A Revision of the Genus Aracana and its Allies.

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[*Contribution from the Australian and South Australian Museums.*]

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Plates XVI. to XXV.

The paper results, primarily, from an examination of the fishes obtained during the cruise of the trawler "Simplon" in the Great Australian Bight, and of which a more general account appears in the preceding pages (pp. 455 to 476). The *Aracanae* in the Australian and South Australian Museums have also been examined, and others obtained by the collectors of the ill-fated Federal trawler "Endeavour" have likewise been reviewed.

In all ninety-three specimens have been examined, which prove the several species to be exceedingly variable in form and colour-marking, in the development of the spines on the carapace, and in the ornamentation of the scutes. We recognize five genera, of which one is new; the others were defined by Kaup in 1855, but were later united with *Aracana*, Gray, by Günther, which genus he further regarded as a subgenus of *Ostracion*, Linnaeus. The species of the genera *Capropygia*, *Caprichthys*, *Kentrocapros*, and *Anoplocapros* are easily separated, but those of *Aracana* are not so readily determined.

Key to the genera allied to *Aracana*.

a Back elevated into a ridge.
  b. Tail encircled by a bony band, which may be incomplete in the young. No supra-orbital spine.
    c. Each lateral ridge of carapace with a single, large, straight spine, which is broad and flat ... ... *Capropygia*
    cc. Lateral ridges without, or with several small spines ... ... *Anoplocapros*
  bb. Tail not encircled by a bony band. Each lateral ridge with a single recurved spine, which is broad and flat. Supra-orbital spine present or absent ... ... *Caprichthys*

aa. Back broad and flattened.
d. Two supralateral spines on each side. Supraorbital spine present. Abdomen keeled ... ... *Aracana*
dd. One supralateral spine on each side. Supraorbital spine feebly developed. Abdomen scarcely keeled ... ... *Kentrocapros*

Capropygia, Kaup.

Capropygia, Kaup : Arch. für Naturg., xxi., 1855, p. 220 (*Acerana unistriata*, Kaup).

Carapace with six ridges—a dorsal, an abdominal, two supralateral, and two infralateral. Each lateral ridge with a single large spine, which is broad and flat; no supraorbital spine. Caudal peduncle with a complete ring of scutes posteriorly. Dorsal with 12-14, anal with 12-13 rays.

Capropygia unistriata (Gray), Kaup.

Pl. xvi.

Acerana (Capropygia) unistriata (Gray, MS.), Kaup: Arch. für Naturg., xxi., 1855, p. 220; Günther: Cat. Fish. Brit. Mus., viii., 1870, p. 266.

D. 12-14; A. 12-13; P. 1+11; C. 10-11.

Length of head, from the rostral end of the carapace to the gill-opening, 3·5-3·6, depth of body 1·1-1·3 in the length exclusive of the caudal rays. Narrowest interorbital width scarcely greater than the orbital diameter, which is 1·3 in the snout; snout, measured from the rostral end of the carapace to the anterior orbital margin, 1·3-1·4 in the head. Longest pectoral ray 1·07, dorsal 1·3, anal 1·6, and caudal 1·3 in the head.

Back and belly each with a compressed keel; lateral edges elevated above the general surface of the carapace. Snout but little produced, not compressed. Forehead flat between the eyes, the supraorbital margins more or less elevated, and unarmed. Supralateral spine in the posterior portion of the median third of the carapace; it is flattened, with a broad base, and is directed outward and upward. Infralateral spine similar but smaller, inserted below the origin of the dorsal fin, and directed outward, downward, and backward. Gill-opening below the hinder portion of the eye; pectoral usually entirely behind the verticle of the eye, its anterior portion sometimes below the hinder orbital margin.

Scutes of the carapace in close contact everywhere except before the gill-opening, where they are slightly separated. Their surfaces are rougher on the head than on the body, and those on the throat are tubercular. Three or four scutes are present behind the dorsal and anal fins, and there is a

more or less complete ring of scutes around the end of the caudal peduncle.

Life Colours.—Ground pale-yellow, with black spots and bars distributed as follows:—Bases of the dorsal and anal fins each with a large black spot, which may be divided into two; caudal peduncle with two spots, one behind the caudal ring, and another larger one in front of it; base of pectoral more or less completely black, as is the fleshy area behind the lips and the nostrils; a black band from below and behind the eye to the hinder part of the carapace is usually present, but may be incomplete or absent; a broad black ring around each of the body spines.

Described from eight specimens, 72-106 mm. long; the specimen figured is 90 mm. in length.

Loc.—Off the mouth of the Murray River, South Australia, 20 fathoms; 40 miles west of Kingston, South Australia, 30 fathoms; Spencer Gulf, South Australia, 20 fathoms; off Flinders Island, Investigator Group, South Australia, 37 fathoms; Rocky Point, Eastern Cove, Kangaroo Island.

(1) "Simplon" Station 2, 22 fathoms; Station 3, 80-140 fathoms; Station 5, 85 fathoms; Station 6, 85 fathoms; Station 8, 72 fathoms.

Anoplocapros, Kaup.

Anoplocapros, Kaup.: Arch. für Naturg., xxi., 1855, p. 220 (*Ostracion lenticularis*, Richardson).

Carapace compressed, the back elevated into a ridge; there are six ridges in the young, but the lateral ones usually become obsolete in adults, while the abdominal ridge is not always well defined. Young generally with several small spines on the lateral ridges, which are usually wanting in adults; no supraorbital spine. Tail encircled by a band of osseus scutes, which may be incomplete in the young. Dorsal and anal fins each with about ten rays.

Key to the species of *Anoplocapros*.

a. Occiput not gibbous before the dorsal crest ... *lenticularis*
aa. Occiput gibbous before the dorsal crest ... *gibbosus*

Anoplocapros lenticularis, Richardson.

Pl. xvii.

Ostracion lenticularis, Richardson: Proc. Zool. Soc., 1841, p. 21, and Trans. Zool. Soc., iii., 1849, p. 158.

Acerana (Anoplocapros) lenticularis, Kaup: Arch. für Naturg., xxi., 1855, p. 221.

Acerana (Anoplocapros) grayi, Kaup: *loc. cit.*

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(1) For further details of "Simplon" Stations see pp. 457 and 458 of previous paper.

Ostracion (Aracana) lenticularis, Günther: Cat. Fish. Brit. Mus., viii., 1870, p. 268; Macleay: Proc. Linn. Soc., N.S.W., vi., 1881, p. 335.

Aracana lenticularis, Castelnau: Proc. Zool. Soc., Vict., ii., 1873, p. 148, and Proc. Linn. Soc., N.S.W., iii., 1879, p. 401; Waite: Mem. Austr. Mus., iv., 1899, p. 95, pl. xvii., fig. 2, and pl. xviii., and Rec. Austr. Mus., iv., 1902, p. 190, and *loc. cit.*, vi., 1905, p. 82.

A representative series of twenty-nine specimens, 102-300 mm. long, shows that this species varies in form to an extraordinary degree, some of the variations being due to the regular changes with growth, while others are merely individual peculiarities.

In the young, the supralateral and infralateral ridges of the carapace are well defined, and sometimes armed with short thick spines; both ridges and spines usually become obsolete in adults, but are sometimes retained. Small specimens have the scutes very rugose with widely-spaced granules, and elevated ridges radiating from central tubercles; these ridges become more or less reduced with age, and some large specimens have the carapace uniformly and minutely granular. The snout is always oblique in the young, and rarely also in adults, but larger specimens generally develop a more or less prominent hump on the snout which may make its anterior profile almost vertical. The carapace is usually compressed, and the back and abdomen form sharp crests; some specimens, however, are much thicker, and the dorsal crest is obtuse, while that of the abdomen is almost obsolete. The depth varies greatly, and in two specimens, 183 and 226 mm. long, respectively, the greatest depth is 1·4-2 in the length, exclusive of the caudal fin.

The young and adult forms of this species have been described in detail and illustrated by Waite. The specimen here figured is a particularly slender example, and is evidently of the form which was briefly described by Kaup as *A. grayi*.

Loc. — Port Jackson, and near Sydney, New South Wales; Shoalhaven Bight, New South Wales, 19-20 fathoms ("Thetis" expedition); off Cape Three Points, New South Wales, 23-34 fathoms ("Thetis" expedition); South Australia; Fremantle and Mandurah, Western Australia.

Anoplocapros gibbosus, n. sp.

Pl. xviii.

D. 9-11; A. 10; P. 1+11; C. 11.

Length of head 3·2, depth of body 1·4-1·6 in the length without the caudal rays. Snout 1·2-1·3, orbit 3·2-3·3, and narrowest interorbital width about 2 in the head. Longest

pectoral ray 1·6-1·7, dorsal 1·7-2·1, anal 2·1-2·5, and caudal 1·7-1·8 in the head.

Form of the body variable. Snout somewhat produced and compressed. Interorbital space concave or flattened, the supraorbital margins somewhat elevated. The back rises more or less abruptly from the interorbital space, generally forming a broad occipital hump; thence it narrows, becoming compressed into a keel on its upper and hinder portions, which is higher in some specimens than in others. Abdominal profile either flattened below and more or less compressed, or evenly arched and broader. Lateral ridges obsolete, no true spines on the carapace. Gill-opening behind or below the posterior orbital margin; pectoral entirely behind the eye.

Scutes of the carapace in close contact everywhere except in advance of the gill-opening, where they are more or less separated by naked interspaces. On the head they are ornamented with close-set rounded granules. The body-scutes are also beset with similar granules, and their centres are elevated to form obtuse or spiniform tubercles on the lower portions of the sides; these tubercles are well developed and widely distributed in some specimens, but are obsolete in others. A broad saddle-shaped scute is present behind the dorsal, and another behind the anal fin, and there may be others irregularly placed between them; a complete ring of scutes extends around the caudal peduncle.

