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GEOLOGICAL STUDY OF THE GURA ŞOIMULUI FORMATION FROM THE BISTRIȚA – RÂŞCA HALF - WINDOW (EAST CARPATHIANS)

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Abstract. The Gura Şoimului Formation is characteristic of the Vrancea Nappe who appears as of several half windows, windows and rabotage blades which come into contact with the pericarpathic deposits.
The Gura Şoimului Formation occurs in most cases, in the filling of some sinclynes mainly developed to the NE or NW-SE diections, the most widespread areas being in the Bistrița – Râşca Half - Window. In this localite the Gura Şoimului Formation (130 m) overlies the upper menilites and the upper disodiles It is made up of turbiditic arenite – pelitic sequences, containing also rudites and olistoliths.

I have studied especially carbonate pebbles incorporated in rudites. The carbonate galets are biomicrites with foraminifers: *Rotalia sp, Rotalia* cf. *R. hensoni* Smouth, *Nummulites pernotus* Schaub*, Nummlites gallensis* Heim*, Discocyclina seunesi* Douvillé*; Discocyclina douvillei* Schlumberger, *Dicocyclina roberti* Douvillé.

Taking into consideration the large foraminifers like *Nummulites gallensis* Heim*, Discocyclina roberti* Douvillé, the age is middle Eocen, i.e. Lutetian. The carbonate pebbles with foraminifers come from the land area where they were preserved in the form of patches on the green rocks relief which are predominant.

Keywords: Gura Şoimului Formation, microfacies, Bistrița – Râşca half - window, East Carpathians.

INTRODUCTION

The Gura Şoimului Formation, distinguished and described by Stoica (1953), is characteristic of the Vrancea Nappe (Figure 1). This nappe appears in more half-windows, windows and glacial planning blades coming into contact with the Carpathian molasse.

"The Gura Şoimului rata" occur, in most of the cases, in the filling of some synclines preponderently developped north-southwards or north west-south eastwards, the most extended areas being situated in the Half-window Bistrița-Râşca.

Humă (1971) considers that sometimes The Gura Şoimului Formation concordantly overlies the upper menilites and some other times it rests transgressively over different members of the Oligocene, the upper disodiles included, or even over the Eocene (Ionesi et al., 1994).

The Gura Şoimului Formation marks the beginning of an subaerial sedimentation, in an oxygenated environment. The thickness varies, reaching 110 m (Ionesi, Bogatu, 1986) or even 130 m (Popescu, 1996-1997). In the Gura Şoimului Formation, which is made up of arenite-pelitic turbidity sequences, some perturbations appear caused by contribution of rudites and olistoliths. They appear both in the Tazlăului Basin and northwards of the Bistrița Basin, on Cuejdi and Pângărăcior brooks respectively. The high value of their thickness of these allochton deposits has lead to the false impression about their appartenance to the Gura Şoimului Formation.

LITHOLOGY

The rudites (refer here exclusively to those having an arenite-siltic matrix), are situated at different levels in the Gura Şoimului Formation and they generally display an advanced degree of rolling. It indicates that these are littoral deposits resulting both from the sea cliffs and from the torrential cones.

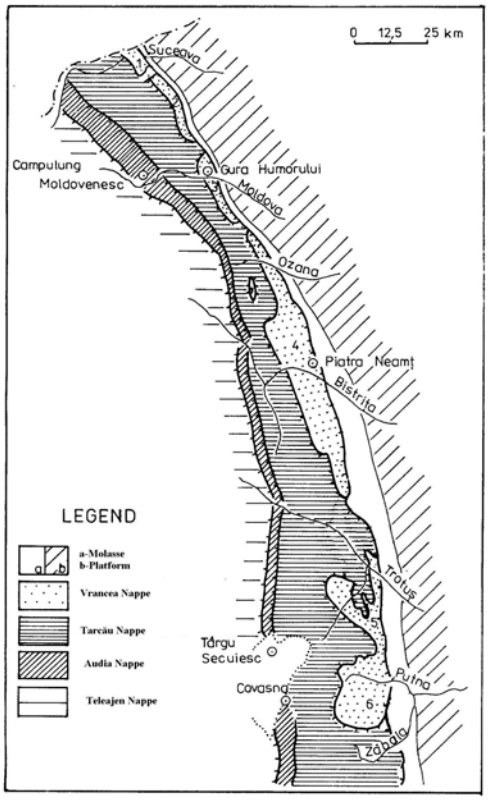

Figure 1 Tectonic sketch of the outer flysch in the central-north area of the East Carpathians (Grasu et al., 1988): 1-Putna-Suceava Half-window; 2-Sucevița Half-window; 3-Humor Half-window; 4-Bistrița–Râşca Half-window; 5-Slănic-Oituz Half-window; 6-Vrancea Half-window; 7-Bran-Dumesnic Window.

