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EARLY TRIASSIC OSTEICHTHYANS FROM THE KNOCKLOFTY FORMATION OF TASMANIA

by Thomas John Dziewa
Department of Biology, Wayne State University Detroit, Michigan 48202, U.S.A.

(with four text figures and eight plates)

ABSTRACT

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A small but diverse osteichthyan assemblage from the freshwater deposits of the Early Triassic Knocklofty Formation of southeastern Tasmania is described. This includes *Ceratodus gypsatus*, Quenstedt, a coelacanthid, *Acrolepis hamiltoni* Johnston and Morton, *Acrolepis tasmanicus* Johnston and Morton, *Cleithrolepis granulata* Egerton, *Saurichthys* sp. of which only the *Acrolepis* spp. had been previously recorded from this area, and an undetermined coulacante. Previously only had been reported from this locality.

INTRODUCTION

Osteichthyan remains collected from the Early Triassic Knocklofty Formation of southeastern Tasmania are described here.

The occurrence of osteichthyan remains from the fresh-water sediments of the Early Triassic Knocklofty Formation of southeastern Tasmania has been recognized since Johnston and Morton (1890, 1891) described *Acrolepis tasmanicus* from the Tinder Box Bay area. Little else was reported prior to the work of Cosgriff (1974). Material acquired by Cosgriff and the present author in 1971 during a collecting trip, generously sponsored by the National Geographic Society, and in earlier collections by Cosgriff, are forms assignable to the ubiquitous Triassic dipnoan genus *Ceratodus* as well as fragmentary remains assignable to the chondrostean genera *Saurichthys* and *Cleithrolepis*, and, questionably, the family Coelacanthidae.

Unfortunately, the new osteichthyan materials are of little stratigraphic use as, without exception, all of the genera present have a relatively long geologic time range. The evidence provided by the amphibian and reptilian remains, is at present far more reliable for purposes of correlation (Cosgriff 1974).

Fish-bearing localities in the Knocklofty Formation

(Figs 1-2)

1. Old Beach locality:- Derwent (1:100 000); metric coordinates: 8312-238623
Fauna. *Ceratodus gypsatus*
Acrolepis sp.
Lithology. Clay-pebble conglomerate matrix collected from a lenticular stream channel deposit.
Stratigraphy. The stratigraphic position of this site is generally equivalent to the lower member of the section of the Knocklofty Formation exposed at Crisp and Gunn Quarry (Cosgriff 1974).
2. Midway Point locality:- Prosser (1:100 000); 8412-427617
Fauna. *Ceratodus gypsatus*
Coelacanthidae gen. et sp. indet.

Lithology. Clay-pebble conglomerate matrix collected from lenticular stream channel deposits.

Stratigraphy. The stratigraphic position of this site relative to the section of the Knocklofty Formation exposed at Crisp and Gunn Quarry is not known (Cosgriff, 1974)

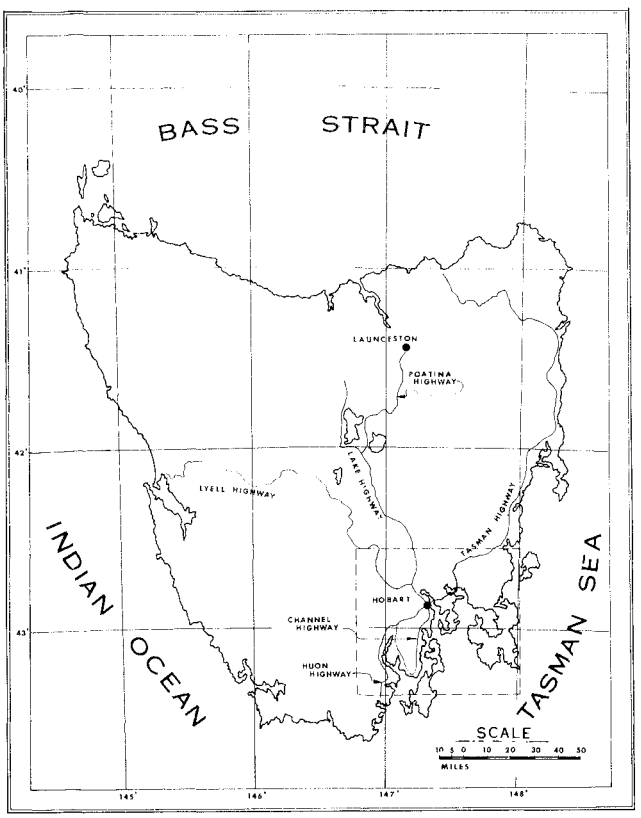

FIG. 1. - Tasmania, showing principal cities and highways. (The area enclosed within the dash-bordered box is shown enlarged and with more detail in Figure 2.)

3. Granton locality:- Derwent (1:100 000); 8312-200649.

Fauna. Osteichthyan of indeterminate taxonomic affinity.

Lithology. Gray siltstone.

Stratigraphy. The stratigraphic position of this site relative to the section of the Knocklofty Formation exposed at Crisp and Gunn Quarry is not known.