Life Colours.—Ground colour yellow, tinged with pink, with two dark-greyish areas on the back, which are bordered with indefinite dark wavy lines; the anterior extends from the occiput to the back, while the other covers its postero-lateral portion, and extends forward toward the eye.

Described from four specimens, 177-250 mm. long. The largest is selected as the type, and is the example figured.

Two young specimens, about 80 and 124 mm. long, respectively, differ from the larger ones in their great depth and in the pronounced sculpture of the scutes of the carapace, while their colour-marking is greatly accentuated. The greatest depth is 1·2 in the length, exclusive of the caudal fin, the dorsal ridge being very high. Prominent, elevated, granular ridges radiate from the centre of each scute to its angles, and the spaces between them are covered with spaced granules; a few irregular granular nodules are situated on the ridges on one side of one of the specimens, but are absent on the other side. The arrangement of the colour-marking is similar to that shown in the figure, but the dark areas are defined by conspicuous dark-brown lines.

Loc.—Marsden Point, Kangaroo Island; Flinders Island, Investigator Group, South Australia, 37 fathoms; Corney Point, Spencer Gulf, South Australia.

"Simplon" Station 4, 88-94 fathoms.

Caprichthys, n. gen.

This genus is allied to *Aracana*, but differs in having the back elevated into a ridge instead of being broad and flattened. It is distinguished from *Capropygia* and *Anoplocapros* by having the caudal peduncle naked posteriorly instead of encircled with a bony band. Carapace with six ridges—a dorsal, an abdominal, two supralateral, and two infralateral. Each lateral ridge with a single recurved spine, which is broad and flat; a supraorbital spine present or absent.

Caprichthys gymnura, n. sp.

Pl. xix.

D. 12-13; A. 12; P. 1+11; C. 10-11.

Length of head, from the rostral end of the carapace to the gill-opening, 3·3-3·5, depth of body 1·2 in the length without the caudal rays. Narrowest interorbital width subequal to the diameter of the orbit, which is 1·4-1·7 in the snout; snout, measured from the rostral end of the carapace to the anterior orbital margin, 1·2-1·3 in the head. Longest pectoral ray 1·1, dorsal 1·4-1·5, anal 1·4-1·6, and caudal 1·3-1·4 in the head.

Back and belly each with a compressed keel; the lateral edges less pronounced though well defined. Snout somewhat produced, a little compressed. Forehead flat between the eyes, the orbital margins elevated; the younger specimens have a flattened curved spine over each eye, directed upward, outward, and backward, but the orbits are spineless in the largest example. Spine of supralateral ridge in the anterior portion of the hinder third of the carapace; it is flattened, curved, and striated, and directed outward, upward, and backward. Infralateral spine similar, inserted behind the verticle of the upper one, and directed outward, downward, and backward. Gill-opening below or in advance of the verticle of the hinder orbital margin; the pectoral may be wholly behind the eye, or the anterior portion of its base may be placed below the posterior portion of the eye.

Scutes of the carapace in close contact in the young, but irregularly separated on the abdomen by naked areas in the larger example, which has also a few free scutes around the bases of the dorsal and anal fins; those before the gill-opening are more or less separated in all specimens. The scutes are

much rougher on the head than on the body, especially around the lips and on the throat, where they become tubercular; the body-scutes are ornamented with rows of granules radiating from a central point. About three distinct scutes are present behind the dorsal and anal fins; caudal peduncle otherwise naked.

Colour.—Creamy-white in formaline, with more or less numerous blackish spots and lines distributed as follows:—Naked parts with a varying number of narrow black lines; some large black spots on and around the bases of the body-spines, which become smaller as they recede from them; the greater part of the back is also spotted in one example.

Described from four specimens, 86-113 mm. long. The example figured is 100 mm. in length, and is selected as the type.

Loc.—Doubtful Island Bay, South-western Australia, 20-25 fathoms; between Cape Naturaliste and Geraldton, Western Australia.

Aracana, Gray.

Ostracion, subgenus *Aracana*, Gray: Ann. Mag. Nat. Hist., i., 1838, p. 110; Günther: Cat. Fish. Brit. Mus., viii., 1870, p. 266.

Platycanthus, Swainson: Nat. Hist. Classif. Fishes, ii., 1839, pp. 194, 324 *(P. auratus,* Shaw).

Acerana, Kaup.: Arch. für Naturg., xxi., 1855, p. 219 (misprint).

Carapace with five more or less distinct ridges—two supralateral, two infralateral, and an abdominal. A supraorbital and two supralateral spines on each side; a mediolateral, and one to four infralateral spines are more or less developed, Caudal peduncle with broad saddle-shaped scutes, which may form an osseous ring around the base of the tail. Dorsal with 9-11, anal with 10-11 rays.

Type.—According to Günther *(loc. cit.*, p. 267), the name *Aracana* was first used by Gray in his "Illustrations of Indian Zoology," published about 1829, for a fish which he figured as *A. aurita*, Richardson. He later considered that his figure represented a distinct species, which he called *A. reevesii*, and which must therefore be accepted as the type of the genus. Unfortunately Gray's figure is not available to us, so we rely upon Günther in the above statement.

The species of *Aracana* are subject to considerable variation in form, development of the spines, ornamentation of the scutes, and colour-markings. We have examined a series of twenty-five specimens of different sizes from various localities, and find them to be separable into several groups; but which of these groups represent species, subspecies, sexual

forms, or merely varieties we are unable to say. Kent [2] has described and roughly figured two very differently-marked specimens as *A. ornata* and *A. aurita*, which he regards as sexual forms of the one species. His figures are very crude, and do not quite agree with any specimens in our series, and as he offers no proof of his contention, we suggest that the two names be retained until further information is available.

Key to the species of *Aracana*.

a. Supraorbital spines inclined more or less backward.
  b. Caudal not ornate ... ... *aurita*
  bb. Caudal ornate ... ... *spilogaster*
    c. Body subcircular, more than half as deep as long.
      d. One mediolateral, two infralateral spines ... ... typical form
      dd. Two mediolateral, four infralateral spines ... ... var. *spinosissima*
    cc. Body ovate, less than half as deep as long ... ... var. *angusta*
aa. Supraorbital spines inclined upward and slightly forward.
  e. Dark bars on caudal peduncle paired, much broader than the light interspaces. Snout subvertical in adults, oblique in the young.
    f. Sides of carapace with numerous polygonal spots; caudal fin ornate ... ... *ornata*
    ff. Sides of carapace with broad bars, not spots; caudal fin plain ... ... *ornata*, var.
  ee. Dark bars of caudal peduncle not paired, usually narrower than the light interspaces; snout oblique; caudal fin plain *flavigaster*

Aracana aurita, Shaw.

Pl. xx.

Ostracion auritus, Shaw: Nat. Miscel., ix., 1798, pl. cccxxxviii., and Gen. Zool., v., pt. 2, 1804, p. 429, pl. clxxiii.; Bloch and Schneider: Syst. Ichth., 1801, p. 561.

Ostracion (Aracana) auritus, Gray: Illustr. Ind. Zool., 1829(?), pl. xcviii., fig. 2; Gray: Ann. Mag. Nat. Hist., i., 1838, p. 110; Richardson: Trans. Zool. Soc., iii., 1849, p. 160, pl. ix., figs. 1 and 2; Bleeker: Verh. Akad. Amstrdm., ii., 1855, p. 26; Günther: Cat. Fish. Brit. Mus., viii., 1870, p. 266; Macleay: Proc. Linn. Soc., N.S.W., vi., 1881, p. 334; Johnston: Proc. Roy. Soc., Tasm., 1882 (1883), p. 136, and 1890 (1891), p. 38; Lucas: Proc. Roy. Soc., Vict. (2), ii., 1890, p. 41.

Aracana aurita, Klunzinger: Arch. für Naturg., xxxviii., 1872, p. 43, and Sitzb. Akad. Wiss. Wien., lxxx., 1879, p. 424; Castelnau: Proc. Zool. Soc., Vict., ii., 1873, p. 147; Hutton:

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[2] Kent: "Naturalist in Australia," 1897, p. 187, chromo pl. vii., figs. *a-c*.

Trans. N. Zeal. Inst., v., 1873, p. 271; Waite: Rec. Austr. Mus., vi., 1905, p. 82; Fowler: Proc. Acad. Nat. Sci. Philad., 1907 (1908), p. 439.

Acerana aurita, Kaup: Arch. für Naturg., xxi., 1855, p. 219.

Ostracion quatuordecim aculeatus, Lacépède: Ann. Mus. Hist. Nat., iv., 1804, pp. 202, 211, pl. lviii., fig. 1.

Ostracion striatus, Shaw: Gen. Zool., v., pt. 2, 1804, p. 430.(3)

Ostracion tobinii, Donovan: Nat. Repos., ii., 1824, pl. lxvi.(4)

Ostracion (Aracana) lineatus, Gray: Ann. Mag. Nat. Hist., i., 1838, p. 110.

Ostracion (Aracana) reevesii, Gray: Ann. Mag. Nat. Hist., i., 1838, p. 111.(5)

D. 10-11; A. 10-11; P. 1+10-11; C. 11-12.

Length of head 3·4-3·5, depth 1·3-1·7 in the length excluding the caudal rays. Narrowest interorbital width 2·3-2·4 in the head, and greater than the orbital diameter, which is 2·7-3·3 in the head. Longest pectoral ray 1·5-1·7, dorsal 1·4-1·6, anal 1·7-1·8, and median caudal rays 1·5 in the head.

