material.* Accra, March 1930 (Irvine 64)—BMNH 1930.8.30.10 (one: ca 305 mm SL); Winneba, March 1934 (Irvine 168).

*Distribution.* Coast of West Africa from Morocco to Ghana. Also occurs in the Mediterranean and along the Atlantic coasts of Spain and Portugal (Roux, 1971).

#### Discussion

Some 180 species of marine fish were recorded from Ghana by Norman and Irvine (1947) and some 292 specimens belonging to 139 species were located within the Natural History Museum collections. The valid names currently accepted for 45% of the species have changed since 1947, with the names used by Irvine now regarded either as junior synonyms or placed in a different genus. More importantly, a further 20% of species were found to have been misidentified (tables 3, 4). This indicates the importance of museum collections to back up taxonomic inferences. Norman had died before publication and Irvine had to finalise the marine fishes section by himself. The final stages of putting the book together were further hampered by the Second World War and the inaccessibility of type specimens, which had been removed from London for safe storage (Wheeler, 2000). These factors explain some curious errors in the identifications, notably the inclusion of the holotype of *Serranus accraensis* (Norman, 1931) under 'Sea perch—*Anthias* (?) sp.' in Irvine's book. Irvine wished to leave a duplicate specimen collection behind at Achimota College for reference by local ichthyologists and his correspondence in the Fish Section archives indicates that many specimens were marked 'To be returned'. Unfortunately, some critical specimens such as that identified as *Conger conger* (Linnaeus, 1758), which we include as a 'doubtful record' in table 1, were among those so marked. Although enquiries have so far not revealed whether any of the Ghana collection remains, the fact that it was extant in 1986 (B. Hughes, personal communication) gives some hope that continuing enquiries may yet locate further specimens.

Six of the marine species collected by Irvine were correctly surmised to be new to science by Norman and were described by him as new species between 1930 and 1935. These were: *Rhinobatos albomaculatus* Norman, 1930; *Rhinobatos irvinei*

Table 3. Misidentifications of material by Norman and Irvine (1947) for species already known to science. (Then undescribed species, which were misidentified, are listed in table 4. Uses of what are now considered *nomina dubia* but were commonly accepted names in 1947 have not been included.)

Actual species	Norman and Irvine (1947) identification (modern name)
<i>Rhizoprionodon acutus</i> (Rüppell, 1837)	<i>Rhizoprionodon terraenovae</i> (Richardson, 1836)
<i>Mustelus mustelus</i> Linnaeus, 1758	<i>Mustelus canis</i> (Mitchill, 1815)
<i>Torpedo mackayana</i> Metzelaar, 1919	<i>Torpedo nobiliana</i> Bonaparte, 1835
<i>Pteromylaeus bovinus</i> (Geoffroy Saint-Hilaire, 1817)	<i>Myliobatis aquila</i> (Linnaeus, 1758)
<i>Muraena robusta</i> Osorio, 1909	<i>Muraena helena</i> Linnaeus, 1758
<i>Lycodontis afer</i> (Bloch, 1795)	<i>Gymnothorax vicinus</i> (Castelnau, 1855)
<i>Selene dorsalis</i> (Gill, 1862)	<i>Selene setapinnis</i> (Mitchill, 1815)
<i>Trachinotus teraia</i> Cuvier, 1832	<i>Trachinotus falcatus</i> (Linnaeus, 1758)
<i>Pseudotolithus senegalensis</i> (Valenciennes, 1833)	<i>Pseudotolithus senegalla</i> (Cuvier, 1830)
<i>Pagellus bellottii</i> Steindachner, 1882	<i>Pagellus erythrinus</i> (Linnaeus, 1758)
<i>Drepane africana</i> Osorio, 1892	<i>Drepane punctata</i> (Linnaeus, 1758)
<i>Abudefduf taurus</i> (Müller and Troschel, 1848)	<i>Abudefduf hoefleri</i> (Steindachner, 1881)
<i>Euthynnus alletteratus</i> (Rafinesque, 1810)	<i>Auxis rochei</i> (Risso, 1810)
<i>Auxis rochei</i> (Risso, 1810)	<i>Auxis thazard</i> (Lacepède, 1800)
<i>Gobioides africanus</i> (Giltay, 1935)	<i>Gobioides ansorgii</i> Boulenger, 1909
<i>Mugil cephalus</i> Linnaeus, 1758	<i>Liza aurata</i> (Risso, 1810)
<i>Mugil bananensis</i> (Pellegrin, 1928)	<i>Liza dumerili</i> (Steindachner, 1870)
<i>Acanthostracion notacanthus</i> (Bleeker, 1862)	<i>Acanthostracion quadricornis</i> (Linnaeus, 1758)
<i>Ephippion guttifer</i> (Bennett, 1831)	<i>Tetraodon pustulatus</i> Murray, 1857

Table 4. Species new to science in 1947 which were collected by Irvine but not recognized as such and later described by other workers.

