Hagiastridae Species from Karimia Formation (Upper Jurassic-Lower Cretaceous) Northren Iraq

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Abstract

The Hagiastridae Reidel include Spongodiscacea with two, three or four rayed test comprised of layered spongy meshwork lacking concentric ring or spirl. This family appears to be restricted to the Mesozoic (1, 2, 3). It has ageologic history extending at least as far as the Jurassic. The majority of Hagiastridae species are distinctive and with short range.

Seven species of Hagiastridae: *Paronaella ewingi, Halesium quadratum, Patulibracchium inaequalum, Patulibracchium marshensis, Hagiastrum plenum, Crucella messinae, Crucella irwini,* have been described. They are frome the upper Jurassic-lower Cretaceous Karimia Formation of northren Iraq.

الخلاصة

تعود عائلة Hagiastridae الى فوق عائلة Spongodescacea والتي يمتاز افرادها بقشرة ذات شكل ثنائي، ثلاثي او رباعي الشعاع، اضافة الى ان هذه القشرة تتكون من طبقات شبكية الشكل غير متحدة المركز بشكل حلقي او حلزوني. تمتاز هذه العائلة بان لها ظهور واضح محصور في حقب الحياة الوسطى (1, 2, 3) ولها تاريخ جيولوجي يمتد من العصر الجوراسي على اقل تقدير وان اغلب انواع هذه العائلة لها مديات عمرية قصيرة.

وقد امكن تميز سبعة انواع من هذه العائلة من خلال دراسة تكوين الكريمية (جوراسي اعلى – طباشيري اسفل) في شمال العراق، وهي كما يلي:

Paronaella ewingi, Halesium quatratum, Patulibracchium inaequalum, Patulibracchium marshensis, Hagiastrum plenum, Crucella messinae, Crucella irwini,.

Introduction

The Karimia Formation represents an exceptional unit within the Tithonian-Berriasian subcycle. It was first described (according to Bellen et al) by McGinty in 1953 from Kirkuk well no. 109 in the Foothill Zone (4). The age of the formation cannot be ascertained on fossils. On the other hand its position (between well established stratigraphic horizons testifies its Tithonian-Berriasian age). No correlatives of the formation other then in age are known. It should be noted, however, that the formation at least in its upper parts is somewhat younger than Chia-Gara and Makhul Formations (4).

In this study, 70 core and cutting samples have been studied from Kirkuk well no. 109 (Fig.1). The thickness of the Formation is approximately 806 M.

The lithology of Karimia Formation in this study consists of gray limestons with bands of marl and rare calcareous shale bands in upper and middle parts of the Formation.

The classification of (1,5,6,7). Have been adopted in this study. The studied thin sections are deposited in the collection of Department of Geology, College of Science, University of Baghdad.