Form very variable, principally owing to the different development of the abdomen; in the large specimen, figured on pl. xx., it is strongly compressed, and forms a deep rounded keel, but in a narrower example the keel is scarcely developed. Snout oblique, not gibbous. Interorbital space flat mesially, but the supraorbital margins are strongly elevated, making it appear concave. Back almost flat in front, sometimes forming a low crest behind. Gill-opening just behind the verticle of the eye in the young, farther back in adults. Spines variable in form, being either short and somewhat thickened, or elongate and strongly compressed. Supraorbital spine inclined slightly outward and backward. Two supralateral spines on each side. Mediolateral spine situated below or slightly behind the verticle of the hinder supralateral one. Two infralateral spines usually present, but one or both are occasionally absent; the anterior is below the

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(3) *Ostracion striatus*, Shaw. This name was founded on a drawing, which Shaw himself considered possibly represented his *O. auritus*.

(4) *Ostracion tobinii*, Donovan. This name was offered as a substitute for *O. auritus* and *O. striatus*, Shaw, which were regarded as unsatisfactory.

(5) *Ostracion (Aracana) reevesii*, Gray, was proposed for a fish figured in Gray's "Illustrations of Indian Zoology" as *A. aurita*, but later regarded as a distinct species. It was reunited with *A. aurita* by Günther.

interspace of the supralateral spines and far behind the pectoral base.[6]

Carapace uniformly granular in most larger specimens, but in some, including all smaller examples, the scutes are ornamented with radiating lines of larger granules. The scutes are widely separated in front of the gill-opening, and sometimes also on the abdomen near the vent. One or two large saddle-shaped scutes are present behind the dorsal and anal fins, and others form a more or less complete ring around the caudal peduncle. Dorsal and anal fins either somewhat angular or rounded; caudal slightly emarginate, truncate, or rounded.

Colour.—Creamy-yellow in formalin, with a varying number of dark lines which are more or less sinuous, and anastomosing on the supero-posterior portions of the sides; they are almost horizontal on the sides of the snout, and are nowhere wider than the lighter interspaces. Bases of the fins with oblique dark bars, their rayed portions plain.

Described from eleven specimens, 77-205 mm. long; the proportional measurements are those of the narrowest and broadest specimens, one of the latter being figured.

Loc.—Tasmania; off the east coast of Flinders Island, Bass Strait; 40 miles west of Kingston, South Australia, 30 fathoms; off the mouth of the Murray River, South Australia, 20 fathoms; Gulf St. Vincent, South Australia; Fremantle, Western Australia.

"Simplon" Station 2, 22 fathoms, and Station 5, 85 fathoms.

Aracana aurita, Shaw, (?) young.

Pl. xxi.

Fourteen young examples, 22-47 mm. long, resemble *A. aurita* in their general colour-marking. The smallest specimens, one of which is figured on pl. xxi., are almost globular, with the sides a little compressed; the back and abdomen are rounded. The scutes are very distinct and irregular; the centre of each is elevated into a rounded tubercle, from which raised ridges radiate towards the centres of each adjoining scute, and fine radiating striae cover the entire surface. No spines are developed, but their positions are indicated by

(6) None of our specimens has a third infralateral spine below or in advance of the pectoral fin, and they agree with Shaw's description and figure in this respect. Richardson figures two specimens as *A. aurita*, in which, however, these spines are present; as his illustrations seem to agree with Shaw's species in other details, it is probable that the presence or absence of these spines is not of specific value. *Ostracion quatuordecim aculeatus*, Lacépède, also has subpectoral spines.

enlarged tubercles. The eye is very large, and the nostrils are prominent and tubular. The fins are similar to those of larger specimens, but their rays are either simple or bifurcate.

As the fish grows the striations on the scutes become less pronounced, and give way to scattered granules. The enlarged tubercles become more spiniform, and the general form and proportions alter to those of the adult. The dark stripes on the carapace and tail are few in number and widely spaced in the smallest specimens, but in others 47 mm. long, they do not differ from those of the adult *A. aurita*.

Loc.—Gulf St. Vincent, South Australia; Western Port, Victoria.

ARACANA SPILOGASTER, Richardson.

Ostracion (Aracana) spilogaster, Richardson: Proc. Zool. Soc., 1840, p. 27, and Trans. Zool. Soc., iii., 1849, p. 163, pl. x., fig. 1; Bleeker: Verh. Akad. Amstrdm., ii., 1855, p. 27.

D. 10-11; A. 10-11; P. 1+10; C. 11.

Length of head 3·3, depth of body 1·5-1·7 in the length without the caudal fin. Narrowest interorbital width 2·2-2·4 in the head, almost equal to the orbital diameter, which is 2·4 in the head. Longest pectoral ray 1·5, dorsal 1·5, and median caudal rays 1·3 in the head.

Snout oblique. Interorbital space flat, but the supraorbital ridges are elevated, making it appear concave. Back almost flat anteriorly, sometimes obscurely keeled posteriorly. Gill-opening behind the verticle of the hinder orbital margin. Supraorbital spine inclined backward, and more or less outward. Two supralateral spines on each side; a mediolateral spine is placed below or a little in advance of the verticle of the posterior supralateral one. Two infralateral spines, which are sometimes but little developed; the anterior is below the interspace of the supralaterals, and well behind the base of the pectoral fin.

Carapace covered with small rounded granules, which are usually more numerous on the lighter parts than on the dark (blue) lines and spots; this character is particularly marked on the sides of the snout. A large saddle-shaped scute is present behind the dorsal and anal fins, and others form a more or less complete ring around the base of the tail; numerous irregular smaller scutes are scattered over the sides of the caudal peduncle.

Colour.—Carapace and tail with numerous broad and more or less sinuous light-blue stripes, which are generally broken up into rounded spots on the sides; abdomen with a network of blue lines enclosing golden spots. Caudal fin

ornate, with broad blue bars between the rays, which are united with an intramarginal loop of the same colour.

Described from eight specimens, 143-200 mm. long.

Loc.—Tasmania; Gulf St. Vincent, South Australia.

Aracana spilogaster, Richardson.

var. spinosissima, n. var.

Pl. xxii.

An example, 160 mm. long, differs from the typical form of *A. spilogaster* only in the excessive development of the spines of the carapace. There are two mediolateral spines on each side, though the posterior one of the left side is only rudimentary. The infralateral ridges are armed with four spines; in addition to the normal two, there is one below the gill-opening and another smaller one below the hinder portion of the pectoral fin.

We have no doubt that this is merely a variation of *A. spilogaster*.

Loc.—Tasmania.

Aracana spilogaster, Richardson.

var. angusta, n. var.

Pl. xxiii.

D. 10; A. 10; P. 1+10-11; C. 11.

Length of head, from the snout to the gill-opening, 3·4, depth of body 1·7 in the length without the caudal fin. Narrowest interorbital width almost equal to the orbital diameter, which is 2·7 in the head. Longest pectoral ray 1·4, dorsal 1·3, anal 1·5, and caudal fin 1·1 in the head.

Snout oblique, slightly convex. Interorbital space flat, but the supraorbital margins are considerably elevated, making it appear concave. Back broad, almost flat. Abdomen compressed into a keel, its profile evenly arched from the snout to the caudal peduncle. Supraorbital spine well developed, inclined strongly backward and outward. Two supralateral spines on each side, and a strong mediolateral one situated slightly in advance of the verticle of the posterior supralateral one. Three infralateral spines; the anterior is the smallest and is placed below the anterior base of the pectoral, and the second is a little behind the verticle of the anterior supralateral spine.

Carapace uniformly granular except around the gill-opening, whence there is a naked space extending forward to the snout. Saddle-shaped scutes are present behind the dorsal and anal fins, and others form a nearly complete ring around the base of the tail; small irregular scutes are also

present on the lower parts of the caudal peduncle. Dorsal and anal fins obscurely angular, their hinder margins almost straight. Middle portion of caudal fin emarginate, the outer lobes rounded.

Colour.—Sides of head, body, and tail with sinuous dark (blue) lines, which are not so broad as the light interspaces; very indefinite intermediate bars can be traced on the sides of the snout, portions of the body, and on the caudal peduncle. The dark bars become broken up into spots on the upper parts of the sides, and they give place to a network of light-blue lines on the abdomen. Caudal ornate, with an intramarginal dark band, with which several irregular dark inter-radial bars are connected.

Described and figured from a specimen 180 mm. long.

A second example, of about the same length, differs in the form of the dark bars on the carapace and in having the spines but little developed. The supraorbital, mediolateral, and two infralateral spines are rudimentary, and the anterior infralateral spine is absent. The dark bars on the body and tail are much broader than the lighter interspaces, and are defined by a narrow darker line on each margin. This is evidently a variation of the form described above.

Loc.—East of Flinders Island, Bass Strait.

"Simplon" Station 3, 80-140 fathoms.

Aracana ornata, Gray.

Pl. xxiv.

Ostracion (Aracana) ornata, Gray: Ann. Mag. Nat. Hist., i., 1838, p. 110; Richardson: Trans. Zool. Soc., iii., 1849, p. 165, pl. x., fig. 2; Hollard: Ann. Sci. Nat., (4), vii., 1857, p. 142 (*O. nasus*, MS.).

Aracana ornata, Günther: Cat. Fish. Brit. Mus., viii., 1870, p. 267; Castelnau: Proc. Zool. Soc., Vict., i., 1872, p. 246; Macleay: Proc. Linn. Soc., N.S.W., vi., 1881, p. 334; Johnston: Proc. Roy. Soc., Tasm., 1882 (1883), p. 136, and 1890 (1891), p. 38; Kent: "Naturalist in Australia," 1897, p. 187, chromo pl. vii., figs. *a-c.*

D. 10-11; A. 10; P. 1+9-10; C. 11.

Length of head 3·08-3·5, depth of body 1·4-1·5 in the length without the caudal rays. Snout, measured from the orbital margin to the lips, 1·3-1·5 in the head. Narrowest interorbital width a little greater than the orbital diameter, which is 2·5 in the head. Longest pectoral ray 1·4-1·5, dorsal 1·2-1·5, anal 1·5-1·7, and median caudal ray 1·5-1·6 in the head.