4. Tinderbox Bay locality:- D'Entrecasteaux (1:100 000):- 8311-266325.

Fauna. *Acrolepis tasmanicus*

Lithology. Sandstone

Stratigraphy. The stratigraphic position of this site relative to the section of the Knocklofty Formation exposed at Crisp and Gunn Quarry is not known.

5. Coningham locality:- D'Entrecasteaux (1:100 000); 8311-236301

Fauna. *Ceratodus gypsatus*
Cleithrolepis granulata
Saurichthys sp.

Lithology. Clay-pebble conglomerate matrix collected from several lenticular stream channel deposits.

Stratigraphy. While not definitely established, the varied lithology of the section of this site suggests that it is equivalent to the middle member of the formation of Knocklofty (Cosgriff 1974).

6. Cascade locality:- Derwent (1:100 000); 8312-244507.

Fauna. *Acrolepis hamiltoni*

Lithology. Sandstone.

Stratigraphy. The stratigraphic position of this site relative to the section of the Knocklofty Formation exposed at Crisp and Gunn Quarry is not known.

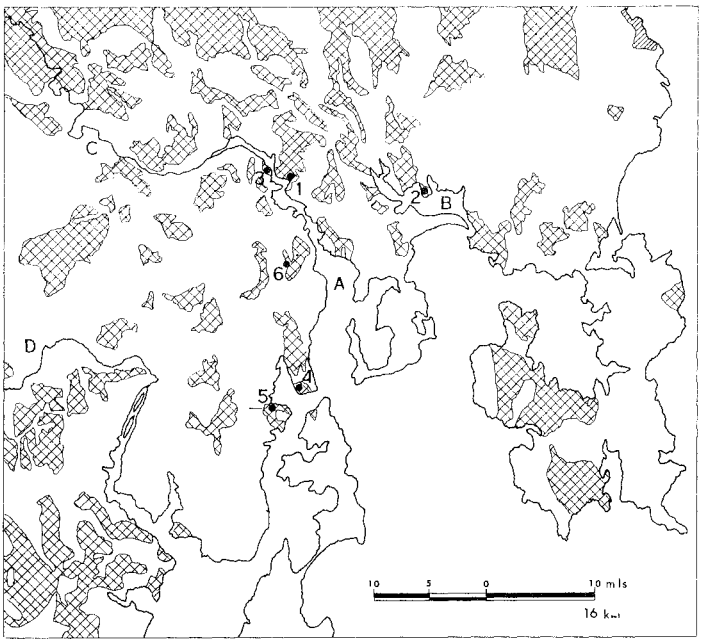

FIG. 2. - Southeastern Tasmania, the areas of outcrop of the Knocklofty Formation and the principal vertebrate localities from which fossil fish have been recovered:
(A) Derwent estuary; (B) Pitt water; (C) Derwent River;
(D) Huon River;
1. Old Beach locality; 2. Midway Point locality; 3. Granton locality; 4. Tinderbox Bay locality; 5. Coningham locality; 6. Cascades locality.
The coastlines and the areas of outcrop of the Knocklofty Formation (shown in cross hatch) are based on The Geological Map of Tasmania, Geological Survey, Department of Mines, Tasmania, 1961.

Class OSTEICHTHYES
Subclass SARCOPTERYGII
Order DIPNOI
Family CERATODONTIDAE Gill, 1872

Genus *CERATODUS* Agassiz, 1838

Diagnosis: See Woodward (1891, pp. 264-265)
Type species: *Ceratodus latissimus* Agassiz, 1838

Ceratodus gypsatus Quenstedt, 1885
(Fig. 3)

1885 *Ceratodus gypsatus* Quenstedt: 287, pl. 24, fig. 2
1909 *Ceratodus ornatus* Broom: 253-254, pl. 12, fig. 4 (new synonymy)
1924 *Ceratodus palaeoruncinatus* Frentzen: 216-220 (new synonymy)
1928 *Ceratodus palaeoruncinatus* Frentzen: Schmidt: 347, fig. 971
1974 *Ceratodus sp.* Cosgriff: 3

Referred Material

U.T.G.D. 87871, nearly complete left palatal dental plate lacking only the distal portion of the first ridge. U.T.G.D. 95100, nearly complete left mandibular dental plate lacking the distal tips of all four ridges. Both the above have been prepared out of a clay-pebble conglomerate matrix.

Also present in the collection are two incomplete dental plates U.T.G.D. numbers 95101, and 95102 contained in a clay-pebble conglomerate matrix.

The abbreviation U.T.G.D. indicates a specimen in the collection of the Geology Department, University of Tasmania; subsequently the abbreviation T.M. will be used for specimens in the collection of the Tasmanian Museum and Art Gallery.

Locality

U.T.G.D. 87871 from the Midway Point locality, number 95100 from the Coningham locality and numbers 95191 and 19102 from the Old Beach locality.