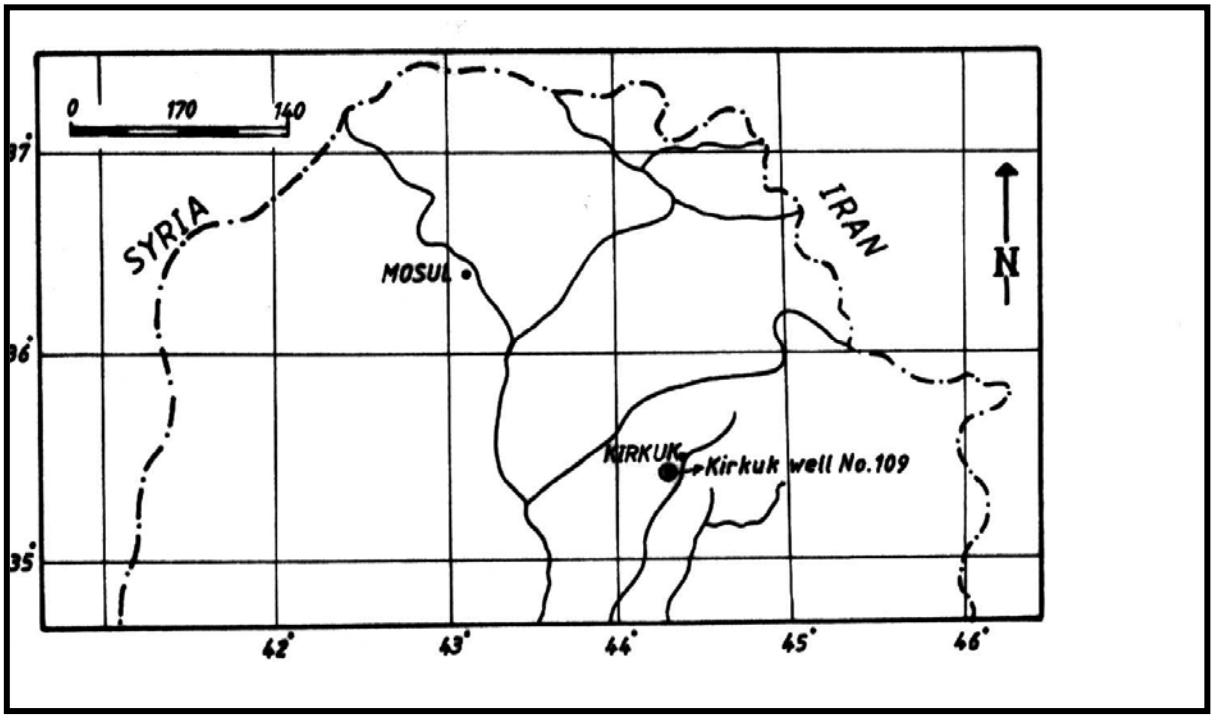

Fig. (1): Location map of the study area.

Description of the Species

In the description the following abbraviations are used, S=Shap; DF=Distinctive Features; GR=Geologic Range; R=Remarke; M=Measurment.

The criteria for the classification of Hagiastridae at the family, subfamily, generic and specific level are summarized in fig.2. The occurrence of all species with depth (see Table no.1.).

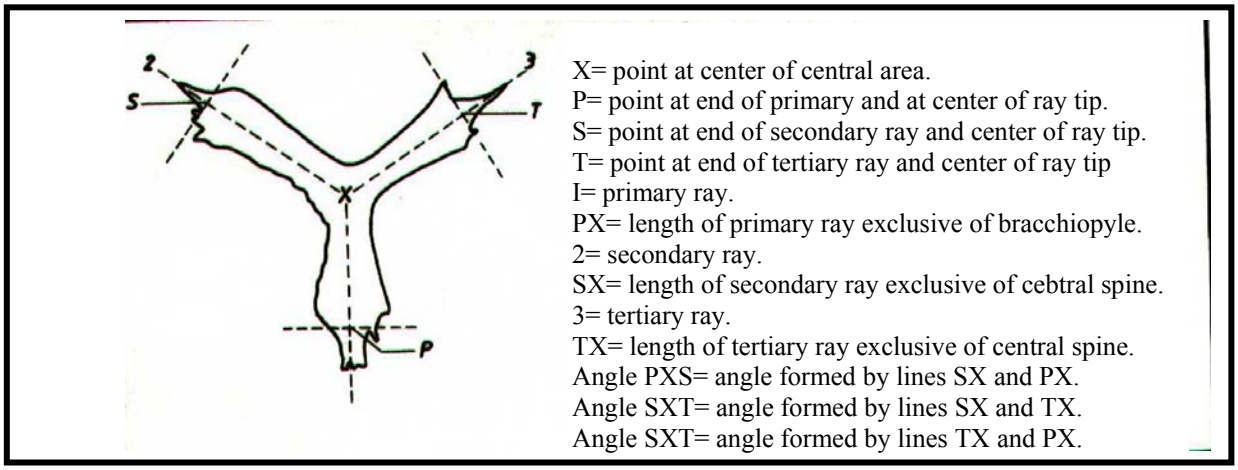

Fig. 2: Illustrate the summary of criteria for the Hagiastridae classification. (after pessagno, 1971)

Systematic Description

Phylum: PROTOZOA
Subphylum: SARCODINA
Class: RETICULARIA
Subclass: RADIOLARIA
Order: POLYSTIDA
Suborder: SPUMELLARINA
Superfamily: SPONGODISCACEA Haeckel, 1881, emend. Pessagno, 1971, 1973
Subsuperfamily: PSEUDOAULOPHACILAE Riedel,1971, emend. Pessagno,1971.
Family: HAGIASTRIDAE Riedel, 1967, emend. Pessagno, 1971.
Subfamily: PATULIBRACCHIINAE Pessagno, 1971.
Genus: *PARONAELLA* Pessagno, 1971
Paronaella ewingi Pessagno;1971
(Plat.I,Fig.1, 2)
This species is named for Dr. Mauric Ewing (Lamont-Doherty Geological observatory), Co. Chief scientist of JOIDES LegI.
S= Discoidal flat.
DF=Test with three extremely elongate, slender rays of nearly equal length having expanded ellipsoidal tips. Ray tips terminating in five to seven minute spines meshwork on rays comprised of square to rectangular frames are arranged in two markedly linear rows. Rays subrectangular in axial section.