Snout compressed, its anterior profile oblique in the young, subvertical and elevated above into a prominent hump in larger specimens. Interorbital space flat, the supraorbital margins slightly raised. Back broad, almost flat, and

evenly arched. Abdomen compressed into a keel, its profile more or less evenly arched from the mouth to the vent. A very long compressed spine above the middle of each eye is directed upward, and sometimes slightly forward. Two similar but smaller spines are present on each side of the back. Another on the middle of the side, well behind the pectoral fin. Lower lateral ridge obsolete, its usual position indicated by two or three spines; the first below the posterior base of the pectoral fin, the last below the base of the dorsal fin, and a smaller one, usually present, midway between these two.

Carapace uniformly granular, its scutes not clearly defined. Abdominal surface more or less deeply and irregularly grooved. Imperfect scutes are present behind the dorsal and anal fins, and on the upper and lower surfaces of the end of the caudal peduncle. Anterior dorsal and anal rays very slightly produced in some specimens, forming a distinct angle to the margins of the fins.

Colour.—Entire carapace and tail ornamented with polygonal spots and paired brownish bars on a light ground-colour of pale-blue, white, or pale-yellow. The sides of the snout bear more or less numerous oblique bars, which also extend over the sides of the abdomen, where they are sometimes irregular and vermiculate. The polygonal spots on the sides of the carapace form distinct rows in some specimens, but are more irregular in others, and each usually has a central blue spot. Caudal peduncle and bases of dorsal and anal fins with dark paired stripes, separated by narrow blue streaks, and disposed more or less horizontally; the interspaces are pale-blue or white. Anterior portions of dorsal and anal fins darker. Caudal with blue inter-radial bars, which are symmetrically disposed and connected by an intramarginal series of loops; these bars are defined by darker lines, and vary in form; they are scarcely developed in our smallest specimen.

Two young specimens, 87 and 93 mm. long, respectively, differ in having the sides of the carapace marked with brown bars, similar to those on the snout, abdomen, and tail, instead of being ornamented with polygonal spots. The caudal fin is almost or quite plain.

Described from fourteen specimens, 87-114 mm. long, the largest of which is figured.

Kent regarded this species as the male form of *A. aurita*, though he offered but little proof of his contention. We are unable to examine the sexual organs of our specimens, and in the absence of more definite information prefer to keep the two forms separate.

Loc.—East of Flinders Island, Bass Strait, 40 fathoms; off the mouth of the Murray River, South Australia, 20 fathoms; Glenelg, Gulf St. Vincent, South Australia; nine to 10 miles west of Glenelg, Gulf St. Vincent, 10-12 fathoms; Henley Beach, Gulf St. Vincent.

Klunzinger [7] has recorded *A. ornata* from Port Darwin, but this locality is doubtless incorrect. As far as known, the species is confined to Victoria, South Australia, and Tasmania.

Aracana flavigaster, Gray.

Pl. xxv.

Ostracion (Aracana) flavigaster, Gray: Ann. Mag. Nat. Hist., i., 1838, p. 110; Richardson: Trans. Zool. Soc., iii., 1849, p. 164, pl. xi., fig. 1.

Acerana flavigastra, Kaup: Arch für Naturg., xxi., 1855, p. 219.

Aracana flavigastra, Fowler: Proc. Acad. Nat. Sci. Philad., 1907 (1908), p. 439.

Aracana amoena, Castelnau: Proc. Zool. Soc., Vict., i., 1872, p. 207; Macleay: Proc. Linn. Soc., N.S.W., vi., 1881, p. 335.

D. 9-11; A. 10-11; P. 1+10; C. 11.

Length of head 3·07-3·2, depth of body 1·4 in the length without the caudal rays. Narrowest interorbital width 1·9-2·05 in the head, and greater than the orbital diameter, which is 2·3-2·6 in the head. Longest pectoral ray 1·4, dorsal 1·3, anal 1·5, and median caudal ray 1·4 in the head.

Snout slightly compressed, oblique, gibbous above in larger specimens. Interorbital space flat, the supraorbital margins scarcely elevated. Back broad, almost flat. Abdomen compressed, keeled; its profile variable, being almost evenly arched in our largest specimen, and more or less flattened in the smaller ones. A long compressed spine above the middle of each eye, directed upward and sometimes slightly forward. Two large compressed supralateral spines inclined backward. A large mediolateral spine is present in the small specimens, but is reduced in the larger one. Two or three infralateral spines, the anterior placed below the hinder base of the pectoral fin, and the posterior below the dorsal fin; a smaller one may be present midway between these two, but is wanting in the largest example, and the other spines are reduced.

Carapace uniformly granular. The scutes are rather widely separated in front of the gill-opening, and somewhat irregular naked areas are present on the posterior portion of the back and abdomen. Small scutes are present behind the dorsal and anal fins, and on the upper and lower surfaces of

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[7] Klunzinger: Sitzb. Akad. Wiss. Wien., lxxx., p. 424.

the caudal peduncle. Anterior dorsal and anal fins a little produced; caudal either truncate, slightly emarginate, or slightly rounded, according to the extension of the exterior rays.

Colour.—Sides of carapace and caudal peduncle with more or less sinuous dark bars, which become irregular and anastomosing on the supero-posterior portions of the sides; they are variable in number, there being about twelve on each side in a small and twenty-one in a larger specimen; they are oblique on the sides of the snout and about as wide as or slightly wider than the light interspaces, but are almost horizontal on the sides and on the caudal peduncle, and usually become broader on the latter. Bases of the dorsal, anal, and pectoral fins with oblique dark bars, which vary in number and disposition. Fins plain, the anterior dorsal and anal rays slightly darkened.

Described from five specimens, 101-135 mm. long. The smallest is in general agreement with Richardson's figure, though the dark bands are not wider than the interspaces as he shows them, and the abdomen is less angular, and its depth not so great. Our largest specimen, which is figured, differs in having the bands more numerous and the snout gibbous in front of the eyes.

Günther has united *A. flavigaster* with *A. ornata*, basing his opinion upon an examination of the types of both forms. We scarcely think the specimens here described and figured can be regarded as forms of *A. ornata*, since they differ from that species in having the snout oblique instead of subtruncate in adults, and the dark bars on the caudal peduncle single instead of in pairs. If *A. flavigaster* is correctly associated with *A. ornata*, our specimens should apparently be identified as *A. amoena*, Castelnau.

Loc.—Tamar River, Tasmania; off the mouth of the Murray River, South Australia, 20 fathoms; nine to ten miles west of Glenelg, Gulf St. Vincent, 10-12 fathoms.

Kentrocapros, Kaup.

Acerana, subgenus *Kentrocapros*, Kaup: Arch. für Naturg., 1855, xxi., p. 220 (*Ostracion hexagonus*, Thunberg).

This genus is apparently valid. It is allied to *Aracana*, having the carapace flat above, but the supralateral ridge bears only one large spine; there is a mediolateral ridge armed with more or less numerous spines, and the abdomen is scarcely keeled.

Ostracion hexagonus, Thunberg, is synonymous with *O. aculeatus*, Houttuyn, according to Günther and Jordan and

Fowler,[8] but the latter authors have erroneously placed it in the subgenus *Capropygia*. *Aracana spilonota*, Gilbert,[9] also belongs to the genus *Kentrocapros*.

EXPLANATION OF PLATES.

Plate XVI.

Capropygia unistriata, Kaup. Specimen 90 mm. long, Investigator Group, South Australia, 37 fathoms.

Plate XVII.

Anoplocapros lenticularis, Richardson, var. *grayi*, Kaup. Specimen 230 mm. long, Port Jackson, New South Wales.

Plate XVIII.

Anoplocapros gibbosus, n. sp. Type, 250 mm. long, Investigator Group, South Australia, 37 fathoms.

Plate XIX.

Caprichthys gymnura, gen. et. sp. nov. Type, 100 mm. long, Doubtful Island Bay, South-western Australia, 20-25 fathoms.

Plate XX.

Aracana aurita, Shaw. Specimen 205 mm. long, off Flinders Island, Bass Strait.

Plate XXI.

Aracana aurita, Shaw. (?) Young specimen 22 mm. long, Western Port, Victoria.

Plate XXII.

Aracana spilogaster, Richardson, var. *spinosissima*, nov. Type of variety, 160 mm. long, Tasmania.

Plate XXIII.

Aracana spilogaster, Richardson, var. *angusta*, nov. Type of variety, 180 mm. long, east of Flinders Island, Bass Strait.

Plate XXIV.

Aracana ornata, Gray. Specimen 114 mm. long, Mouth of the Murray River, South Australia, 20 fathoms.

Plate XXV.

Aracana flavigaster, Gray. Specimen 135 mm. long, Tamar River estuary, Tasmania.

