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BELGIAN MICROPALEONTOLOGICAL LIMITS

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CHIEF MICROPALEONTOLOGICAL LIMITS IN THE BELGIAN UPPER - DEVONIAN.

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INTRODUCTION

The Guidebook of the International Symposium on belgian micropaleontological limits from Emsian to Visean, Namur 1974, defines during the Upper Devonian time span, 32 micropaleontological guide marks (mgm), as shown in nearly 40 sections.

Especially in the Famennian, these limits are mainly based on one of the four micropaleontological groups as conodonts, foraminifers, spores or ostracods. However, the relationships between these fossil groups and the containing sediments are different. In this way, Upper Devonian ostracods are described from nearly 50 sections belonging to the Dinant and Namur basins (MATERN, 1929; LETHIERS 1970-1974; BECKER 1971-1973; BECKER & BLESS (1971-1974; BECKER, BLESS, STREEL & THOREZ 1974).

Nonetheless, the attempts to come to an ostracode zonation for the Upper Devonian of Belgium have failed thus far. This is due to the fact that the ostracode distribution appears to have been influenced to a considerable degree by facies. This becomes especially apparent from the Upper Frasnian onwards. Therefore, the zonations proposed by LETHIERS (1974) and BECKER & BLESS (1974) have only local value.

For the purpose of establishing of widely international stratigraphical correlations, it is thus excluded to insist on guide marks based on ostracods in the same way as on those based upon conodont faunas which have a world wide distribution, and a well known often phylogenetic succession.

It is the aim of this paper to emphasize the most important mgm's available today (1974), useful for international correlations and based upon the most suitable reference sections.

The authors wish to thank the members of the Upper Devonian section of the National Belgian Committee of Stratigraphy for their constructive criticism when discussing part of this paper, which however cannot be considered by any means as an official publication of this Committee.

CHIEF MICROPALEONTOLOGICAL LIMITS.

(1)- LOWER PART OF THE FRASNIAN :

there are two possible boundaries based on conodonts near the top of the "Calcaire de Givet" (Givet Limestone) (ERRERA, MAMET & SARTENAER 1972) ⁎

(A)- Limit at the base of the Ancyrodella rotundiloba biozone.

In Belgium, A. rotundiloba starts with the subspecies A. rotundiloba binodosa It could be defined in the Fromelennes section in a sequence consisting or rather homogeneous nodular limestone, enclosing large brachiopods, characteristic of the "Zone des Monstres" of Gosselet (1869). It could be drawed at the first appearance of A. rotundiloba, first species of the Ancyrodella genus, at bed 8 in a succession of 12 conodont-bearing samples over 3 meters. More than 300 conodonts were recovered from the beds just below the first Ancyrodellids (Guidebook, Namur, exc. F1, 1974 : mgm 17/18).

As a result of the homogeneity of the facies and the total amount of conodonts, this limit may be considered as well established. It may also be recognized as well in other sections of the Frasnes-Givet type area (MOURAVIEFF 1970).

Spathognathodus insitus, a possible precursor of Ancyrodella rotundiloba, is not yet recorded from this region. A fairly rich level, containing more than 60 specimens occurs in Ny (COEN & COEN-AUBERT 1971 and Guidebook Namur, exc. E10, 1974). This species is more evenly distributed in Ave et Auffe (Wellin), (personal communication of P. BULTYNCK and Guidebook Namur, exc. E6, 1974) but in both cases, these levels are covered by at least 10 to 15 meters of sediments without conodonts.

The first appearance of Ancyrodella corresponds to the base of the Lower asymmetricus Zone sensu Ziegler (1971).

This limit is widely utilized in many regions of North America (KLAPPER, SANDBERG et. al. 1971, p. 301; UYENO 1974) and in Australia (GLENISTER & KLAPPER, 1966).

⁎ The exact definition of this lithostratigraphical boundary (top of the Fromelennes Formation) is still under discussion within the National Belgian Committee on Devonian Stratigraphy.

It is situated in the lower part of the Manticoceras Stufe (do I α, ZIEGLER 1971), as recently discussed by MOURAVIEFF & BOUCKAERT (1973).