Description

Both U.T.G.D. 87871 (fig. 3), a nearly complete left palatal tooth plate and U.T.G.D. 95100 (fig. 3), a nearly complete left mandibular tooth plate, exhibit nearly triangular outlines in occlusal view. Five straight, minutely denticulated radially arranged ridges present on palatal plate, four on mandibular plate. Medial and anterior borders of both straight. Angle formed by anterior and medial borders slightly in excess of 90° on palatal plate, approximately 90° for mandibular plate. Labial borders of both convex with distal portions of ridges set off from each other by concave excavations that become increasingly shallower proceeding from anterior ridges towards posterior ridges. Length of palatal dental plate, as measured from anteromedial angle to posterior tip of medial border, 14 mm; that of mandibular dental plate, which lacks posterior tip of medial border, approximately 7 mm. Greatest width of palatal plate, on line extending perpendicular to medial border to distal tip, second ridge, 9 mm; length first ridge of mandibular plate, whose distal portion has been broken off, approximately 8 mm. Ridges of both plates sharply angular in cross section. All ridges on each plate project labially and posteriorly from anteromedial corner. Three anteriormost ridges of palatal plate joined together at the anteromedial corner independently of each other, whereas ridges four and five fuse together at point posterior to the anteromedial corner. Ridges one, two, and four of mandibular plate joined together at the anteromedial corner independently of each other, whereas ridge three fuses with the fourth at point posterior to anteromedial corner. In labial view both palatal and mandibular plate exhibit "V" shaped valleys between ridges with valley between ridges one and two wider and deeper than those between more posterior ridges. Ridge crests of both plates exhibit anteriorly orientated angulation.

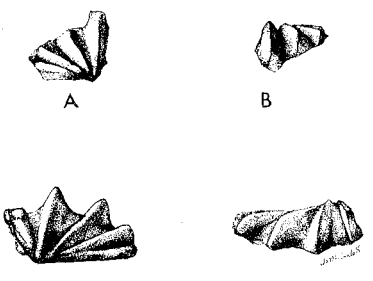

Fig. 3. - *Ceratodus gypsatus* Quenstedt, 1885, U.T.G.D. 95100 (Coningham locality); left mandibular dental plate: A. occlusal view; B, labial view. U.T.G.D. 87871 (Midway Point locality); left palatal dental plate: C, occlusal view; D, labial view ; x 1.6.

Comparisons

The Knocklofty *Ceratodus* has been compared with the majority of other Triassic representatives of this genus which have been described and illustrated in the literature. On the basis of palatal plate ridge count, the fashion in which these ridges

join the medial border of the dental plate and the angle formed by the first ridge and the medial border, the Knocklofty *Ceratodus* is indistinguishable from *C. gypsatus* Quenstedt, 1885 from the Keuper deposits of Wurtemberg, Germany and is, therefore, assigned to this species. *C. ornatus* Broom 1909 from the Upper Triassic Stormberg series at Burghersdorp, South Africa and *C. palaeorruncinatus* Frentzen 1924, from the Lower Triassic Bunter deposits of Baden, Germany are also indistinguishable from the type of *C. gypsatus* and are placed in synonymy with this species.

Remarks

Miall (1878, p.12), in his revision of a number of *Ceratodus* species originally described by Oldman (1859) from the Upper Triassic Maleri Formation of India, concluded that the palatal plates of *Ceratodus* could be distinguished from those borne on the mandible as the former posses an additional ridge, i.e., five on the palatal plate if four are present on the mandibular plate. Supportive evidence favouring Miall's supposition which the present author is in agreement with through consideration of the Tasmanian material, is provided by Zittel (1886), who noted that the palatal plates of *Neoceratodus forsteri* differ from those borne on the mandible through the possession of an additional ridge, i.e., seven versus the six present on the mandibular plate.

Order CROSSOPTERYGII
Suborder COELACANTHINI
Family COELACANTHIDAE Agassiz, 1843

Diagnosis : See Schaeffer (1948, pp. 28-29).

Coelacanthidae gen. et sp. indet.
(Fig.4, Pl. 1)

Material

U.T.G.D. 87821, fragment of vertical posterior limb of left pterygoid. U.T.G.D. 95099 and 85756, two undeterminable palatal bone fragments. All from a clay-pebble conglomerate matrix.

Locality : Midway Point.

Description

Pterygoid fragment (fig. 4) closely resembles that of *Wimania sinuosa* (Stensio 1921, fig. 26). Lateral surface concave, medial surface convex. Medial surface minutely denticulate. Lateral surface bears two distinct ridges that diverge dorsally from ossification centre of element. Anterior ridge increases in both breadth and thickness dorsally. In cross-section, anterior surface of this ridge concave, posterior surface convex. Only ventral portion of posterior ridge present, this structure not confluent with proximal portion of anterior ridge.

U.T.G.D. 95099 (pl. 1) and U.T.G.D. 85756 each exhibits one minutely denticulated surface similar to that exhibited on medial surface of pterygoid fragment.