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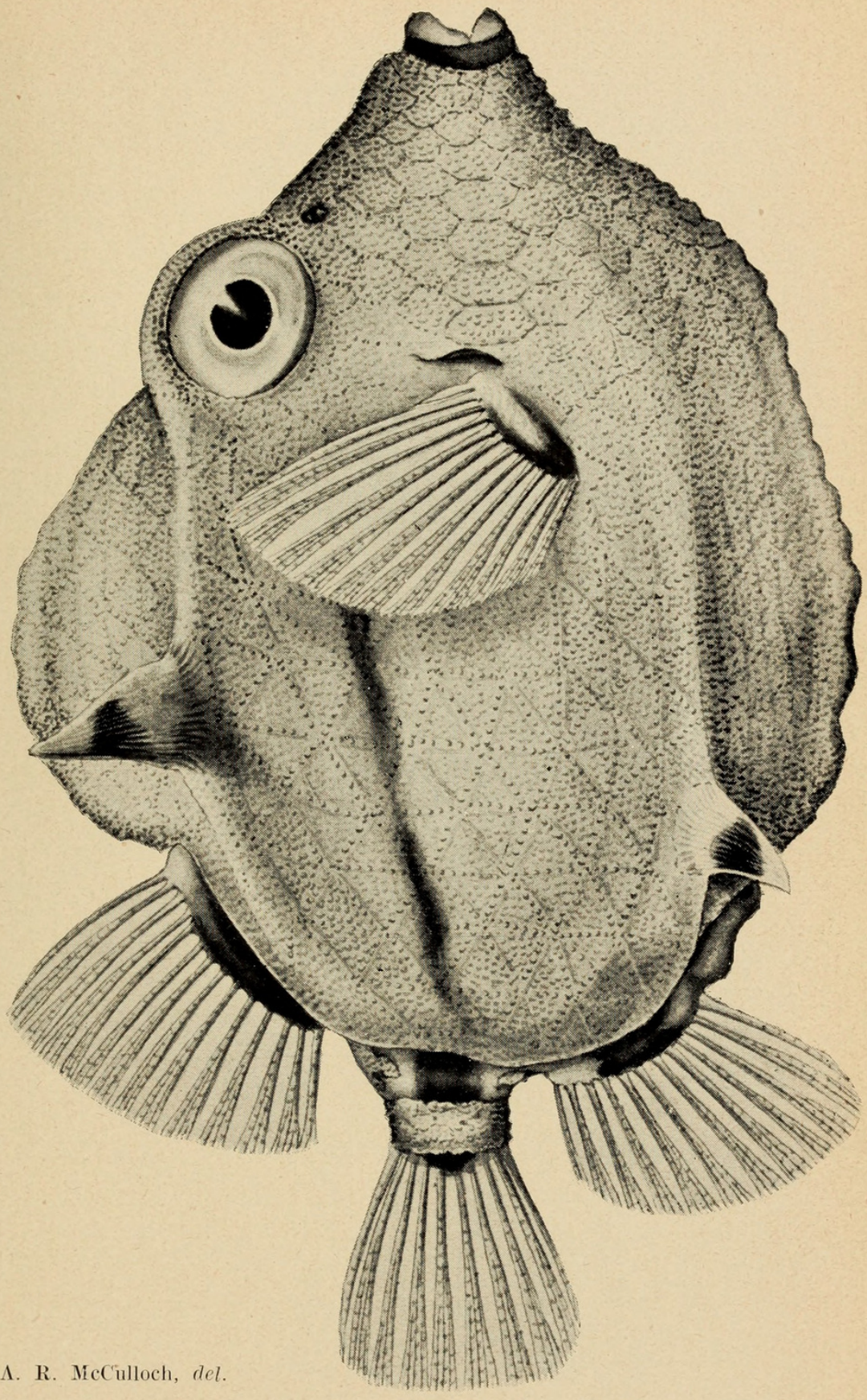
[8] Jordan and Fowler: Proc. U.S. Nat. Mus., xxv., 1902, pp. 283-284; Tanaka: Fig. Descr. Fish. Japan, vii., 1912, p. 119, pls. xxxi. and xxxii.

[9] Gilbert: Bull. U.S. Fish. Comm., 1903, ii. (1905), p. 626, fig. 242.



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Capropygia unistriata, Kaup.

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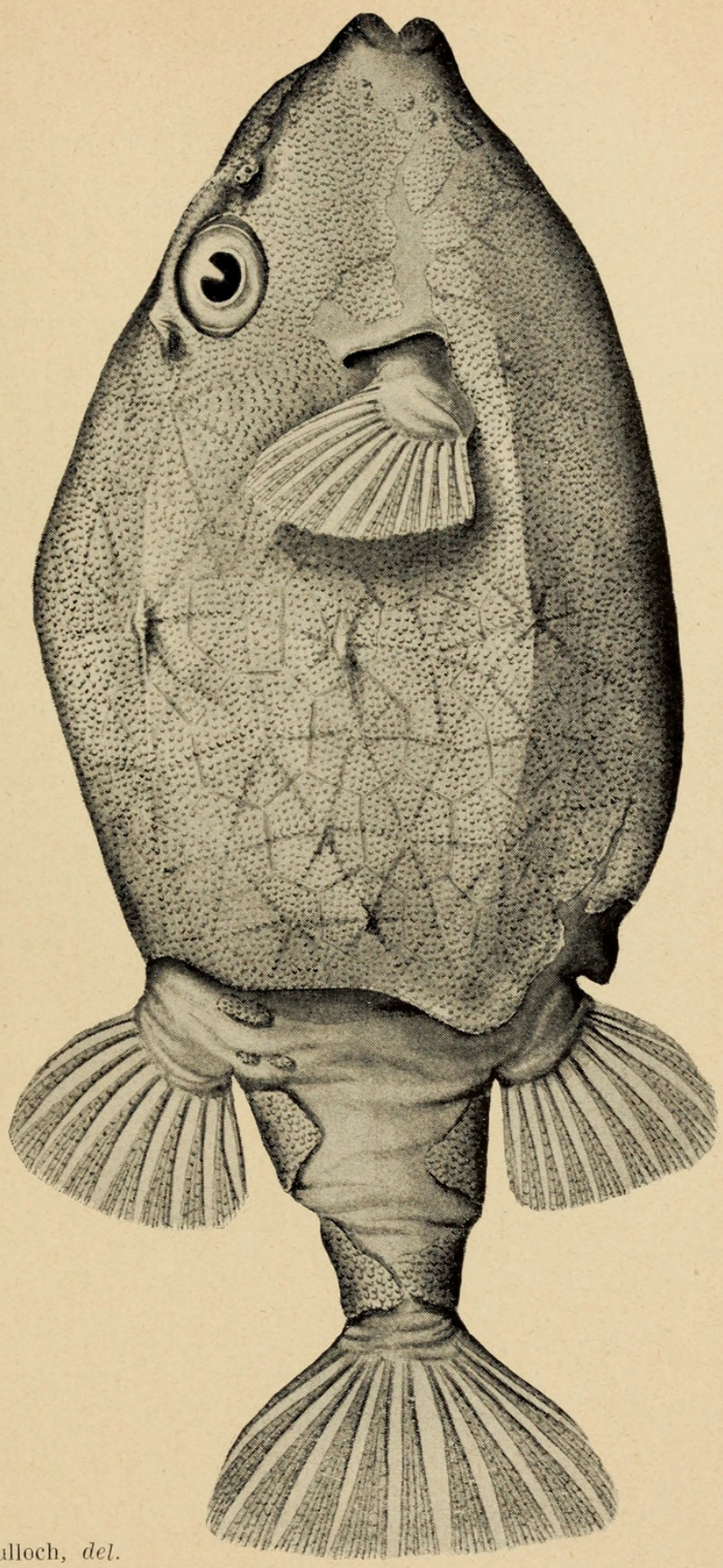

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Anoplocapros lenticularis, Richardson, var. *grayi*, Kaup.

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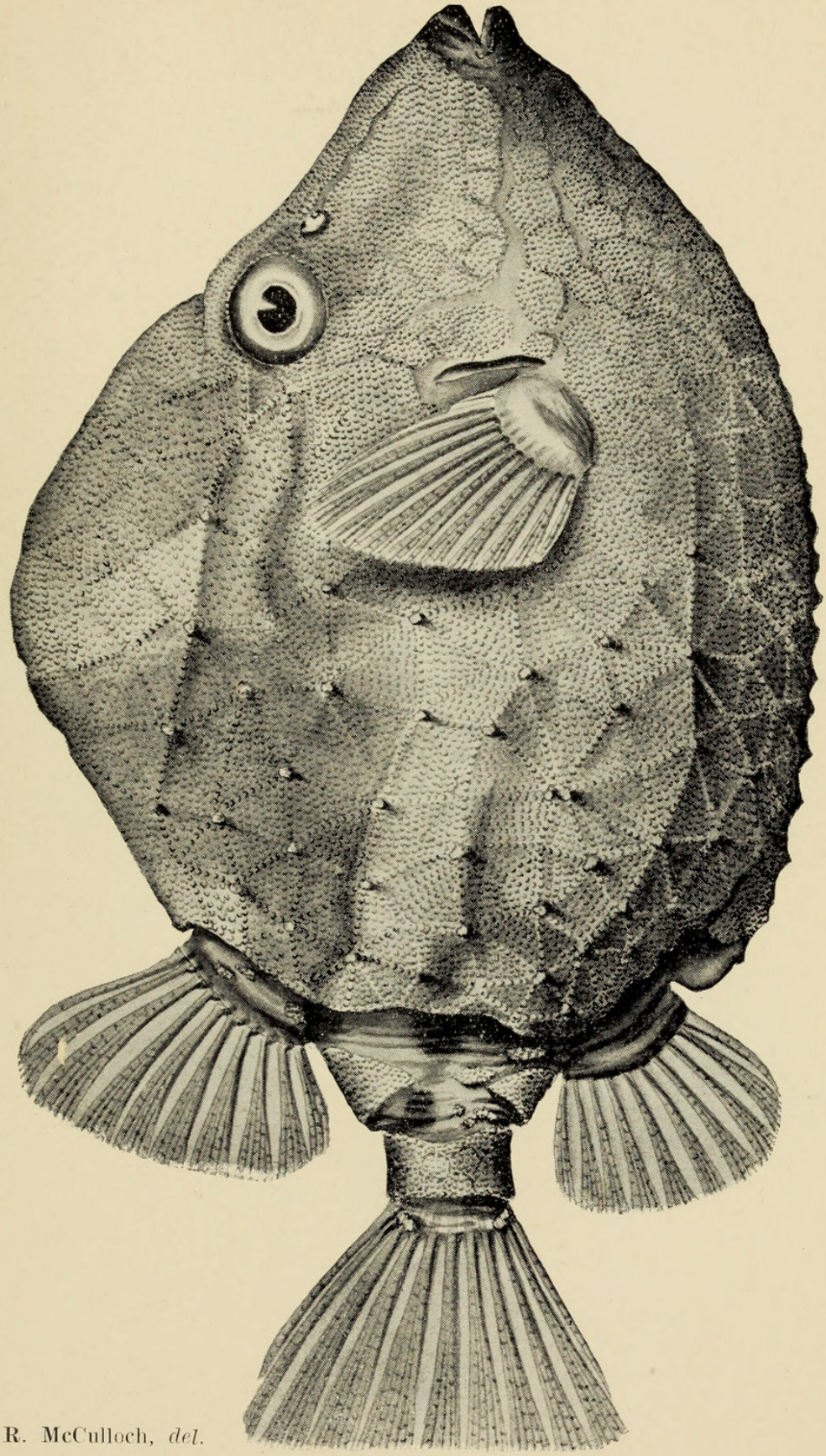