The nature of the pebbles shows a land origin almost exclusively on green schists only small portions of limestones with large Foraminifera were

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conserved. At irregular intervals they glided gravitationally force on the slope reaching as far as the fan area. In this way, their uneven, lens-like distribution could be explained. The glide of the rudites was not simultaneous with the rhythmic transport of the turbidity currents, but simultaneity cannot be excluded either. Locally the rudites can substitute, almost entirely the turbidites, as it is the case of the syncline Bejenia – Argintăria (Figure 2).

There must be a correlation between the quantity of rudites and the morphology of the shore, as they abound in the areas with high sea cliffsand or with craggy slopes crossed by torrents.

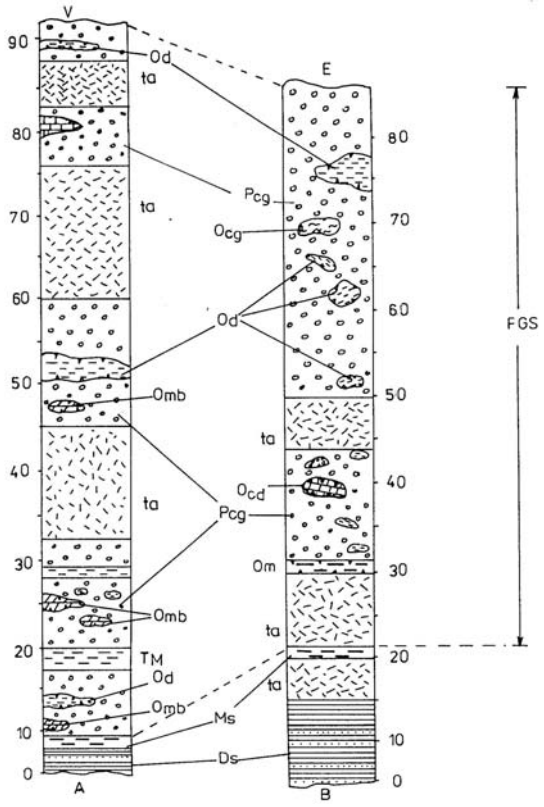


Figure 2 Lithological columns on the western (A-Cuejdiu) and eastern (B-Argintăria) flanks of the Argintăria –Cuejdiu outcrop. Ds-upper disodiles; Ms.upper menilites; FGS-Gura Şoimului Formation: Pcg-paraconglomerates; TM-pelitic turbidites; O-olistoliths (cg-conglomerates, mb-bituminous marls, d-disodiles, m-menilites).

The olistoliths made up of menilites, disodiles, limestones and sandstones interrupt the pelitic-arenite sedimentation of the Gura Şoimului Formation between Suha and Nemţişor brooks. Ionesi & Grasu (1976) quote in the area with rudites the existence of some blocks of limestones with brachiopods, bivalves and nummulites which would come from the pebbles of some conglomerates and which would be stratigraphically situated within the Gura Şoimului Formation.

The olistoliths are rock bodies with an allochtonous position in the deposits of the Gura Şoimului Formation perturbing the sedimentation of the turbidites. They are intraformational deposits composed of rocks subjacent to the Gura Şoimului Formation, belonging to the lower menilites-upper menilites interval, except for the Doamna limestone olistolith from the Argintărie brook (the Cuejdiu Basin).

These rocks have been interpreted as “normal” intercallations, respectively facies recurrences within the Gura Şoimului Formation. From the description of the outcrops it is quite obvious that they are not “normal” intercalations but alochtonous rock bodies.

As compared to the turbidites and rudites, the source of olistoliths is basinal. Obviously, in other localites, olistoliths are known resulting from sea cliffs and glided on the slope or at its basis, but in the case of those belonging to Gura Şoimului Formation they do not belong to this category. Ionesi et al. (1994) explained their formation through the apparition of some embryonal anticlines (without exceeding the water level), from where larger and smaller blocks separated and glided on slopes among the sediments of the Gura Şoimului Formation. The glide didn’t happen as a skidding on the surface of the sediments but inside them, after the beginning of the diagenesis process.

MICROFACIES

I have tried to render evident some microfacies features of the pebbles of the rudites. Petrographycally the rudits are frequently represented by conglomerates and less frequenci by breccia. The pebbles are represented by chlorite quartzitic schists, phyllites, amphibolites, white quartzites, quartzitic sandstones and limestones. I have analysed in detail the limestones with large foraminifera. The limestones pebbles are present in the rudits from the Half-window Bistriţa-Râşca, in the Carpen, Bejenia, Argintăria-Cuejdiu outcrops to the north of Bistriţa river and the Stroe and Vescar outcrops south of Bistriţa river.