(B)- A limit drawn at the transition A. rotundiloba binodosa/A. rotundiloba rotundiloba, as proposed by COEN (1973, p. 243), has a better phylogenetical support. See Guidebook Namur : exc. E6 (Ave et Auffe) and E10 (Ny); mgm 18/19. Almost at the same level, we find a limit between the Polyzygia beckmanni and P. neodevonica ostracod faunas, one of the rare limits based on ostracods that appear to be free from diachronism throughout the Dinant and Namur basins and the Rhenish basins. Although recognized in other countries too, the subspecies of Ancyrodella rotundiloba are not used in a detailed biozonation. Therefore, the first appearance of A. rotundiloba is still considered to be the most important guide mark.

(2)- MIDDLE AND UPPER PART OF THE FRASNIAN

Limit at the base of the Ancyrognathus triangularis conodont biozone. This species evolved from Ancyrognathus nov. sp. (figured by COEN 1973, plate I : fig. 1, 2, and named Ag. triangularis euglypheus).
The limit is defined in a section along the entrance road to the Lion quarry near Frasnes, in a sequence of nodular limestones and shales, rich in conodonts (Guidebook Namur, exc. F4, 1974 : mgm 21/22). It is drawn at the first appearance of Ancyrognathus triangularis in bed 158. The abundancy of conodonts above and below this limit, in a homogeneous lithological facies, guarantees its precision.
This limit is also recognized in some other Belgian sections (e.g. in Neuville : Guidebook Namur, exc. F6, 1974) Ag. triangularis is well known in the whole worls, particularly in North America (KLAPPER, SANDBERT et al., 1971, fig. 3). It is situated in the middle part (doI β or γ) of the Manticoceras Stufe (doI γ, ZIEGLER, 1971).
COEN (1973) stated that this fauna only corresponds to the upper part of the Ag. triangularis Zone of ZIEGLER (1971). This problem is still under study. However the appearance of the first Ancyrognathus is rather indistinct, while the lower limit of the typical Ag. triangularis is easily discernible and retained here.

Two other Frasnian limits based on conodonts and respectively situated above and below the limit just mentioned, were proposed by MOURAVIEFF (1970) and COEN (1973).

(a)- The first appearance of Ancyrodella gigas, in phylogenetical relation to A. rotundiloba. This guide is occurring more frequently in the Belgian basins than Palmatolepis punctata (and than Palmatolepis in general), and thus more suitable for the recognition of the presumed equivalent of the Middle asymmetricus Zone of ZIEGLER. This is in agreement with the American authors usage (KLAPPER, SANDBERG et al. 1971).
However, it will not be utilized as major limit because of the still remaining problems regarding the details in the filiation between A. rotundiloba and A. gigas (see herefore the Durbuy-section, Guidebook, Namur, exc. I9, 1974 : mgm 19/20).

(b)- The first appearance of Ancyrognathus asymmetricus, phylogenetically related to Ag. triangularis, which, in Germany, marks the base of the Upper gigas Zone, at the transition do I γ - do I δ.
This has been observed in the road section by passing Mariembourg, in the new railroad cut of Neuville (Guidebook, Namur, exc F 58, F 6, 1974, mgm : 22/23), and also but less precisely, in the Vesdre area (COEN-AUBERT 1971 & 1974) and at Barvaux.
A limit based on the appearance of A. triangularis is prefered anyway, as the last one is not so far removed from the former.

(3)- THE FRASNIAN - FAMENNIAN TRANSITION :

Limit at the base of Palmatolepis triangularis Biozone. Palmatolepis triangularis is a conodont which possibly evolved from P. subrecta.
This limit is well exposed in the railroadcut at Hony, south of Liège; within a sequence of shales with nodules and bedded limestones rich in conodonts (BOUCKAERT, MOURAVIEFF et al. 1972). P. triangularis appears at bed 48bis, where it is the only representative of the genus (25 observed specimens); this bed occurs higher than different conodont levels belonging to the Upper gigas Zone of ZIEGLER (1962), with Ancyrodella curvata and Ancyrognathus asymmetricus (Guidebook, Namur, exc. I6, 1974 : mgm 23/24) x

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x Note the correction in the paper by BOUCKAERT, MOURAVIEFF et al. (1972) at the foot of page 88 and at the top of the text on page 90 : "The presence of P. triangularis WITHOUT A. cryptus NOR A. asymmetricus allows us to ..."

