

A NEW SPECIES OF CHIMAEROID FISH FROM THE UPPER PALEOCENE (THANETIAN) OF MARYLAND, U.S.A.

by

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ABSTRACT

The recent discovery of several mandibular toothplates of a chimaeroid fish at a dig in the area of the Landover Mall, near Landover, Prince Georges County, Maryland, brings to our attention a new species of the chimaeroid, *Ischyodus*.

Although superficially reminiscent of the European chimaeroid toothplates of *Ischyodus thurmanni* (cf. text-fig. 2), *I. williamsae* nov. sp. probably has a more closer relationship to *I. bifurcatus* CASE, 1978, of the Upper Cretaceous of New Jersey and Delaware.

RESUME

La découverte récente de plusieurs plaques dentaires inférieures d'un poisson chiméroïde lors d'une excavation dans la région de Landover Mall, près de Landover, Comté de Prince Georges, Maryland, Etats-Unis, révèle l'existence d'une nouvelle espèce du genre chiméroïde *Ischyodus*.

Malgré la ressemblance avec les plaques dentaires du chiméroïde européen *Ischyodus thurmanni* (cf. text-fig. 2), *I. williamsae* nov. sp. a probablement des affinités plus marquées avec *I. bifurcatus* CASE, 1978, du Crétacé supérieur nord-américain du New Jersey et du Delaware.

INTRODUCTION

Until recently, it was assumed that the chimaeroid *Edaphodon* was the only species of fossil ratfish that had a transition from the Upper Cretaceous into the Tertiary. Now it also appears that the genus *Ischyodus* has made the crossover of the Cretaceous-Tertiary boundary.

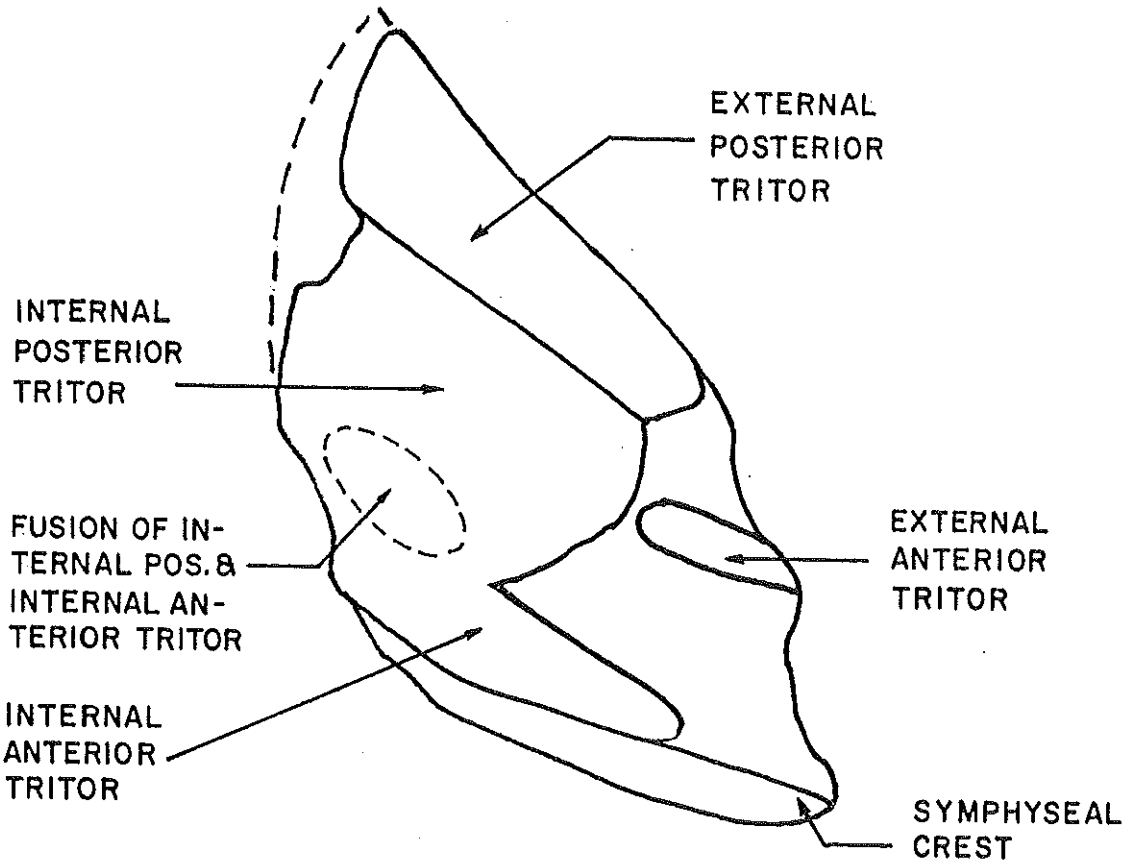
Ischyodus williamsae nov. sp. is somewhat similar in overall appearance to the European species, *I. thurmanni* PICTET & CAMPICHE (cf. text-fig. 2b, and Case, 1978), as far as general shape goes, but it would appear that this new species of *Ischyodus* has a much closer relationship to *I. bifurcatus* CASE, 1978, what with its fusion of two tritoral areas (the Internal Posterior and Internal Anterior Tritors). The fact that there is a pronounced tritoral area in proximity to the symphyseal crest (cf. text-fig. 1), this being the Internal Anterior Tritor as it shows up on mandibular toothplates of *I. williamsae* nov. sp., along with the overlapping of two tritors (mentioned previously) suggests that this is a distinct species worthy of note.