The limestone pebbles are biomicrites with foraminifers:

- biomicrites with entire tests of *Rotalia* sp., *Rotalia* cf. *R. hensoni* Smouth (Plate 1) and abundant axial sections of *Nummulites pernotus* Schaub*, Nummulites gallensis* Heim, *Discocyclina seunesi* Douvillé*, Discocyclina tenuis* Douvillé (Plate 3). The bioclasts are caught in a mud cement of two generations: the first generation is a more or less isopachous crust of fine crystals, and the second is a cloudy brown micrite cement;

- biomicrites with *Nummulites gallensis* Heim, *Discocyclina roberti* Douvillé*, Discocyclina douvillei* Schlumberger*,* calcispheres, small planctonic globigerinaceans. The matrix is micritic, the sparry calcite filling the Nummulites tests (cells, proloculus, intrasertal rooms). Together with the bioclasts a series of allogenous minerals appear (plagioclase

feldspar polysynthetically twinned, quartz as rounded granoclasts) and authigenic minerals (glauconite). The last one can be found in a high percentage. It can be found as rounded grains of various sizes, some of them with a brown-black alteration edge. The presence of the glauconite shows a slow sedimentation rate in a marine environment with shallow and cold waters.

CONCLUSION

The limestone pebbles from the rudits levels of the Gura Şoimului Formation are biomicrites with foramonifera (Plate 4), calcispheres etc. The large Foraminifera among which *Nummulites gallensis* Heim, *Nummulites heimi* Rozlozsnik (Plate 2) and *Discocyclina roberti* Douvillé indicate the age: Middle Eocene (Lutetian). The thin section analyses show that there are also Cretaceous and Paleocene taxa, probably reworked. The limestones with large Foraminifera resulted from the mainland as patches developed on the predominating green rocks.

REFERENCES

Grasu, C., Catana, C., Grinea, D. 1988, Flişul carpatic. Petrografie şi consideraţii economice*, Ed. Tehnică*, Bucureşti.

Humă I. 1971, Studiul geologic al zonei de fliş paleogen dintre valea Bistriței şi valea Iapa, *Rezumatul tezei de doctorat*, Universitatea Bucureşti.

Ionesi, L., Grasu, C. 1976, Prezența unității Vrancea între Suha Mare şi Nemțişor (Carpații Orientali), *Anuarul Muzeului de Ştiințe Naturale, seria geologie-geografie*, III, p.127-136, Piatra Neamț.

Ionesi, L., Bogatu, L. 1986, Contribuţii asupra litostratigrafiei şi biostratigrafiei Formațiunii de Gura Şoimului din Semifereastra Bistrița*, Anuarul Muzeului de Ştiințe Naturale, seria geologie-geografie*, V (1980-1982), p. 91-104, Piatra Neamț.

Ionesi, L., Grasu, C., Popescu, L. 1994, Olistolitele din Formațiunea de Gura Şoimului*, Studii şi Cercetări de Geologie*, 39, p. 59-69, Bucureşti.

Popescu, L. 1996-1997, Quelques considerations concernant la formation de Gura Şoimului de la demi-fenetre de la Bistrița, *Analele ştiințifice ale Universității "Al.I.Cuza"*, IIb, XLII-XLIII, p.297-302, Iaşi.

Stoica, C. 1953, Stratele de Gura Şoimului - Tazlău, Revista Universității "C.I.Parhon" şi Politehnicii Bucureşti, *Ştiințe Naturale,* 2, p.171-176, Bucureşti

PLATES

PLATE I

1-*Discocyclina douvillei* Schlumberger (Cuejdiu brook); 2-4 *Discocyclina* sp. (Cuejdiu brook, 3-Sulfurosu brook, 4-Gruiul brook), 5-*Discocyclina* sp., *Nummulites* sp. (Sulfurosu brook); 6-*Discocyclina* cf. *douvillei* Schlumberger (Bejenia brook); 7-*Rotalia* sp. (Cuejdiu brook); 8-*Rotalia* cf. *hensoni* Smouth (Gruiul brook)(x20).