M= Interradial engles degrees (Fig. 3).
< PXS 110°
< SXT 120°
< TXP 130°
Length of ray in microns (Fig.3).
PX = 380, SX= 370, TX= 370

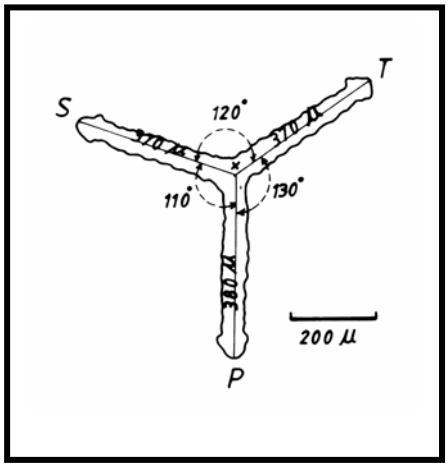

Fig.(3): *Paronaella ewingi*

GR and Ocurrance= Late Jurassic (Tithonian) of Black-Bahama Basin.

Genus *HALESIUM P*essagno, 1971
Halesium quadratum Pessagno, 1971
(Plat. I, Fig.3)
S= Discoidal flat
DF= Test in horizontal view with rays comprised of triangular to rectangular. The rays subequal in length.
M= Interradail angle degrees (Fig.4)
< PXS 118°
< SXT 120°
< TXP 122°
Length of rays in microns
PX = 385, SX= 370, TX= 330

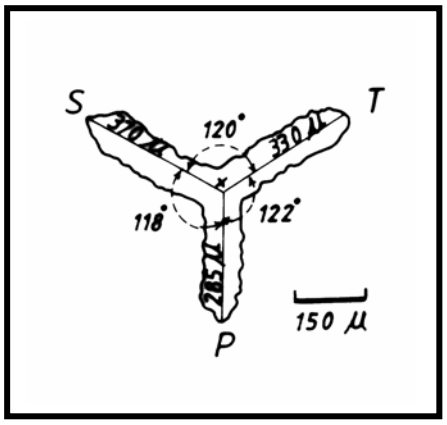

Fig. (4): *Halesium quadratum*

G.R. and Occurrence= Early Cenomanian to Middle Turonian. Rang Zone may extend from Early Cretaceous to Albian, in Great valley sequence, California Coast Ranges. In this study it extend from Early Cretaceus.
Genus *PATULIBRACCHIUM* Pessagno, 1971
Patulibracchium inaequalum ,Pessagno1971
(Plat. I, II, Fig. 5)
S=Discoidal flat
DF=Test in horizontal view with rays and centeral area comprised of square, rectangular, triangular rays varible in length. The primary ray usually is shorter and more massive.
M=Interradial angles degrees (Fig.5).
< PXS 88°
< SXT 166°
< TXP 106°
Length of ray in microns
PX = 230, SX= 300-600, TX= 400-500

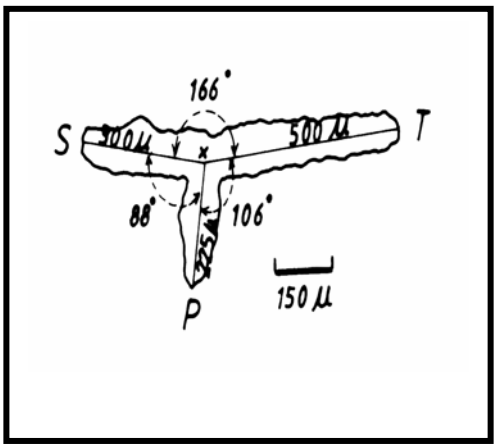

Fig. (5): *Patulibracchium inaequalum*

GR and Occurance= Late Cretaceous? Early Cretaceous? Late Jurassic in Great valley Sequence, California Coast Ranges.