Comparisons

As noted by Schaeffer and Gregory (1961) "the shape and proportions of the pterygoid may differ sufficiently from genus to genus to make this element of some diagnostic significance. It is doubtful, however, that these differences are distinctive enough to warrant the erection of a new genus on the basis of an isolated example." Due to its fragmentary nature, assignment of the Tasmanian pterygoid to any of the previously erected coelacanthid genera where this structure is known (Schaeffer and Gregory, 1961, fig. 6) is not possible.

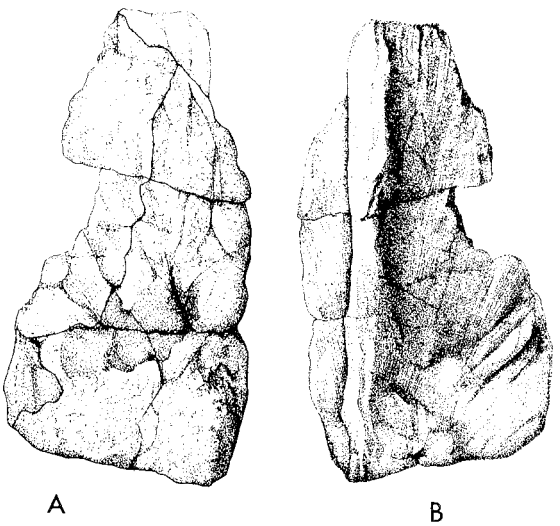

FIG. 4.- Coelacanthidae gen. et sp. indet., U.T.G.D. 87821 (Midway Point locality); fragment of vertical posterior limb of left pterygoid: A, medial view; B, lateral view. anterior to left, dorsal to top; x 1.4.

Subclass ACTINOPTERYGI
Infraclass CHONDROSTEI
Order PALAEONISCIFORMES
Suborder PALEONISCOIDEI
Family ACROLEPIDAE Aldinger, 1937

Diagnosis: See Obruchev (1964, pp. 545-546).

Genus ACROLEPIS Agassiz, 1833

Diagnosis: See Aldinger (1937, p. 257).
Type species: *Acrolepis sedgwicki* Agassiz, 1833

Acrolepis hamiltoni Johnston and Morton, 1890

1890 *Acrolepis? hamiltoni* Johnston and Morton: 102-103, 2 Plates
1891 *Acrolepis hamiltoni* Johnston and Morton: Johnston and Morton: 152-154
1930 *Acrolepis hamiltoni* Johnston and Morton: Wade; 125
1937 *Acrolepis hamiltoni* Johnston and Morton; Aldinger; 259
1974 *Acrolepis hamiltoni* Johnston and Morton; Cosgriff; 5

Holotype

T.M. Z 1377, the left lateral impression of a poorly preserved, laterally compressed fish, on a sandstone matrix lacking or poorly exhibiting the following structures; the anterior portion of the head; the pelvic fins; and part of the anal fins.

Type Locality

Cascades locality.

Remarks

At present little can be added to our knowledge of this form. As shown by the plates included with Johnston and Morton's description, the holotype was originally comprised of both a left and a right lateral imperssion. Currently only the left lateral impression is available for study. Due to its poor state of preservation the present author is of the opinion that Johnston and Morton must have based the better portion of their description on the now missing right lateral impression. Therefore, morphological data employed in comparing this form to *A. tasmanicus* is at present, totally dependent upon Johnston and Morton's description.

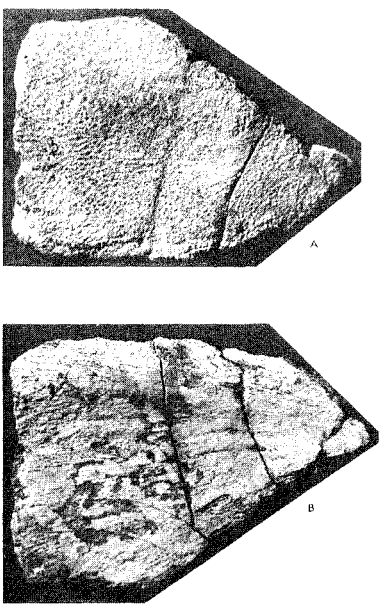

PLATE 1.- Coelacanthidae gen. et sp. indet., U.T.G.D. 95099 (Midway Point locality); indeterminable palatal bone fragment: A, medial view; B, lateral view; x1.33.

Acrolepis tasmanicus Johnston and Morton, 1891
(Plates 2, 3)

1891 *Acrolepis tasmanicus* Johnston and Morton 152-154.
1930 *Acrolepis tasmanicus* Johnston and Morton: Wade; 125.
1937 *Acrolepis tasmanicus* Johnston and Morton: Aldinger; 261.
1974 *Acrolepis tasmanicus* Johnston and Morton: Cosgriff; 5.

Holotype

T.M. Z 1374 and T.M. Z 1375, the left and right lateral impressions of a nearly complete vertically compressed fish, on a sandstone matrix lacking only the distal portion of the upper lobe of the caudal fin, skull badly crushed.