PLATE II

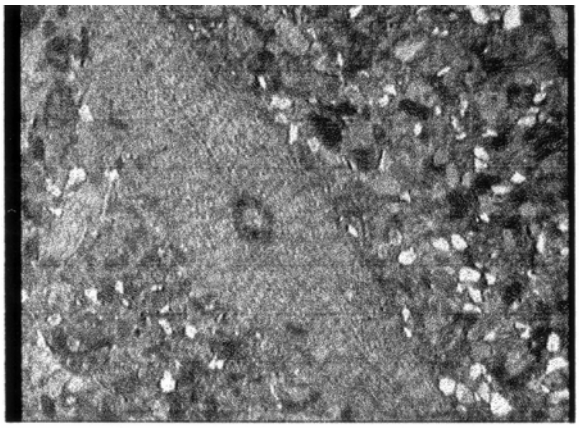
9-*Rotalia* sp., *Nummulites* sp. (Cuejdiu brook); 10, 12, 13-*Nummulites* sp. (10-Bejenia brook, 12-Argintăria brook, 13-Cuejdiu brook); 11-*Nummulites* cf. *galensis* Heim (Bejenia brook); 14-*Nummulites heimi* Rozlaznik (Cuejdiu brook); 15-*Nummulites* cf. *pernotus* Schaub (Argintăria brook); 16-*Nummulites* cf. *pernotus* Schaub and a crinoid plate in *Discocyclina* biomicritic limestone (Carpen brook)(x20).

PLATE III

17-Biopelsparitic limestone with a *Lagenide* bioclast (Sulfurosu brook)(x50); 18-*Textularia* sp. in biosparitic limestone (Sulfurosu brook); 19-Verneulinide bioclast (?*Gaudryna*) in biosparitic limestone (Argintăria brook); 20-Miliolid, in biosparitic limestone (Cuejdiu brook); 21-*Rotalia* sp. in biomicritic limestone (Sulfurosu brook); 22-*Anomalia* sp. and *Discocyclina* bioclasts in biosparitic limestone (Cuejdiu brook); 23-Foraminifera in biopelsparitic limestone (Cuejdiu brook); 24-Transversal sections through evolute tests of Foraminifera (Gruiul brook)(x20).

PLATE IV

25-*Triloculina* sp. in sparitic limestone (Piatra lui Bălan brook)(x50); 26-*Cibicides* sp. (*cf. Cibicides* ex. gr. *lobatus*) in biomicritic limestones (Argintăria brook); 27-*Globigerina* sp. and lagenids fragments in microrudite (Hugin brook); 28-Vernneulides in biosparitic limestone (Argintăria brook); 29-*Globigerina* sp. (cf. *Globigerina triloculinoides* Plummer) in biopelmicritic limestone (Gruiul brook); 30-Foraminifera in biosparitic limestone (Argintăria brook); 31-*Lagenidae* and *Discocyclina* sp. in biopelmicritic limestone (Sulfurosu brook); 32-Incertae sedis (Carpen brook)(x20).



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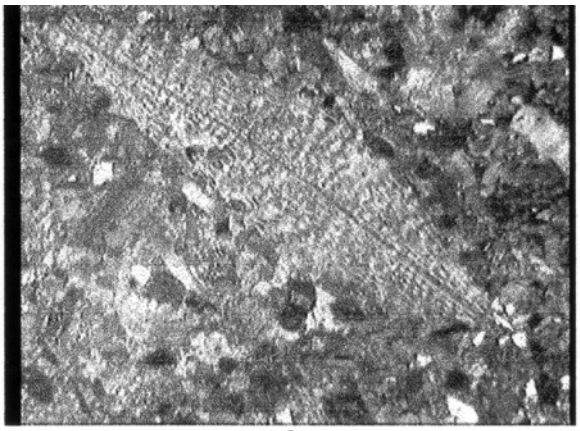

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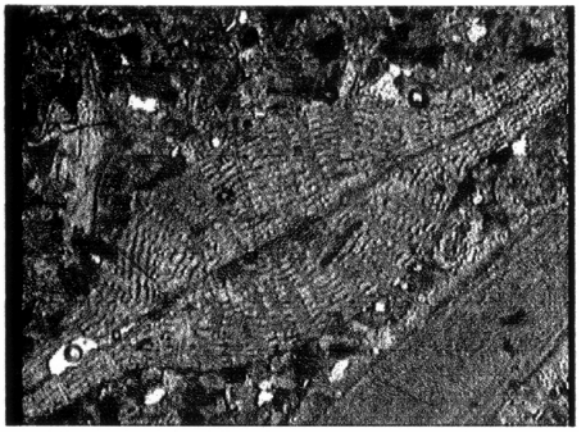