This limit can be traced in many sections in Eastern Belgium (Sinsin, Noiseux, Barvaux, Shignesse, Guidebook Namur, exc. I, 1974). Generally, this limit is very sharp cutting and the Lower triangularis Zone very short or absent (Noiseux). The quantitative results may testify for a decrease in sedimentation around this limit, where the shaly intercalations may account for important gaps in the observation of conodonts. Similarly, this limit cannot be recognized in the classical Frasnes-Senzeilles area, where the lack of limestones at this specific level prevents the observation of a good conodont succession. A quantitative palynological analysis in the classical section of Senzeilles, placed this limit between the point of appearance of the first Pampoecilorhynchus lecomptei brachiopod (SARTENAER, 1960), and the point of appearance of the first conodonts, assigned to the Middle triangularis Zone (BOUCKAERT & ZIEGLER, 1965), somewhat above the classical Frasnian/Famennian boundary of GOSSELET (1877). This limit could be situated in the upper part (do I δ) of the Manticoceras Stufe.

(4)- MIDDLE PART OF THE FAMENNIAN :

Enclosing the Souverain-Pré formation in its type area in Eastern Belgium. Two possibilities for limits based on conodonts are retained (see Guidebook Namur, 1974; mgm 31/32 and 35/36).

(A)- The appearance of Palmatolepis marginifera (see SANDBERG & ZIEGLER, 1972). In the Hamoir-Nord section, a specimen of P. marginifera has been found associated with the earliest forms of P. cf inflexoidea and P. cf. helmsi. The appearance of P. cf. helmsi constitutes a true marker in several sections of the eastern part of the Dinant basin (DREESEN & DUSAR 1975, publication n° 13, Int. Symp. Namur 1974). The lower part of the P. marginifera Zone is characterized in these sections by the persistence of numerous P. rhomboidea. GLENISTER & KLAPPER (1966, p. 815) cited P. helmsi associated with conodonts contained in the P. marginifera Zone, and associated with do II β goniatites. This limit immediately preceeds in the eastern region the first foraminiferal faunas with Septatournayella rauserae.

(B)- A limit at the base of the Scaphignathus velifer biozone. S. velifer is a conodont with a still unproved phylogenetic origin. This limit may be traced at bed 21 of the Hamoir Néblon upper section (DREESEN & DUSAR 1975, publication n° 13, Int. Symp. Namur 1974), within a sequence of

nodular limestone, alternating with shales. S. velifer appears at the base of a sequence riche in Palmatolepis species, such as P. marginifera, P. gr. rugosa, P. distorta and P. perlobata schindewolfi.
This limit is found in all of the French-Belgian basins in different lithological facies. It could be utilized in the whole world and is situated in the lower part (do III α) of the Platyclymenia Stufe.
In the eastern region, this limit occurs between foraminiferal faunas with Septatournayella rauserae (mgm 32) and with Quasiendothyra communis (mgm 39).

(a)- The first appearance of Palmatolepis crepida, phylogenetically related to P. triangularis. However, the sediments in which the transition between these two species takes place, are rather thick and poor in conodonts but, see the Senzeilles section, Guidebook Namur, exc. F7, 1974 : mgm 26/27).

(b)- The first appearance of P. rhomboidea (Guidebook Namur 1974 : mgm 30/31). The base of this zone has been observed in outcrop in the Marche en Famenne area only (BOUCKAERT, STREEL & THOREZ 1968, 1971; BOUCKAERT & THOREAU 1972; BOUCKAERT & HERMAN 1973) and especially at the Aye, Tige de Hogne section (DREESEN & DUSAR 1975/a).
Until present no clear evidence is found in Belgium for the subdivision of the P. rhomboidea Zone, as defined by SANDBERG & ZIEGLER (1973).

Other Famennian limits based on conodonts can be recognized below the already defined ones:

(5)- UPPER PART OF THE FAMENNIAN :

Near the top of the "Psammites du Condroz", two microfossil groups, the foraminifera and the spores take over the command of the conodonts, less frequent at this levels.

(A)- Limit at the base of the Spelaeotriletes lepidophytus biozone.
Spelaeotriletes lepidophytus is a spore with an unknown phylogenetican origin. The limit is traced at bed 94 of the Chanxhe section (Ourthe valley), at the base of a shaly sequence where S. lepidophytus progressively increases in abundance until it constitutes more than 20 % of the spore assemblage. This assemblage consists of about 40 species with a downward extended range. (Guidebook Namur, exc. D6, 1974 : mgm 43/44).
This limit is found in all the French-Belgian basins, in different clastic

sediments, especially in the Avesnois (Guidebook Namur, exc. H2, 1974). It is reported from Ireland, the Oural, and has been used in North America, North Africa and Australia. It is situated in the costatus conodont Zone, probably below the Lower/Middle costatus Zone boundary. As a result, it has to be searched slightly below the base of the Wocklumeria Stufe (do V/VI). In the eastern region, it corresponds to the first development of foraminiferal faunas with Quasiendothyra communis radiata.