Patulibracchium marshensis Pessagno 1971
(Plat. II, Fig.4)

S=Discoidal flat

DF= Test as with P.inaequalum. Rays exclusive of centeral spines and bracchiopyle and nearly equal in length. Primary ray slightly shorter.

M=Interradial angles degrees (Fig. 6).
< PXS 116°
< SXT 112°
< TXP 132°
Length of rays in microns (Fig.6).
PX = 175, SX= 190, TX= 250

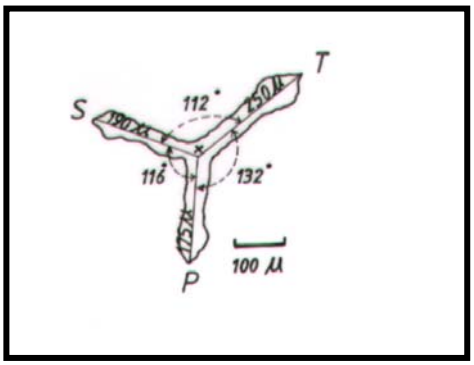

Fig. (6)*: Patulibracchium marshensis*

GR and Occurrence= Cretaceous. Latest Campanian portion of Marsh Creek Formation California.

Subfamily:HAGIASTRINAE Riedel,1967, emend. Pessagno, 1971, 1970

Type genus Hagiastrum Heackel 1881

Hagiastrum plenum Rust, 1885
(Plat. II, Fig.1,2)

S= Discoidal flate.

DF=Test comprised of four rays extending from small centeral area along two axes at right angles to one another. Rays sometimes longer along one axis than other and terminating in bulbous rounded tips lacking spines and small centeral areas.

GR and occurrence= This species is restricted to strata of Jurassic to Late Cretaceous age (1). The age *Hagiastrum plenum* is known from siliceous chalks of Cittiglio and from upper cretaceous portion of the Great Valley sequence, California Coast Rangs (1). This species world wide frome Triassic to Cretaceous (2).

Genus *CRUCELLA* Pessagno, 1971

Crucella messinae, Pessagno,1971
(Plat. II, Fig.3)

S= Discoidal flate.

DF= Test as with H.plenum. Four rays, elliptical to rectangular in cross section, rays equal in length.

R=*C.messinae*., differ from *H.plenum* by (1) possessing rays of nearly equal length. (2) possessing rays with tapered rather than bulbous tips. And (3) having prominent spine at the tipe of each ray.

GR and occurrence= Late Jurassic to Late Cretaceous world wide (1). Lower Jurassic (Sinemurian) to Upper Cretaceous(Upper Camponion) (2).

Crucella irwini Pessagno, 1971
(Plat. 1, Fig.4)

S= Discoidal flat.

DF=Test as with C. Messinae.

R=This species differ from *C.Messinae* by.

(1) The proportionately longer and slender character of its rays.

(2) by possessing alacuna in its centeral area. (3) by having spines wich are circular rather than triradite in axial section.

GR and occurrence = L.Jurassic to L. Creataceous. Middle Turonian portion of Marsh Creek Formation (1).

Conclusion

Seven species of Hagiastridae were distinguished from the Karimia Formation. The age of this Formation in this study is Tithonian-Berriasian according to the occurrence of this species.

Table (1): Distribution chart of Hagiastridae species/ Karimia Formation/ Kirkuk well no. 109.