Paratype

A single specimen T M Z 1996 in the collection of the Tasmanian Museum and Art Gallery (plates 2,3) consisting of the right lateral impression of a fairly complete, laterally compressed fish, on a sandstone matrix, exhbiting a partially crushed skull. Unfortunately, while the exact locale from which this specimen was procured is not known with assurance, the author is of the opinion that the paratype was collected from strata assignable to the Knocklofty Formation. Lithologic similarity and mode of preservation support this conclusion.

Diagnosis

A comparatively small acrolepid which most closely resembles *A. hamiltoni* but differs from this form is that it possesses a greater number of transverse scale rows 66 as compared to 55 noted for *A. hamiltoni*.

Description

An elongate fusiform fish exhibiting the following morphometric parameters.

	Holotype	Paratype
Total length:	140 mm	154 mm
Standard length	116 mm	115 mm
Head length	26 mm	30 mm

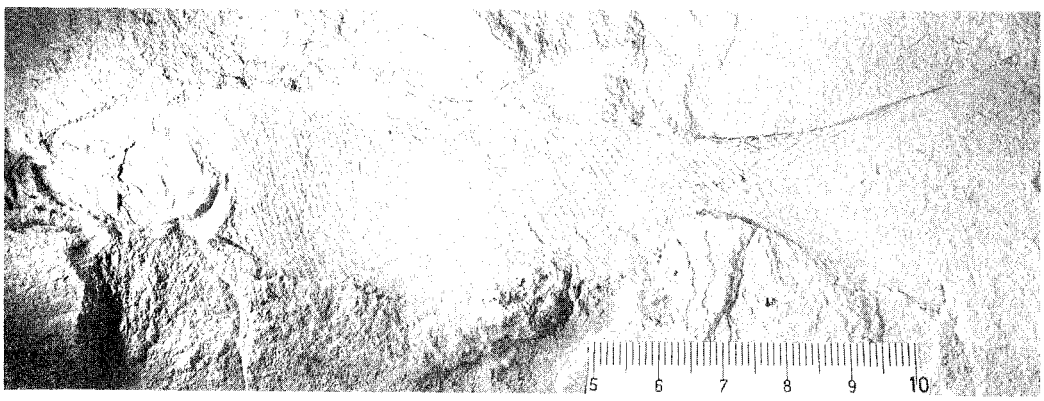

PLATE 2.- *Acrolepis tasmanicus* Johnston and Morton, 1890; paratype, TM Z 1996 (exact locale unknown), overall view; ×0.8.

	Holotype	Paratype
Snout length:	3 mm	4 mm
Snout to origin of pelvic fin:	52 mm	47 mm
Snout to origin of dorsal fin:	70 mm	68 mm
Snout to origin of anal fin	83 mm	79 mm
Length of caudal peduncle	15 mm	17 mm
Maximum depth of trunk	29 mm	31 mm
Minimal depth of caudal peduncle	9 mm	12 mm

Skull

Snout blunt. Orbits large and anteriorly placed. Suspensorium oblique. Mouth subterminal. Dentition moderately strong. Dermal bone ornamentation consists of radiating ridges of tubercles.

Paired Fins

Pectoral fins originating on ventral posterior aspect of cleithrum, exhibiting a fan-shaped outline. Approximately 17 distally articulated and bifurcated lepidotrichia present. Pelvic fins poorly preserved. Lepidotrichia fully articulated and distally bifurcated. Anterior margin originates between posterior border of skull and anterior base of dorsal fin, closer to the former.

Unpaired Fins

Dorsal fin triangular. Anterior border slightly convex and equipped with fringing fulcral scales. Anterior border arises in advance of anterior origin of anal fin. Posterior border concave. Approximately 36 fully articulated and distally

PLATE 3.- *Acrolepis tasmanicus* Johnston and Morton, 1890; paratype, (TM) Z 1996 (exact locale unknown); skull in lateral view; x2.

bifurcated lepidotrichia present. Caudal fin heterocercal, deeply cleft and unequally lobate with dorsal lobe longer. Both upper border of dorsal lobe and lower border of ventral lobe fringed by delicate fulcral scales. Lepidotrichia fully articulated and distally bifurcated. Total number of lepidotrichia believed not to be in excess of 85. Anal fin similar to dorsal in size and outline. Lepidotrichia fully articulated and distally bifurcated. Approximately 38 lepidotrichia present.

Squamation

Scales rhombic, borders smooth. Scale depth greatest in central region of trunk. Scale depth relative to length decreases gradually as dorsal and ventral borders of trunk are approached. Same trend observed when proceeding from posterior portion of trunk towards tail. Transverse body scale rows oriented posteroventrally across the body with angle of orientation to long axis of body becoming more oblique as posterior part of trunk is approached. Scale ornament consisting of a variable number of obliquely-oriented, gently undulating striae emanating from the posteroventral corner of scales. Some striae observed to branch in an irregular fashion as they are traced towards dorsal and anterior scale borders. Angle of striae orientation becomes more horizontal as ventral and dorsal obrders of trunk are approached.

Comparisons

A comparatively small acrolepid which most closely resembles *A. hamiltoni* but differs from this form in that it posseses a greater number of transverse scale rows 66 as compared to 55 noted for *A. hamiltoni*.