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Anoplocapros gibbosus, n. sp.

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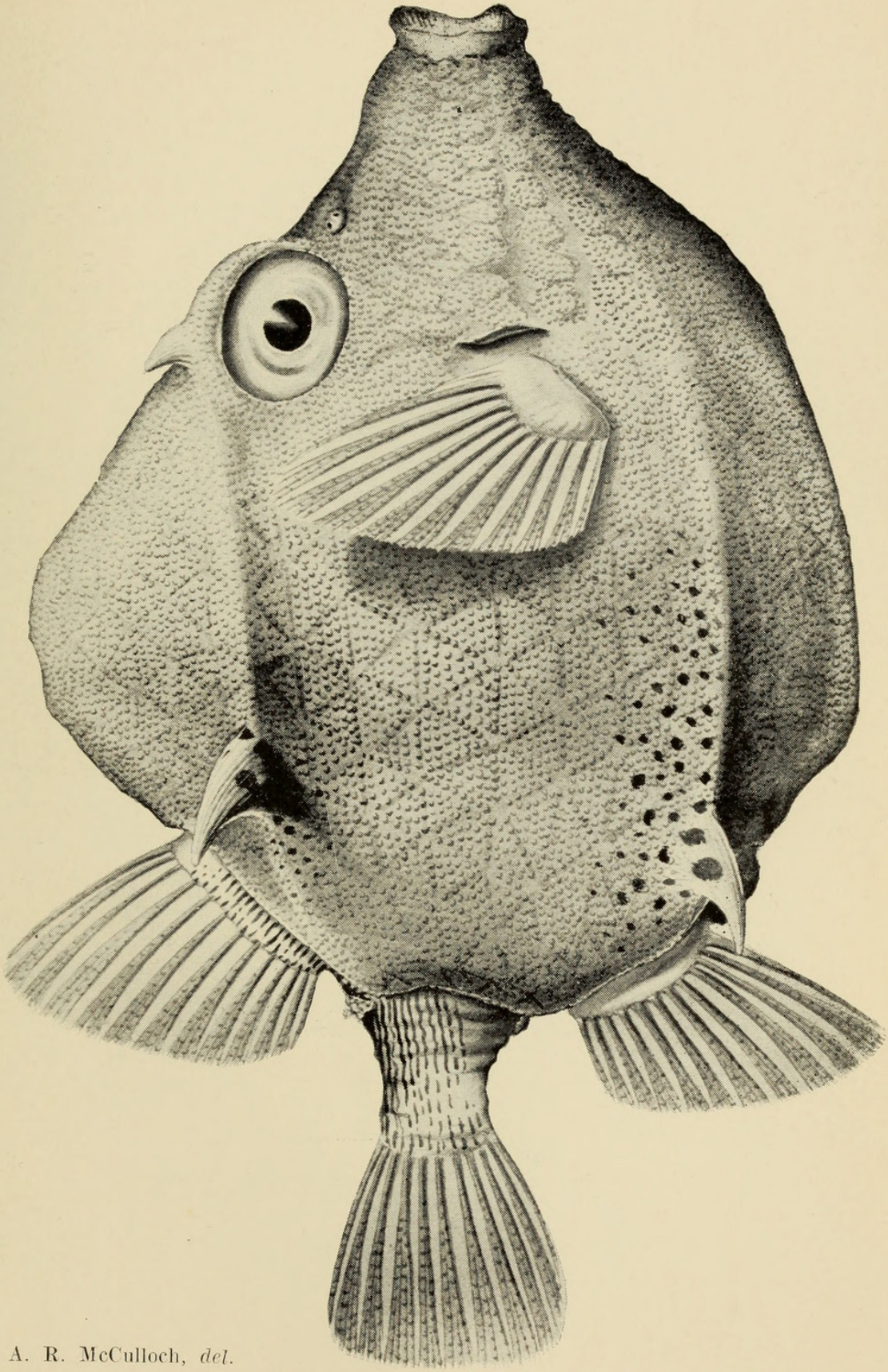

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Caprichthys gymnura, n. gen. and sp.

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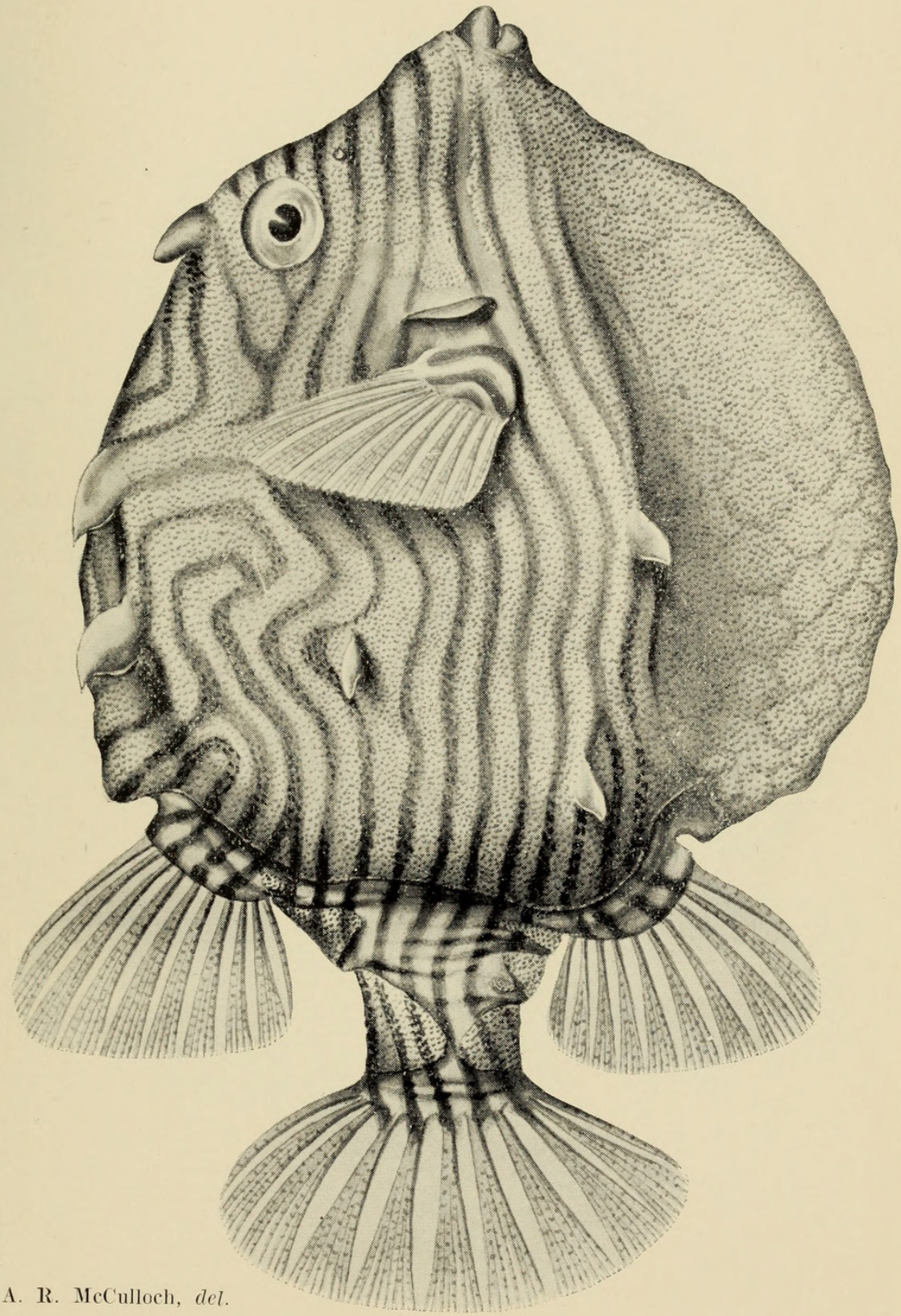

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Aracana aurita, Shaw.