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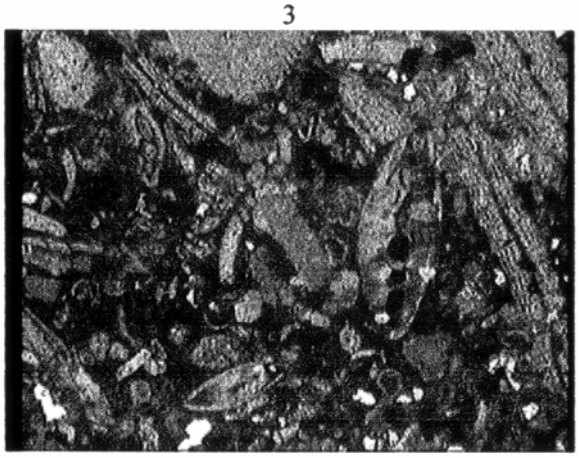

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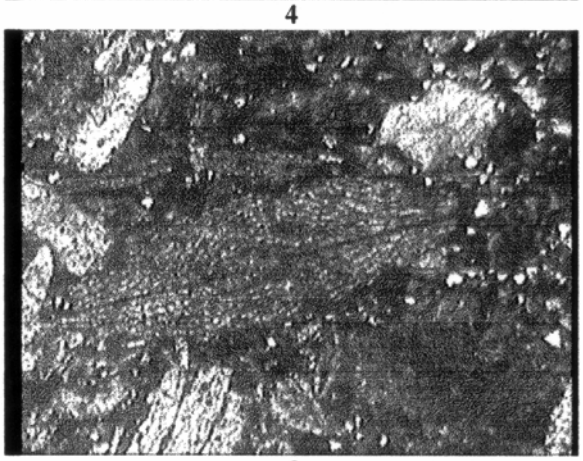

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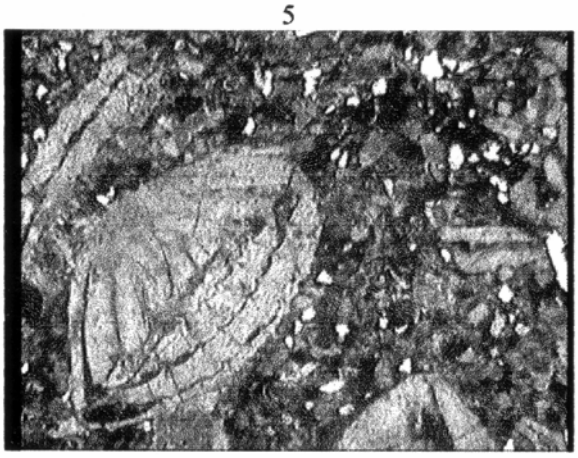

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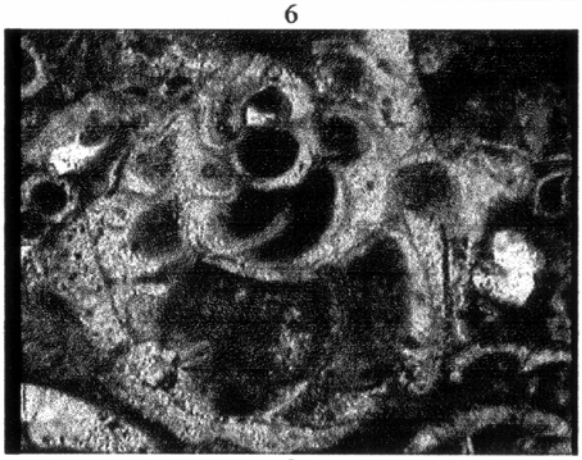

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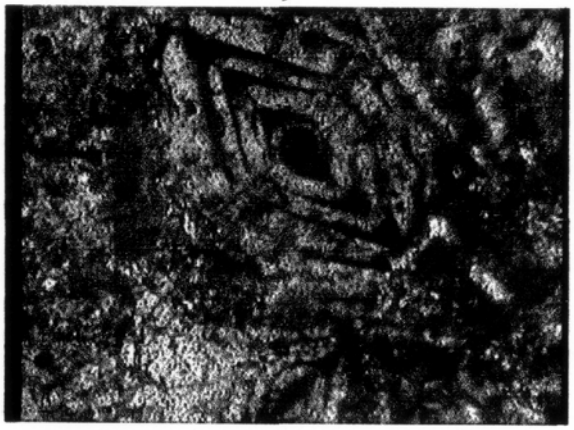