The Internal Anterior Tritor area which is present (in a fusion with the Internal Posterior Tritor) on the mandibulars of *Ischyodus williamsae* nov. sp. does not appear on mandibular toothplates of *I. thurmanni* PICTET & CAMPICHE (cf. text-fig. 2b), but it does show up as a dormant (not yet erupted) tritoral area on *I. bifurcatus* CASE (cf. text-fig. 2c). This might indicate the possibility that *I. bifurcatus* Case is ancestral to *I. williamsae* nov. sp. There is no apparent median (medial) tritor on the toothplates of either *Ischyodus thurmanni*, *I. bifurcatus* and *I. williamsae* nov. sp. A Median Tritor seems to be evident only on the mandibular toothplates of *I. dolloi* (cf. text-fig. 2a).

GEOLOGY

The three mandibular toothplates of *Ischyodus williamsae* nov. sp. (the holotype and two paratypes), come from the Lower Aquia Formation, Thanetian stage of the Paleocene, at the construction site of the Hechinger Corporation Headquarters near the Landover Mall (Browers & Hazel, 1978). Hechinger is a chain of stores in Maryland and parts of the southland that sells lumber, hardware, and plumbing supplies, among other things, very similar to the "Channel" stores in the north-eastern States.

The Hechinger site is located approximately 0.4 km southeast of the cloverleaf intersection of the Capital Beltway (Landover exit) situated in Prince Georges County, Maryland. The site is also situated approximately 3.5 km northeast of the Hampton Mall shopping plaza, which is located slightly due west of the Capital Beltway (off of



Text-fig. 1. — *Ischyodus williamsae* nov. sp., left-hand mandibular dentition showing position of the tritorial elements. $\times 3$.

Rt. 214, Central Avenue) at the next southerly cloverleaf intersection (Largo-Seat Pleasant) (Case, 1989).

The exposure of the Lower Aquia (Paleocene) at this site is mixed in with reworked Upper Cretaceous (Late Maastrichtian), Severn Formation fish material, mostly abraded shark's teeth.

Therefore there is no "true" or intact Aquia layer at this site, but rather a re-deposit caused by dynamic hydraulics, with the fish teeth (mostly sharks and rays) being transported by ground water to a secondary re-deposition. Very little invertebrate material (with the exception of button coral crowns) seems to be mixed in with the vertebrate material. The Severn Formation, also primarily vertebrate, has much reworking and abrasion due to transportation, and therefore is to be considered as a standard "lag deposit" and not a true original deposition. Such lag deposits exist all over America; two particularly good examples would be the Navesink (derived) exposures in the banks of Big, Hop, and Willow Brooks in Monmouth County, New Jersey (Cappetta & Case, 1975). The age of the Navesink is Middle Maastrichtian in the Upper Cretaceous. The second "good example" of a typical "lag deposit" would be the Late Campanian Blufftown Formation (derived) in Hannahatchee Creek, Stewart County, Georgia (Case & Schwimmer, 1988 and Case, 1987).