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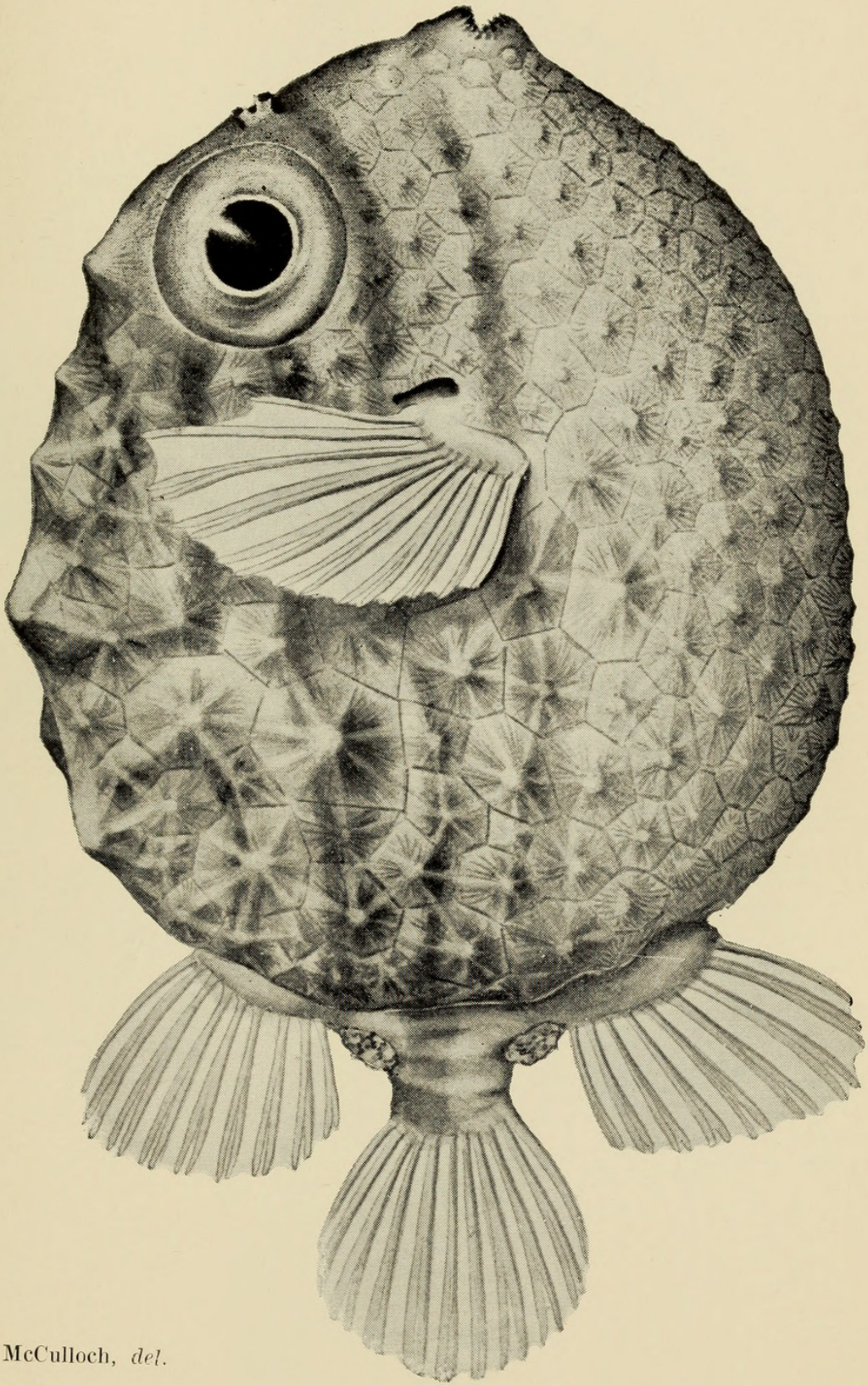

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Aracana aurita, juv., Shaw.

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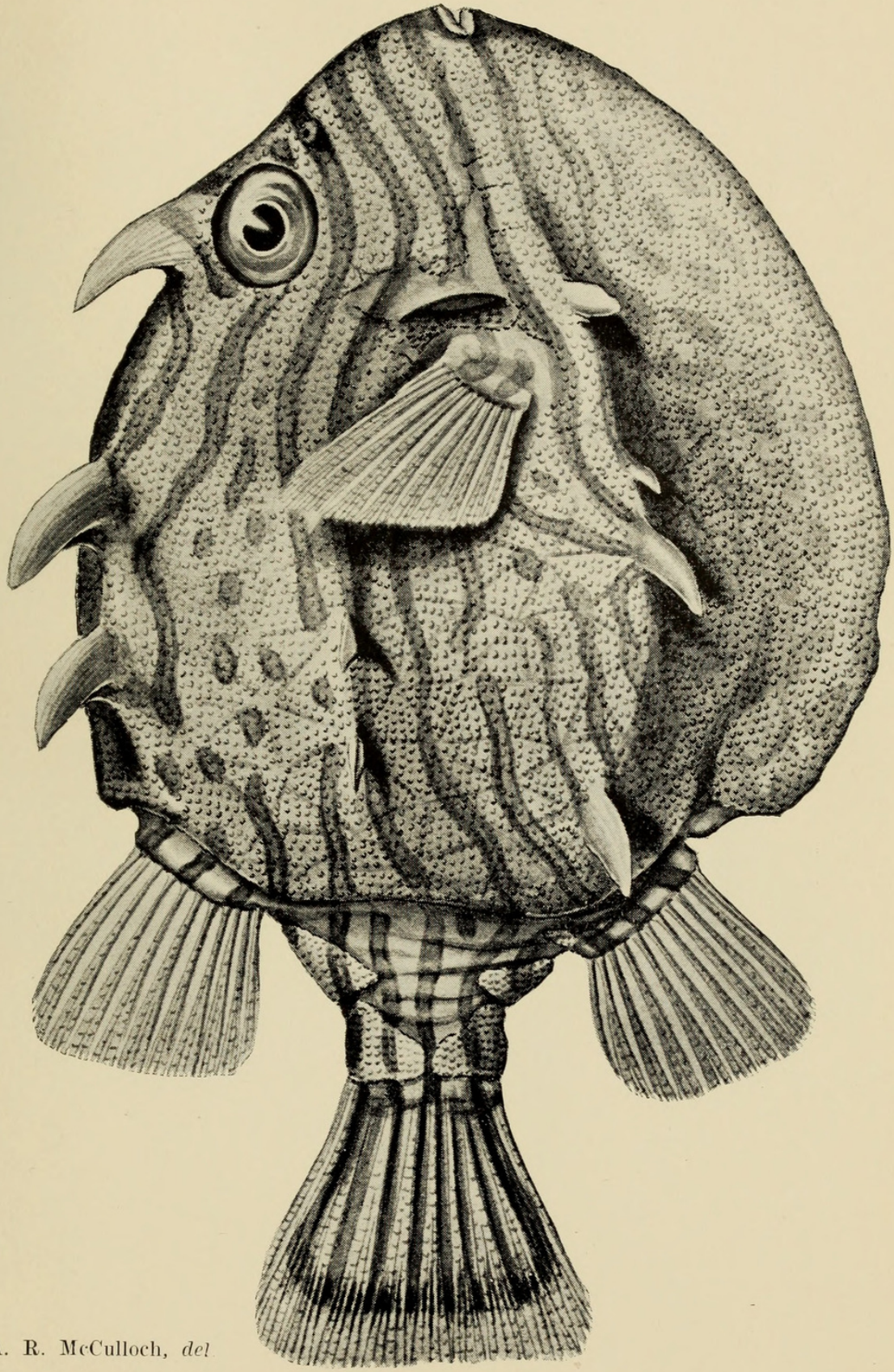

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Aracana spilogaster, Richardson, var. *spinosissima*, n.

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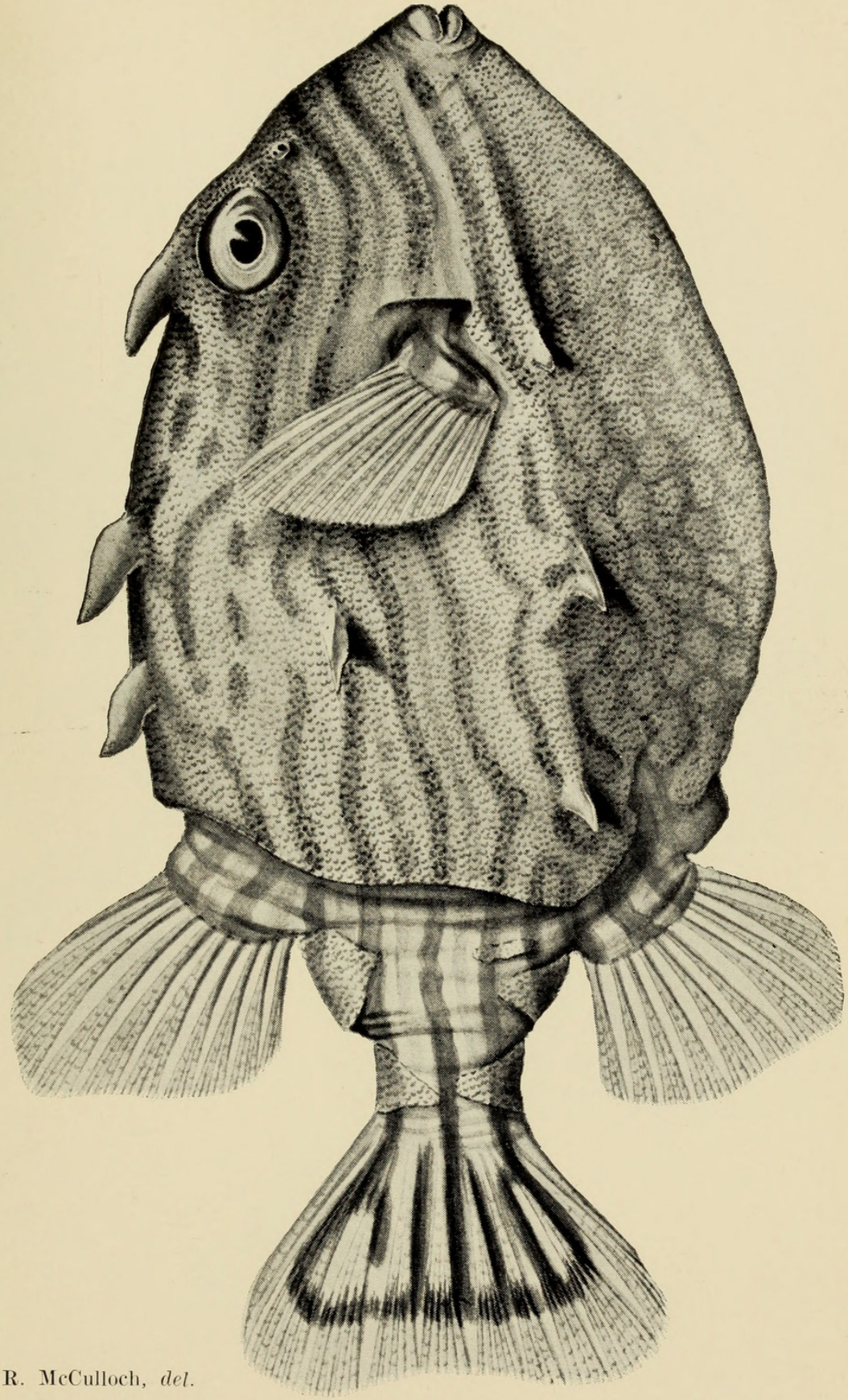