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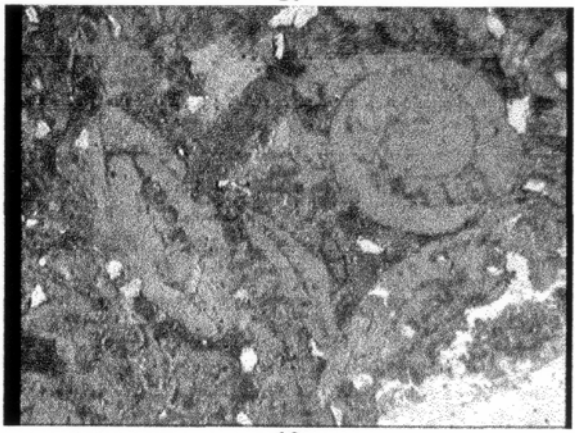

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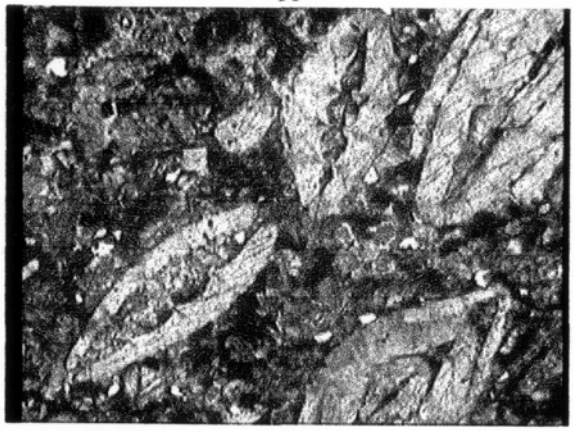

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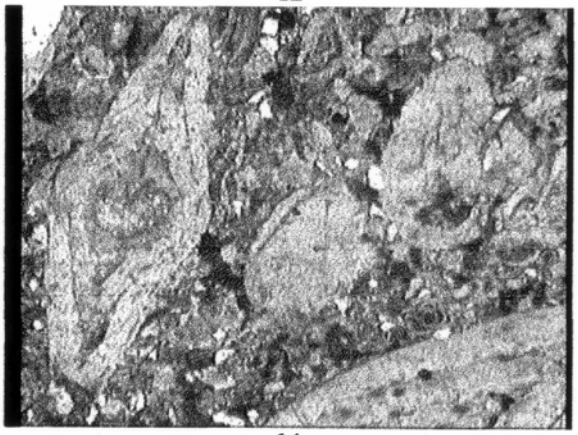

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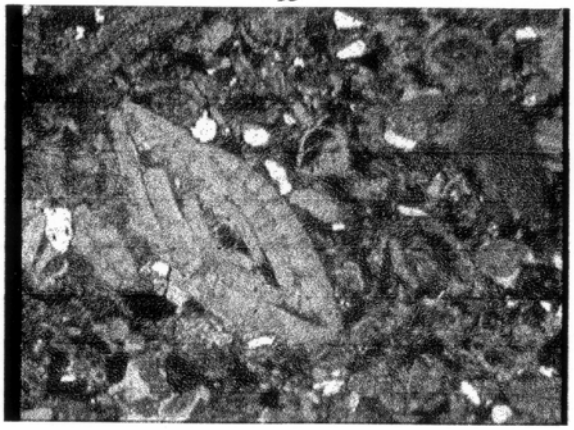

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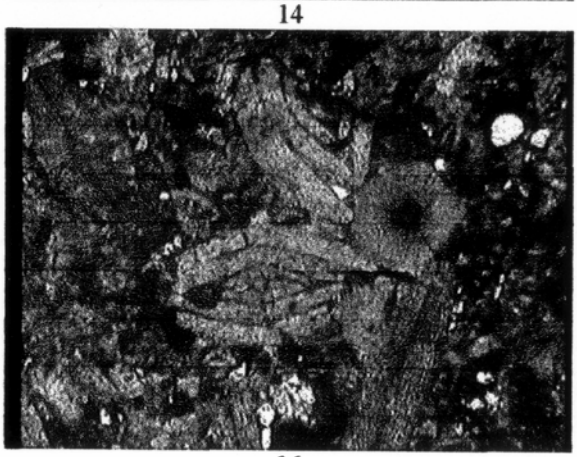

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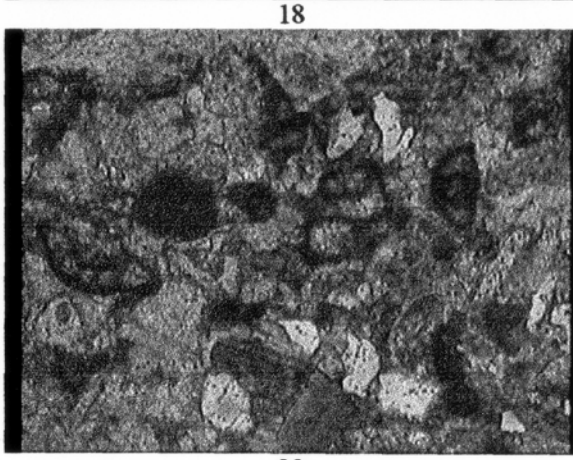