Both Tasmanian species can be distinguished from *A. sedgwicki*, the type species

of the genus, by the following combination of morphological features. First, *A. sedgwicki* is considerably larger (a feature of perhaps dubious taxonomic value) than either of the Tasmanian forms. Secondly, *A sedgwicki* as figured by Agassiz (1833) possesses a series of very robust fulcral scales along the dorsal border of the caudal fin, a condition not present in either of the Tasmanian forms. Thirdly, the pelvic fins of *A sedgwicki* are positioned much more dorsally than in either of the Tasmanian forms.

Both *A. hamiltoni* and *A. tasmanicus* are distinguishable from *A. ortholepis*, as described by Woodward (1891, p. 508), *A. rhombifer*, as shown by Obruchev (1964, p. 546, fig. 38), and *A. macropoma* as described by Berg (1940, p. 448), on the basis of scale ornamentation.

Comparisons between the Tasmanian forms and *A. macroderma* are not possible at this time.

Acrolepis ? sp.
(Plate 4)

Material

U.T.G.D. 95098, a much distorted fish, folded upon itself, and lacking skull, pelvic fins and anal fin. The anterior and middle portion of the trunk are dorso-ventrally compressed but the posterior portion of the trunk and tail are laterally compressed. The fish is embedded in a gray clay clast contained in a clay-pebble conglomerate matrix. The specimen is split through and thus contained in two matching parts: U.T.G.D. 95098a which includes part of the squamation, the right pectoral fin and the dorsal and caudal fins; and U.T.G.D. 95098b which exhibits other portions of the squamation and a portion of caudal fin.

Locality

Old Beach locality.

Description

Body fusiform. Preserved fragment of right pectoral fin comprised of approximately seven unarticulated lepidotrichia. Portion of dorsal fin present too poorly preserved to provide details of shape and construction. Caudal fin heterocercal, deeply cleft and with fully articulated lepidotrichia.

Squamation best preserved on caudal peduncle and dorsal part of trunk. Scales rhombic with smooth borders. Depth of scale does not exceed scale length. Nature of ornamentation, if originally present, not determinable due to incomplete state of preservation.

Comparisons

On the basis of morphological features exhibited by this particular specimen including the unarticulated lepidotrichia of the pectoral fin, the structure of the caudal fin and the shape and proportions of the visible scales it is clearly referrable to the genus *Acrolepis*. It does not, however, preserve any of the difinitive characters that would allow it to be assigned with certainty to either of the Tasmanian species or to any of those from other areas.

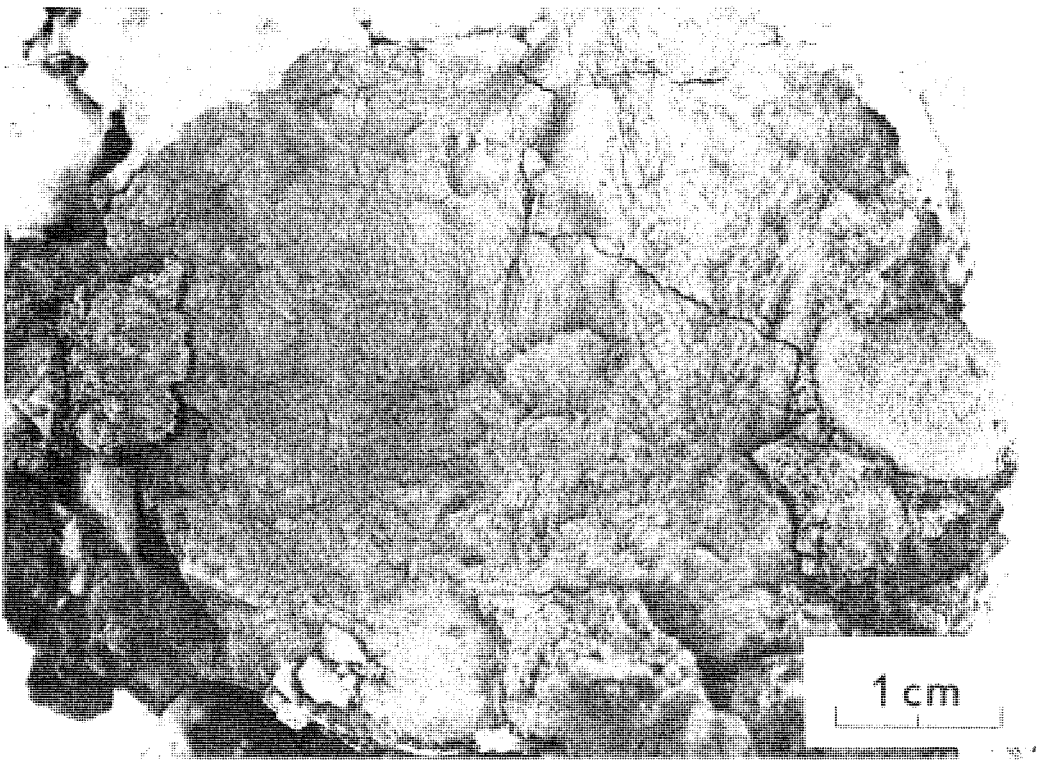

PLATE 4.- *Acrolepis ? sp.* U.T.G.D. 95098a (Old Beach locality); overall view ; x 2.