SYSTEMATIC PALEONTOLOGY

Class CHONDRICHTHYES
Subclass HOLOCEPHALI
Order CHIMAERIFORMES
Family CHIMAERIDAE

Genus *ISCHYODUS* EGERTON, 1843

Ischyodus williamsae nov. sp.

(Plate 1, Text-figs. 1-3)

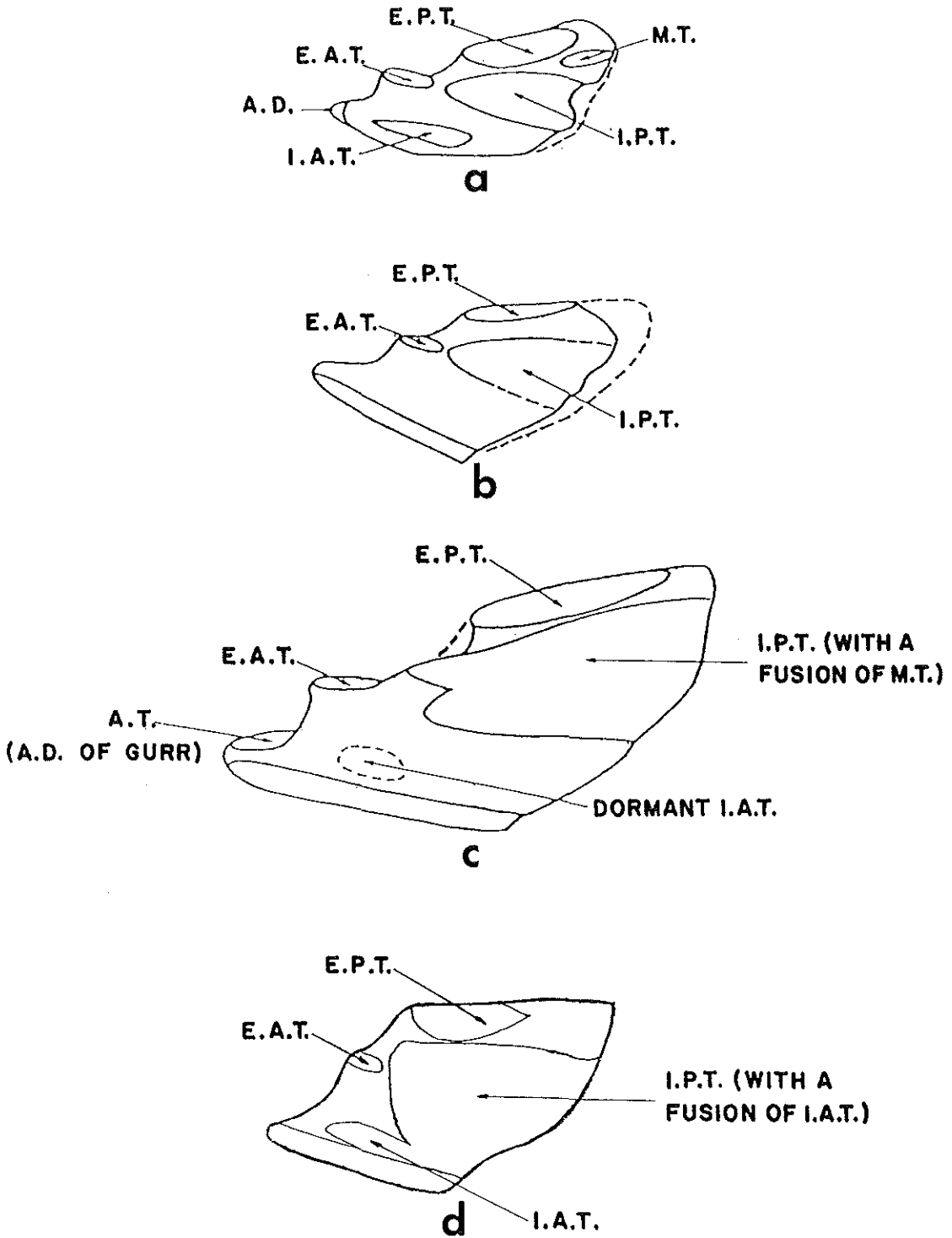
Diagnosis: A small sized species of the chimaeroid fish, *Ischyodus* (presently only known by its diminutive tooth plates), much smaller than other species of *Ischyodus*, i.e.: *I. thurmanni* PICTET & CAMPICHE, *I. bifurcatus* CASE, and *I. dolloi* LERICHE.