Current name	Irvine name
<i>Panturichthys isognathus</i> Poll, 1953	Not listed in book but specimen collected in 1938
<i>Dentex angolensis</i> Poll and Maul, 1953	<i>Dentex macrophthalmus</i> (Bloch, 1791) (in part)
<i>Dentex congoensis</i> Poll, 1954	<i>Dentex macrophthalmus</i> (Bloch, 1791) (in part), <i>D. cunninghamii</i> Regan, 1905 (in part)
<i>Pagrus africanus</i> Akazaki, 1962	<i>Pagrus pagrus</i> (Linnaeus, 1758)
<i>Chromis cadenati</i> (Whitley, 1951)	<i>Chromis chromis</i> (Linnaeus, 1758)
<i>Trachinus collignoni</i> Roux, 1957	<i>Trachinus lineolatus</i> Fischer, 1885
<i>Entomacrodus cadenati</i> Springer, 1966	Not listed in book but specimens collected in 1938
<i>Uranoscopus polli</i> Cadenat, 1953	<i>Uranoscopus scaber</i> Linnaeus, 1758
<i>Chelidonichthys gabonensis</i> (Poll and Roux, 1955)	<i>Trigla hirundo</i> Linnaeus, 1758

Norman, 1931; *Serranus accraensis* (Norman, 1931); *Spicara nigricauda* (Norman, 1931); *Branchiostegus semifasciatus* (Norman, 1931) and *Pontinus accraensis* Norman, 1935. A further nine species collected by Irvine were at the time unknown

to science and have since been described by others as new species; these were identified by Norman and Irvine (1947) as similar-looking well-known species or in two cases (*Entomacrodus cadenati* and *Panturichthys isognathus*) the specimens appear to have been overlooked (table 4).

Most of the 39 species for which material could not be located represented uncontested records with a Ghanaian occurrence supported by other workers. However, there were eight species listed by Irvine, for which no voucher specimens could be located, which are unlikely (in varying degrees) to occur off Ghana and a further two species (*Carcharodon carcharias* and *Alopias vulpinus*), for which Irvine's records cannot be considered adequate grounds for recording them from Ghana (table 2). Five species recorded by Norman and Irvine (1947), which we consider very unlikely to be present off Ghana, are: *Conger conger*, *Umbrina cirrosa*, *Scorpaena scrofa*, *Chaetodon striatus* and *Liza ramada* (tables 1, 2). We consider these records to be misidentifications. Three other species appear unlikely records for Ghana but cannot be totally dismissed: *Dentex macrophthalmus* (material not assigned to *D. angolensis* or *D. congoensis* was not identifiable but recorded distribution is anti-equatorial in the eastern Atlantic, with no reliable records from the Gulf of Guinea coast), *Sphyrna zygaena* and *S. tudes* (table 1). *Sphyrna zygaena* tends to be anti-tropical in distribution although it has been recorded in equatorial waters in the Indian Ocean and is a cosmopolitan warm-temperate and sub-tropical species (Compagno, 1984). It may occur off Ghana but its occurrence there needs to be verified. The taxonomy and nomenclature surrounding *Sphyrna tudes* is complex (Compagno, 1984) but it seems likely that this species is confined to the tropical western Atlantic from Venezuela to Uruguay. The species collected by Irvine was most likely the similar-looking *S. couardi* Cadenat, 1950 which is known from Senegal to the Congo.

A significant lesson from this study has been to show the importance of voucher specimens to support taxonomic work. Because Irvine deposited specimens, which have allowed us to revise his taxonomy in the light of modern research, his work has lasting value. Without the specimens it would now be of little scientific worth, just a set of unverifiable identifications.

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