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Aracana spilogaster, Richardson, var. *angusta*, n.

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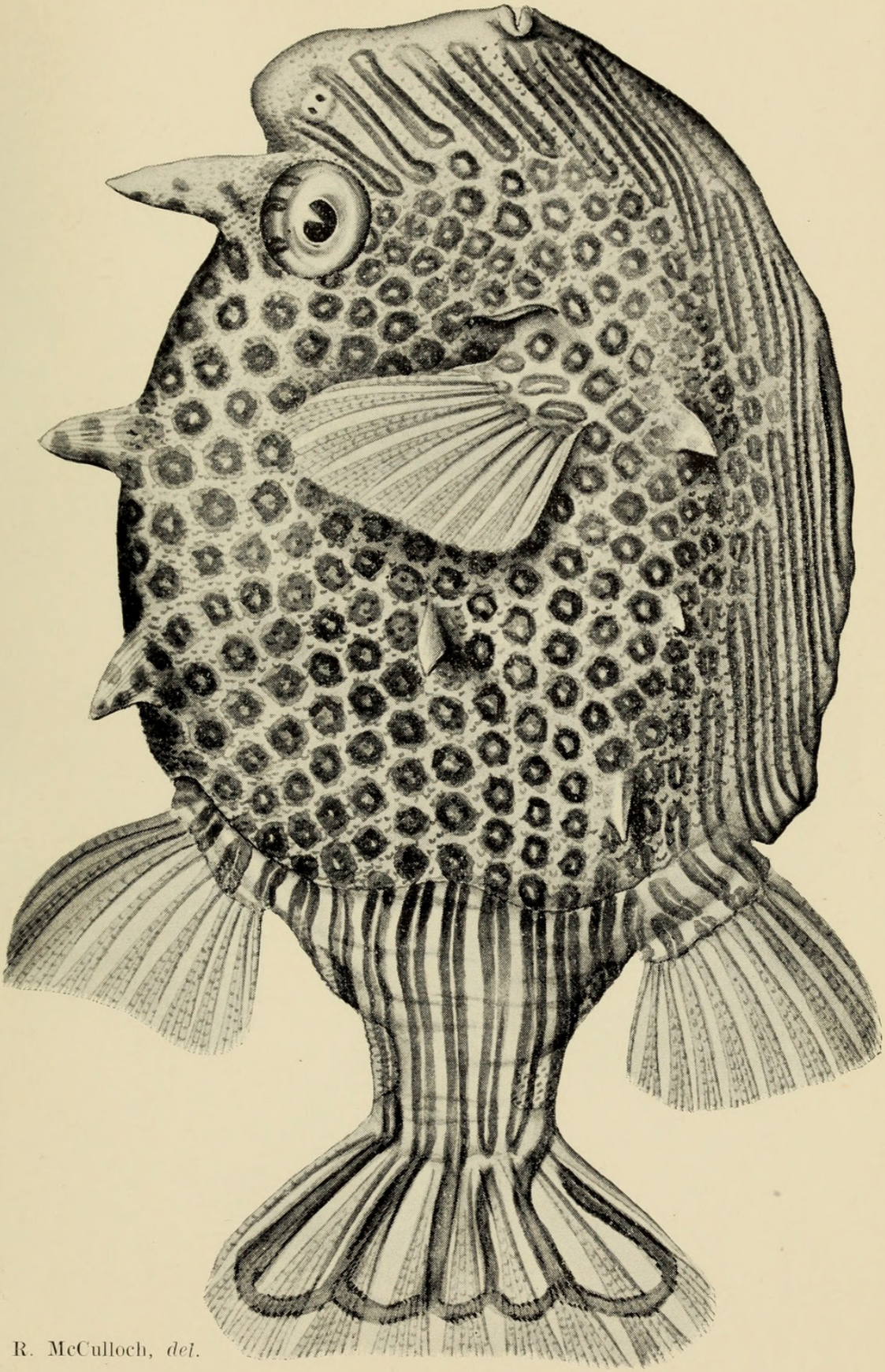

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Aracana ornata, Gray.

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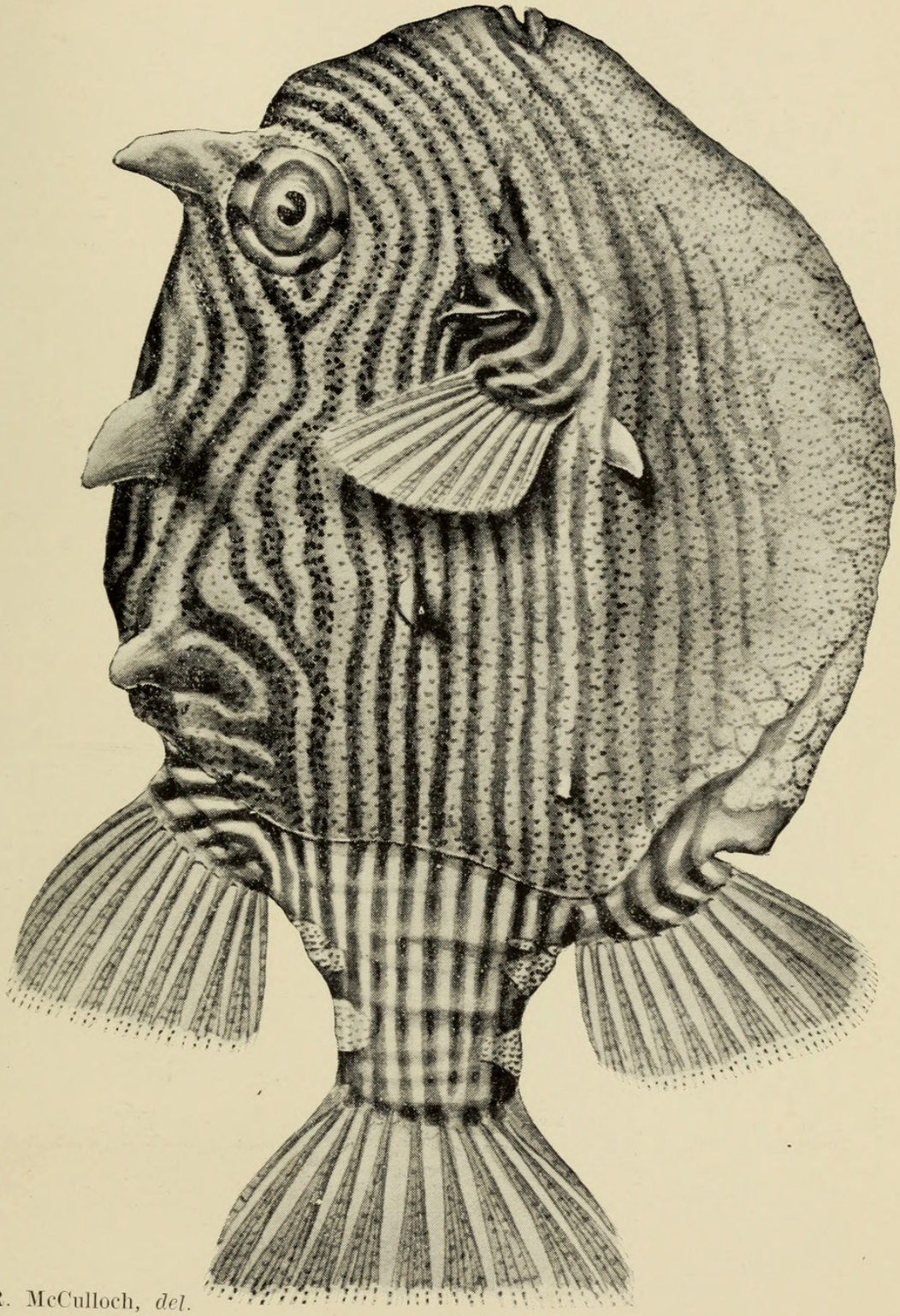

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Aracana flavigaster, Gray.

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