The fusion of the Internal Posterior and the Internal Anterior Tritors on the mandibular toothplates of *Ischyodus williamsae* nov. sp., plus the appearance of an internal anterior tritor (such as appears on *I. dolloi*) and the lack of a median tritor, sets this new species of *Ischyodus* apart from all previous species.

Derivatio nominis: Species named in honor of the collector, Ms. Gaye L. Williams, Bowie, Maryland, USA.

Holotype: University of Montpellier CEN-4, mandibular (plate 1a-b, text-figs. 1 and 2).

Paratypes: CEN-5, mandibular (plate 1c-d and text-fig. 2); CEN-6, mandibular (plate 1e-f).



Text-fig. 2. — Comparison of four right-hand mandibulars of *Ischyodus*. a: *Ischyodus dolloi* LERICHE; b: *Ischyodus thurmanni* PICTET & CAMPICHE; c: *Ischyodus bifurcatus* CASE; d: *Ischyodus williamsae* nov. sp.

Type horizon: Lower Aquia Formation (Thanetian Stage), Paleocene age.

Type locality: Hechinger Corporate Headquarters construction site near the Landover Mall shopping center, near Brightseat, Prince Georges County, Maryland, USA (Brouwers & Hazel, 1978: 47).

Topographic map reference: R76°, 50', 56"; T38°, 54', 50", on the Lanham Quadrangle (USGS map), Prince Georges County, Maryland-7.5 minute series.

Description

The mandibular toothplates of *Ischyodus williamsae* nov. sp. are small compared to other known chimaeroids of the generic type; the holotype specimen (CEN-4) is approximately 4.5 cm diagonally across the tooth plate from tip (near the apical dentine area of Gurr (1963) to the upper posterior edge (near the external posterior tritor region). Paratype 1 (CEN-5) is approximately 42 mm diagonally, while paratype 2 (CEN-6) (which is incomplete — missing the area containing the external posterior tritor) is approximately 37 mm on the diagonal.

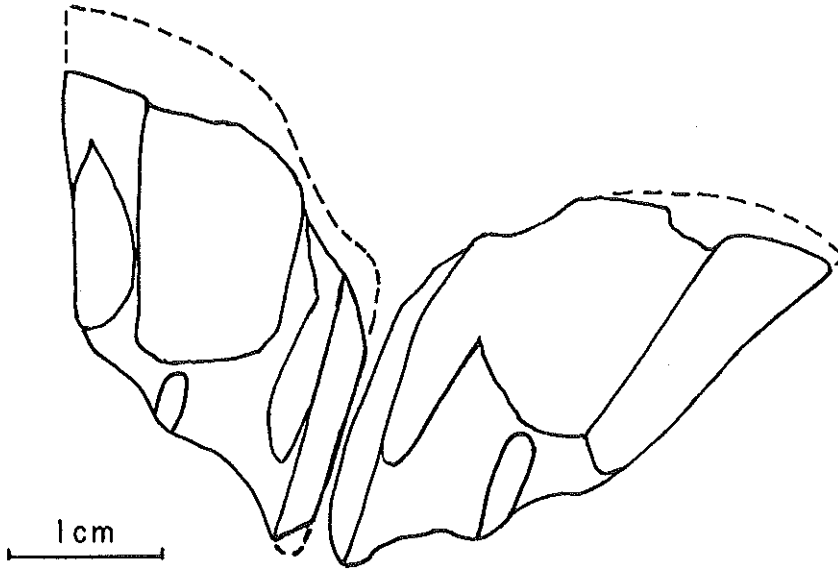
There is a fusion between the internal posterior and internal anterior tritors, and the fact that an internal anterior tritor is present at all on this new species of *Ischyodus* makes it reminiscent of *I. dolloi* Leriche of the Upper Cretaceous of Europe. Furthermore, *I. williamsae* nov. sp. does not have a median tritor as in *I. dolloi* (cf. text-fig. 2).