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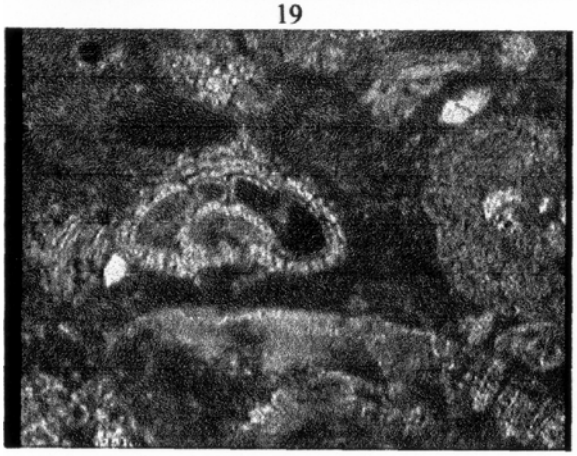

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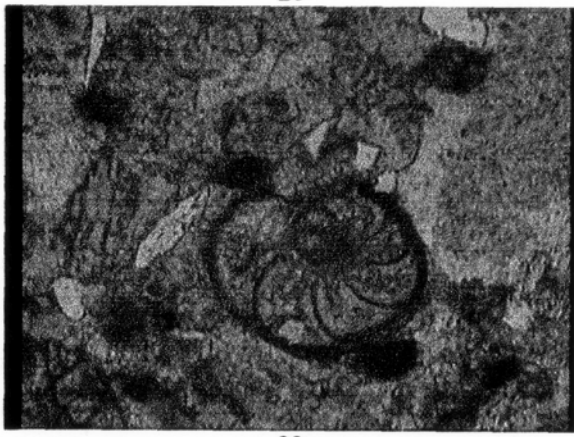

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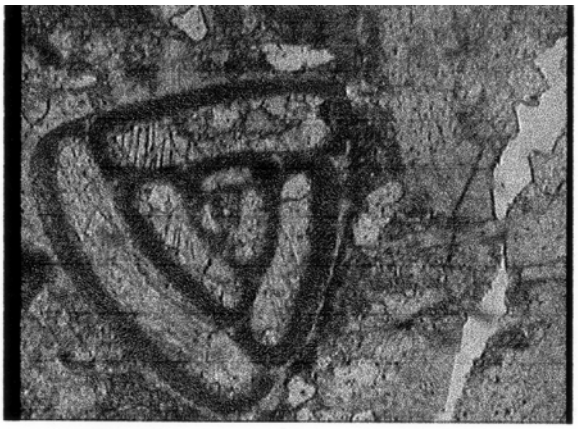

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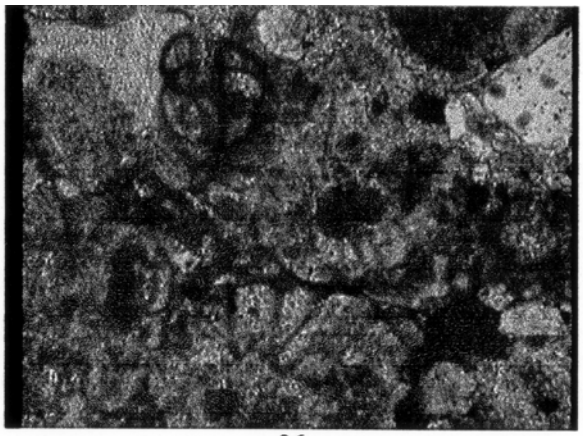

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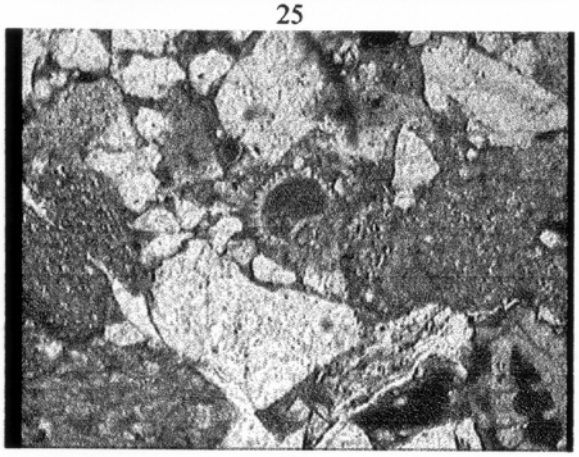