Suborder PERLEIDOIDEI
Family CLEITHROLEPIDAE Wade, 1935

Diagnosis: See Hutchinson (1973, p. 302).

Genus *CLEITHROLEPIS* Egerton, 1864

Diagnosis: Emended diagnosis as given by Hutchinson (1973, p. 311)
Type Species: *Cleithrolepis granulata* Egerton 1864.

Cleithrolepis granulata Egerton, 1864
(Plates 5, 6)

1974 *Cleithrolepis*: Cosgriff, 3.

Referred Material
U.T.G.D. 87801, fish with an incomplete and badly crushed skull, missing all fins. Unique specimen in two parts, U.T.G.D. 87801a consisting of skull and anterior portion of trunk and U.T.G.D. 87801b containing the posterior portion of the trunk. Specimen imbedded in gray clay-pebble contained in a clay-pebble conglomerate matrix.

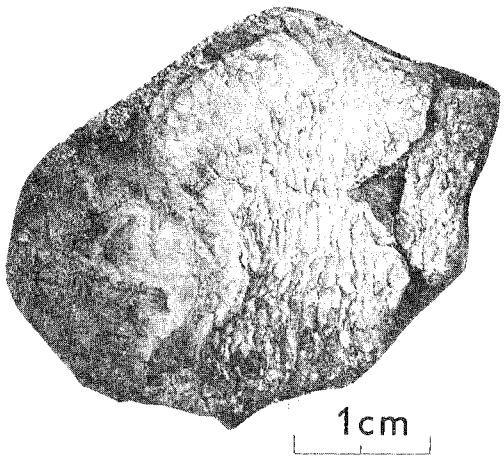

PLATE 5.- *Cleithrolepis granulata* Egerton, 1864; U.T.G.D. 87801a (Coningham locality); skull and anterior portion of trunk in lateral view; x 2.

Locality

Stream deposited conglomerates at the Coningham locality (see Cosgriff 1974, p. 119).

Description

A laterally compressed, deep bodied fish. Opercular "D"-shaped, deeper than wide. Subopercular badly crushed and incomplete.

Scales in region of lateral line much deeper than wide. Relative depth of scales in proportion to length decreases as dorsal and ventral borders of trunk are approached. Unfortunately, because of the nature of preservation, nothing can be said of the scale ornament.

Comparisons

Evidence favoring the assignment of the Tasmanian form to *Cleithrolepis* instead of the closely related South African genus *Cleithrolepidina* (Berg, 1940; Hutchinson, 1973) is provided by the relative proportions of the opercular. This structure being deeper than wide in both *Cleithrolepis granulata* and the Tasmanian form, the reverse of this condition being true of the forms assigned to *Cleithrolepidina*.

The provisional assignment of the Tasmanian form to *C. granulata* is based on the close agreement in body outline of the two forms when compared to that exhibited by *C. alta* in which the trunk is much deeper. The ratio of standard-length minus head length to body-depth in both *C. granulata* as figured by Hutchinson (1973, fig. 43) and the Tasmanian specimen assigned to this species is approximately 1.00 whereas in the case of *C. alta* as figured by Wade (1935, fig. 28) it is approximately 0.83.

Order ACIPENSERIFORMES

Family SAURICHTHYIDAE (Woodward, 1888)

Diagnosis: See Gardiner (1960, p. 271).

Genus *SAURICHTHYS* Agassiz, 1834

Diagnosis: See Stensio (1925, pp. 12-13).

Type Species: *Saurichthys apicalis* Agassiz, 1834.

Saurichthys sp.

(Plates 7,8)

1974 *Saurichthys:* Cosgriff, 3.

Referred Material

U.T.G.D. 87866, posterior portion of right side of head, comprised of dermal elements of both upper and lower jaws and anterior portion of opercular apparatus The specimen is approximately 35 mm in length and in two separate parts embedded in a clay-pebble conglomerate matrix. U.T.G.D. 87866a (Pl. 7) is comprised of the actual

dermal elements and U.T.G.D. 87866b (Pl. 8) is an impression of the former and exhibits the sculpture pattern of the dermal bones present.

Locality: Coningham.

Description

Of the dermal elements present, only the anterior portion of the opercular is clearly visible. This bone possesses a shallow "V"-shaped anterior border whose apex is directed posteriorly. The ornament consists of closely-spaced, fine striae forming a pattern of concentric hemicircles whose center of radiation is located on the center of the anterior border of the bone.