At the present time, the vomerine and palatal tooth plates of *Ischyodus williamsae* nov. sp. are unknown. With additional collecting, these tooth plate elements may eventually be recovered and an additional note may be necessary.

Discussion

It is quite surprising to find in the Tertiary (at least in North American fossil deposits), the genus *Ischyodus*. This genus of the chimaeroids was supposed to have died out in the Middle Maastrichtian of the Upper Cretaceous (Case, 1978), and been replaced by the larger and more robust genus, *Edaphodon*.

Now that *Edaphodon* has been proven to have made the transition of the K/T boundary (Cretaceous/Tertiary), we can consider that *Ischyodus* has as well, at least up to the Early Eocene. No examples of *Ischyodus* or for that matter, *Edaphodon* have been found past the Ypresian Stage of the Eocene (at least not reported upon in any North American geological report). As a matter of fact, Tertiary chimaeroid material is extremely rare past the Ypresian Stage in North America. *Edaphodon* tooth plates are known from the Late Maastrichtian and Early Paleocene of New Jersey, although not officially reported upon as yet. In 1973, Case & Herman described the mesial portion of a dorsal fin spine of *Edaphodon* cf. *bucklandi* (AGASSIZ) from the Ypresian of Morocco. This author has in preparation, a report of a complete palatal tooth plate of *Edaphodon* from the Upper Aquia Formation, Ypresian Stage of the Early Eocene of Maryland, at a site called, "Tinker's Creek". Other than these Tertiary forms of *Edaphodon*, the present report on *Ischyodus williamsae* nov. sp. from the Late Paleocene of Maryland, is significant.



Text-fig. 3. – A matching pair (set) of mandibular dentitions of *Ischyodus williamsae* nov. sp.

Finally, the fact that these three almost identical size, shape, and colouring mandibular toothplates of *Ischyodus williamsae* nov. sp. were recovered from a mixture of reworked and redeposited material from two distinct formations (the Upper Cretaceous, Late Maastrichtian, Severn Formation, and the Late or Upper Paleocene, Thanetian Stage, Aquia Formation) may bring up the question of whether this author has indeed Early Tertiary chimaeroid tooth plate material and not Late Cretaceous material. The conclusion of the author is that the material under study here is Tertiary, and not Cretaceous. This is based upon the following: 1) The condition and colouring of the tooth plate material (and there were several other smaller chimaeroid scraps as well, same colour, same condition) is such that they were not transported over a long distance (such as the Severn material at this site) which would cause the teeth of both shark and bony fishes to be abraded, tumbled, worn and blackish in colouration, while the chimaeroid specimens were by and large all the same light brownish colouring in the admixed Lower Aquia (Paleocene) material, which was also in excellent to "mint" condition. 2) This author has personally collected assorted chimaeroid material, including possible *Ischyodus* types from the Lower Paleocene Hornerstown Formation (Montian Stage) of New Jersey at a site (greensand) near the intersection of Routes 537 and 539, not very far from the Great Adventure amusement park, near Cream Ridge, Monmouth County, New Jersey. This material has not been reported upon at the present, but the condition of the chimaeroid and selachian material is about the same as at the Hechinger site in Maryland.

The Lower Aquia (Paleocene) outcroppings (not reworked or redeposited) at the back of the Hampton Mall shopping center, situated some 3.5 km south and slightly west of the Hechinger site, also along the Capital Beltway, and near to Route 214

(Central Avenue) at the Largo exit (Case, 1989), has given us a large macrofaunal and microfaunal assemblage, whose condition is excellent and has enabled us to separate and compare the species types found mixed in with the Severn (Upper Cretaceous material) found at the Hechinger site.