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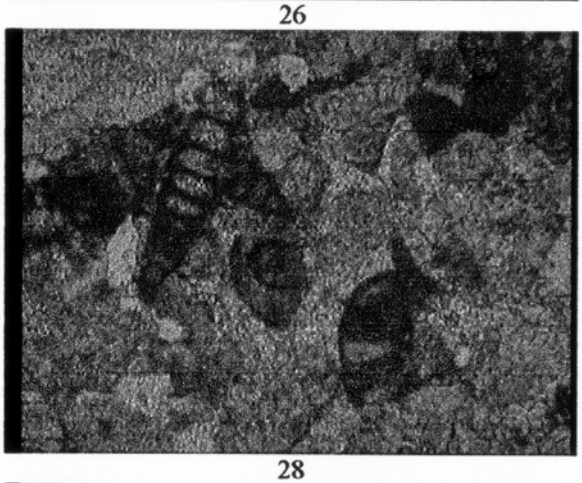

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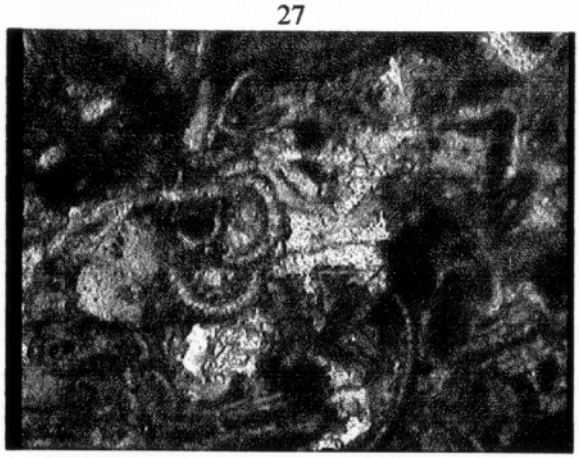

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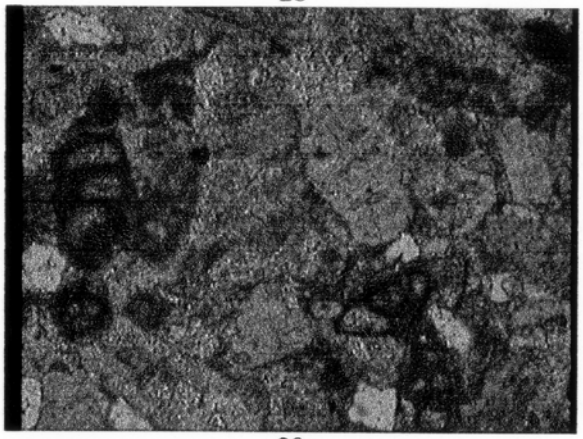

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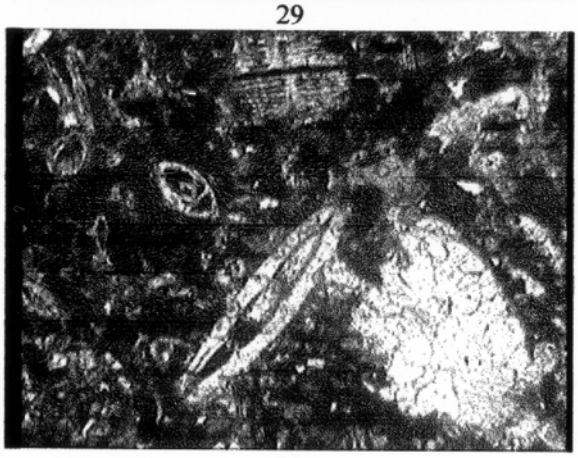

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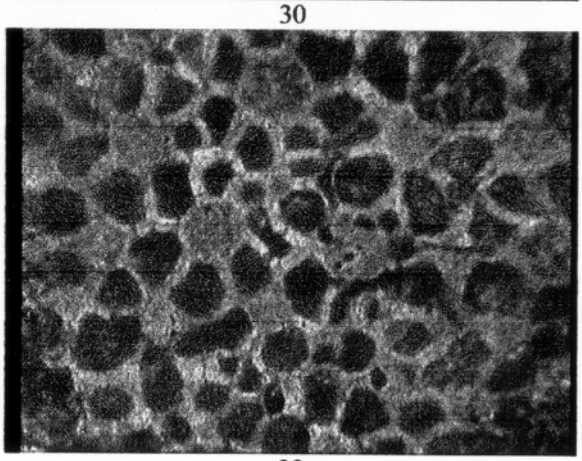

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