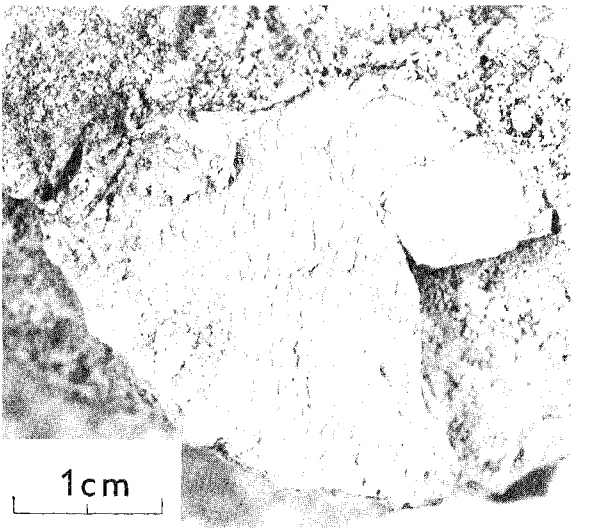

PLATE 6.- *Cleithrolepis granulata* Egerton, 1864; U.T.G.D. 87801b (Coningham locality); posterior portion of trunk in lateral view; x 2.

The posterior portion of the right lower jaw is elongate and shallow, gradually deepening posteriorly. No teeth are visible. Due to the nature of preservation, the individual dermal bones that usually comprise this structure in other members of the genus (angular, supraangular and posterior portion of the dentalosplenial) cannot be differentiated. The ornamentation consists of numerous closely spaced striae resembling those of the opercular. Those on the ventral surface are parallel to the longitudinal axis and those on the lateral surface are orientated obliquely.

On the upper jaw, the dermal elements believed present on the Tasmanian specimen, through comparison with *S. ornatus* Stensio (1925, p. 10, fig. 3) include remnants of the quadratojugal and preopercular. Suture lines between these two elements cannot be discerned and thus their shapes are not determinable.

Comparisons

Evidence for the inclusion of the above described Tasmanian material in the genus *Saurichthys* includes the elongate nature of the skull as well as the nature of the ornamentation exhibited on the skull and mandible. With regard to these features the Tasmanian form cannot be distinguished from such described species as *S. ornatus* Stensio, 1925 from the Lower Triassic of Spitsbergen, *S. gigas* and *S. gracilis* (Woodward, 1890) both from the Lower Triassic Gosford Formation at Gosford, New South Wales, *S. parvidens* Wade, 1935 from the Middle Triassic Hawkesbury Sandstone at Brookvale, New South Wales, and *S. striolatus* (Bronn, 1858) from the Upper Triassic of Raibl, Austria. Therefore, the assignment of this form to any previously described species or the consideration that it may represent a new species must await the discovery of more complete material.

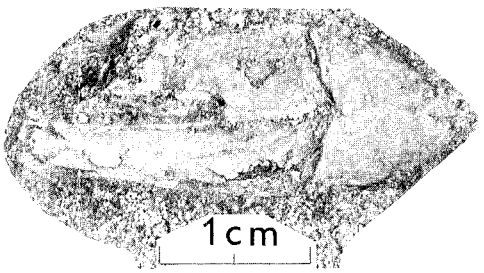

PLATE 7.- *Saurichthys sp.*, U.T.G.D. 87866a (Coningham locality); portion of skull and lower jaw in lateral view ; x 2.

PLATE 8.- *Saurichthys sp.*, U.T.G.D. 87866b (Coningham locality); impression of portion of skull and lower jaw exhibiting surface sculpture in lateral view.

CONCLUSIONS

Osteichthyan remains representing five genera are associated in the fresh-water deposited sediments of the Early Triassic Knocklofty Formation of Tasmania with the four species of temnospondylous amphibians described by Cosgriff (1974) and the semi-aquatic crocodile-like proterosuchian reptile *Tasmaniasaurus triassicus* (Camp and Banks, 1978). The total osteichthyan assemblage presently known from the unit includes the dipnoan, *Ceratodus gypsatus* Quenstedt, 1885, a coelacanth, a palaeoniscoid *Acrolepis hamiltoni* Johnston and Morton, 1890, a perleidoid, *Cleithrolepis granulata* Egerton, 1864 and a saurichthyid, *Saurichthys* sp.

Unfortunately, the osteichthyans known from this composite assemblage are of little biostratigraphic value as each of the genera present had a considerable time range. Remains assignable to the dipnoan genus *Ceratodus* have been identified from deposits ranging in age from Lower Triassic to Upper Cretaceous (Schaeffer 1970, p. 377). Forms included in the chondrostean genus *Acrolepis* have been described from deposits varying in age from Mississipian to Lower Triassic (Aldinger 1937, p. 259-261). Finally, representatives of the genera *Cleithrolepis* (Hutchinson 1973, p. 312) and *Saurichthys* (Romer 1966, p. 353) are known from deposits ranging in age from Lower to Upper Triassic.

It is now known (from unpublished data) that this fresh-water osteichthyan assemblage differs from other such assemblages of comparable age in that endemic genera are completely lacking.

Ceratodus ornatus Broom, 1909 and *C. palaeoruncinatus* Frentzen, 1924 have been placed in synonymy with *C. gypsatus* Quenstedt, 1885.

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