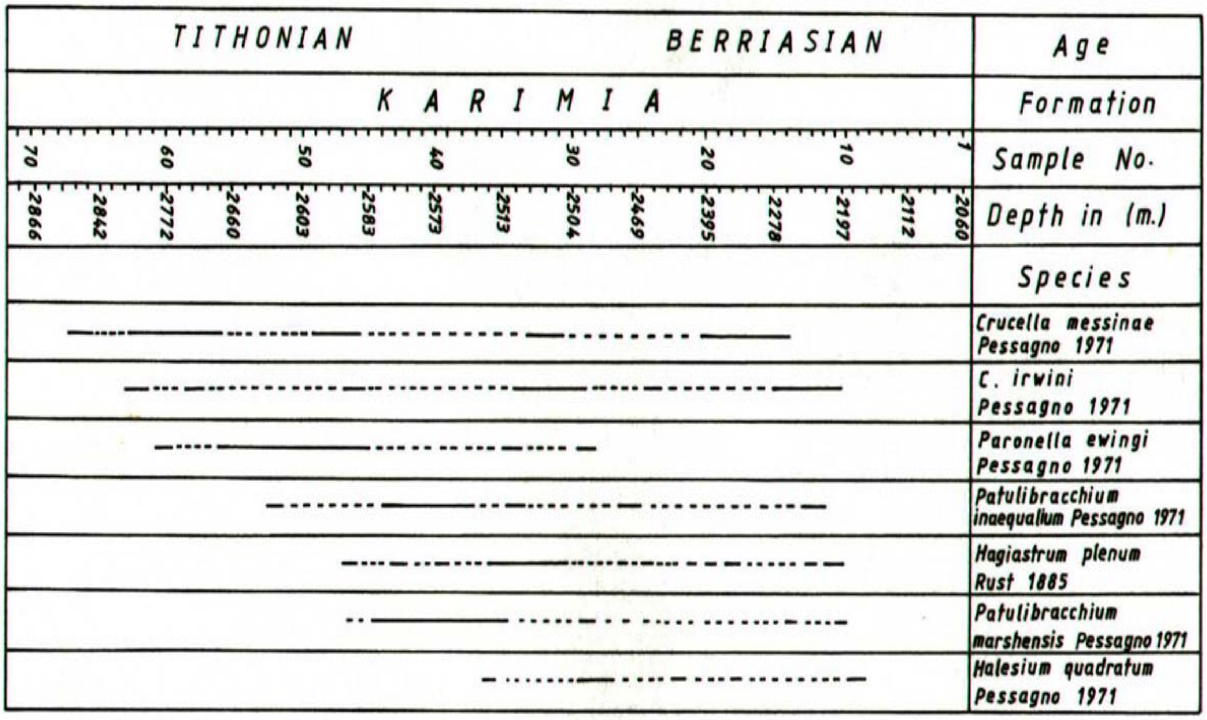

PLATE I

All figures are from Karimia Formation, Kirkuk well No. 109

Fig 1: *Paronella ewingi* Pessagno; Axial section; depth 2579 M.;50; Marker= 200 Micron.

Fig 2: Ray tip of Paronella ewingi Pessagno; Axial section depth 2529M;X120; Marker= 40 Micron

Fig 3: *Halesium quadratum* Pessagno; Axial section; depth 2510M.;X70; Marker= 150 Micron

Fig 4: *Crucella irwini* Pessagno; Axial section; depth 2257M.; X 70; Marker= 100 Micron

Fig 5: *Patulibracchium inaeqaelum* Pessagno; Axial section depth 2579 M.;X100; Marker = 150 Micron.

Plate II

All figures are from Karimia Formation, Kirkuk well No. 109

Fig 1: *Hagiastrum plenum* Rust; Axial section depth 2681m; X50 ; Marker= 100 Micron.

Fig 2: *Hagiastrum plenum* Rust; Axial section depth 2681m;X100; Marker= 40.

Fig 3: *Crucella messinae* Pessagno; Axial section; depth 2579M;X80; Marker= 150 Micron

Fig 4: *Patulibracchium* marshensis Pessagno; Axial section; depth 2278M.; X 100; Marker= 100 Micron

Fig 5: *Patulibracchium inaeqaelum* Pessagno; Axial section depth 2197M.; X 100; Marker = 150 Micron.

PLATE - I -

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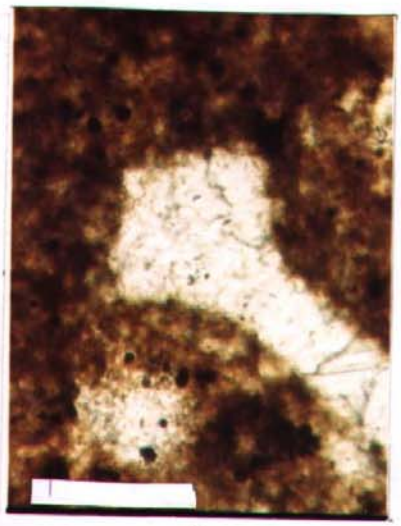