Text-figure 3 shows right and left hand mandibular toothplates of *Ischyodus williamsae* nov. sp. The closeness of their size does not preclude the fact that they may be from the same fish, however, this is merely speculation, and it is just fortunate that we have at least a matching pair of these lower jaw plates.

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Abbreviations

- A.D. = Apical dentine
- A.T. = Anterior tritor
- M.T. = Median tritor
- E.A.T. = External anterior tritor
- E.P.T. = External posterior tritor
- I.A.T. = Internal anterior tritor
- I.P.T. = Internal posterior tritor

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LEGEND OF PLATE

PLATE 1

Ischyodus williamsae nov. sp.

a-b: left-hand mandibular plate, labial and lingual views, holotype;

c-d: right-hand mandibular plate, lingual and labial views, paratype;

e-f: right-hand mandibular plate, lingual and labial views, paratype.



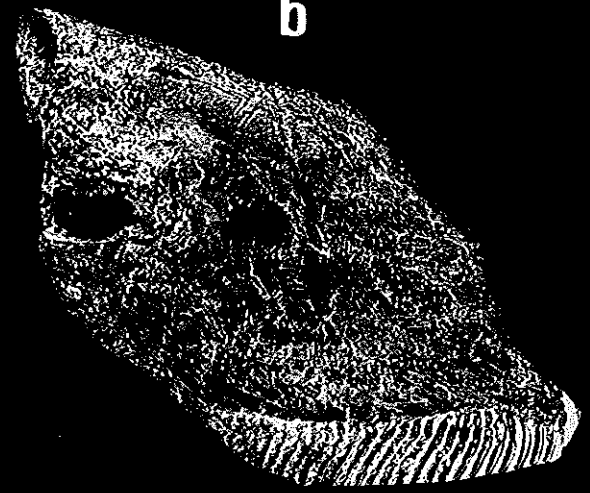
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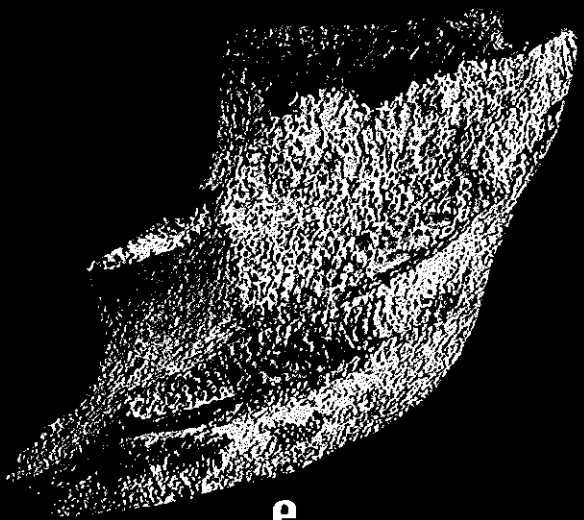
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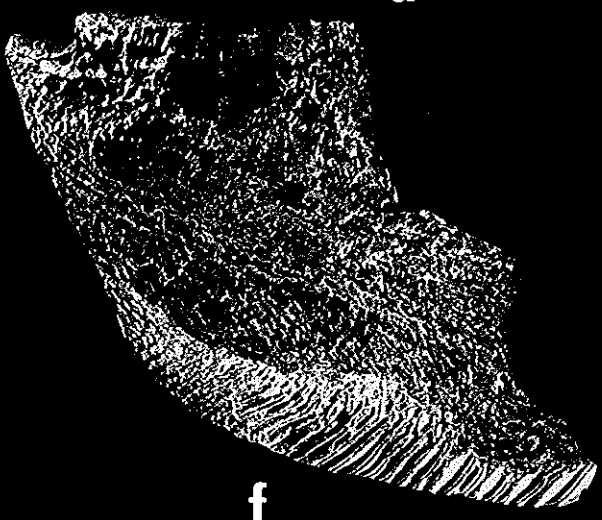
c



d



e



f