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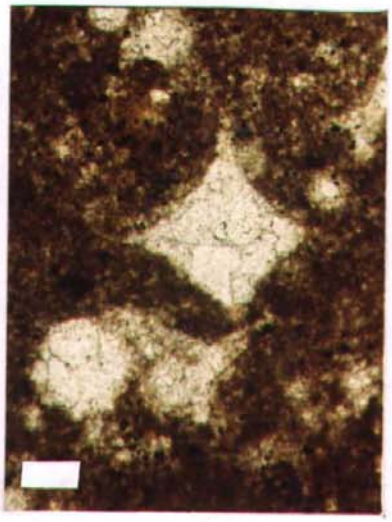

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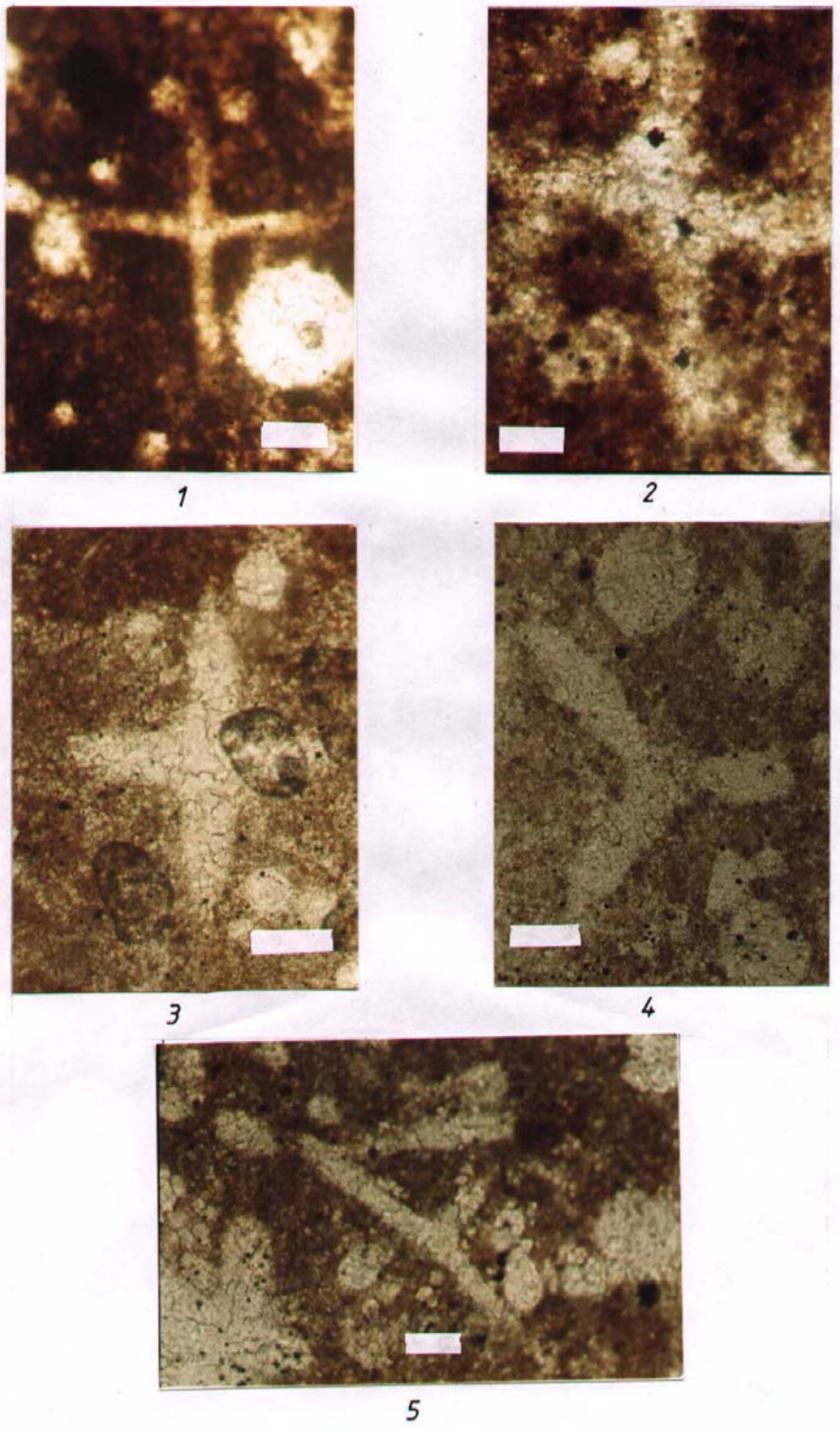
PLATE - II -



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