(B)- Limit at the base of the Quasiendothyra kobeitusana biozone.
Q. kobeitusana is a foraminifer in phylogenetical connection with Q. communis radiata.
This limit is traced at the base of the limestone bed 135 in the Avesnelles railway cut (France), at 27 m below the "Calcaire d'Etroeungt s.l.", within a shaly sequence containing few limestone beds, the "schistes de l'Epinette" of CONIL (Guidebook Namur, exc. H2, 1974 : mgm 46/47). Perfectly marked in one of the best sequences of Western Europe, this limit can also be recognized in Moravia, in Corsica and in northern Turkey. It is commonly used in the USSR, where the Septaglomospiranella-Quasiendothyra complex is known from Nova Zembla to the Caucasus, till Tian-Chan and the Obi river in Asia.
This limit is situated in the Middle or Upper costatus conodont Zone, corresponding to the Wocklumeria Stufe (Do VI).

CONCLUSIONS

This synthesis of stratigraphical micropaleontology does not consider the problems raising around the definition of the base of the Upper Devonian, or of the base of the Dinantian. It emphasizes only some micropalecntological guide marks available within the concerned time span by revealing the most qualified Belgian (and Northern French) reference sections in the present s state of knowledge (1974).
Fig. 1 outlines all these data showing the most reliable micropaleontological correlations between the selected reference sections.
Based on micropaleontological criteria (essentially on conodonts), the chosen reference sections are arranged without gap in the involved zones from the top of the Givet Limestone to the base of the Etroeungt Limestone.
This does not imply however, that the lithological sequences are necessarily complete or well suited from a lithostratigraphical viewpoint.

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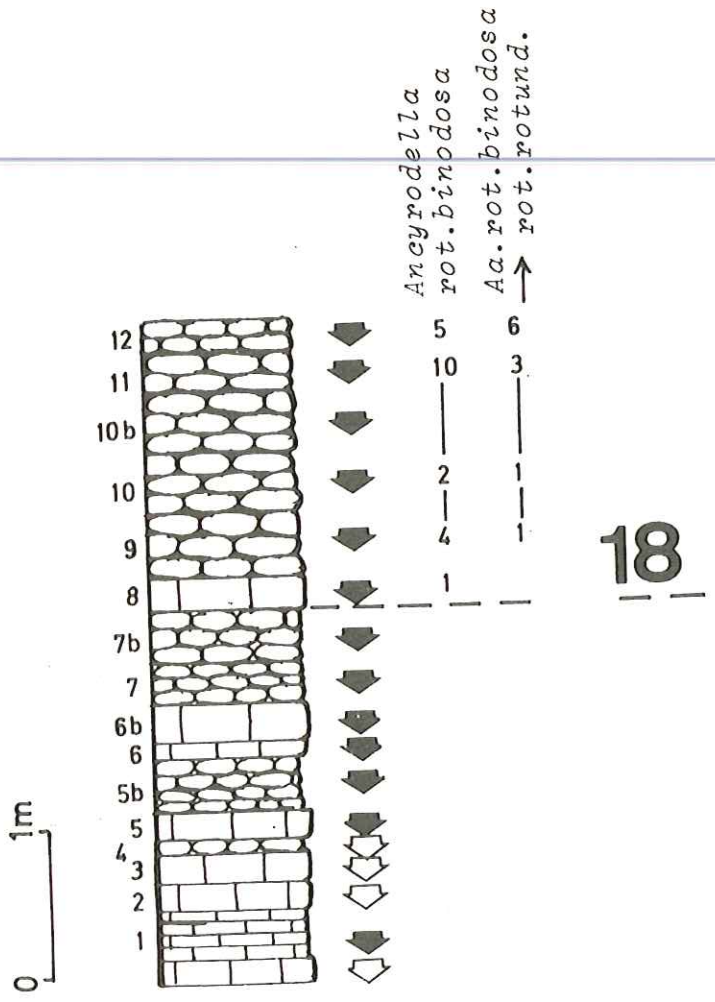
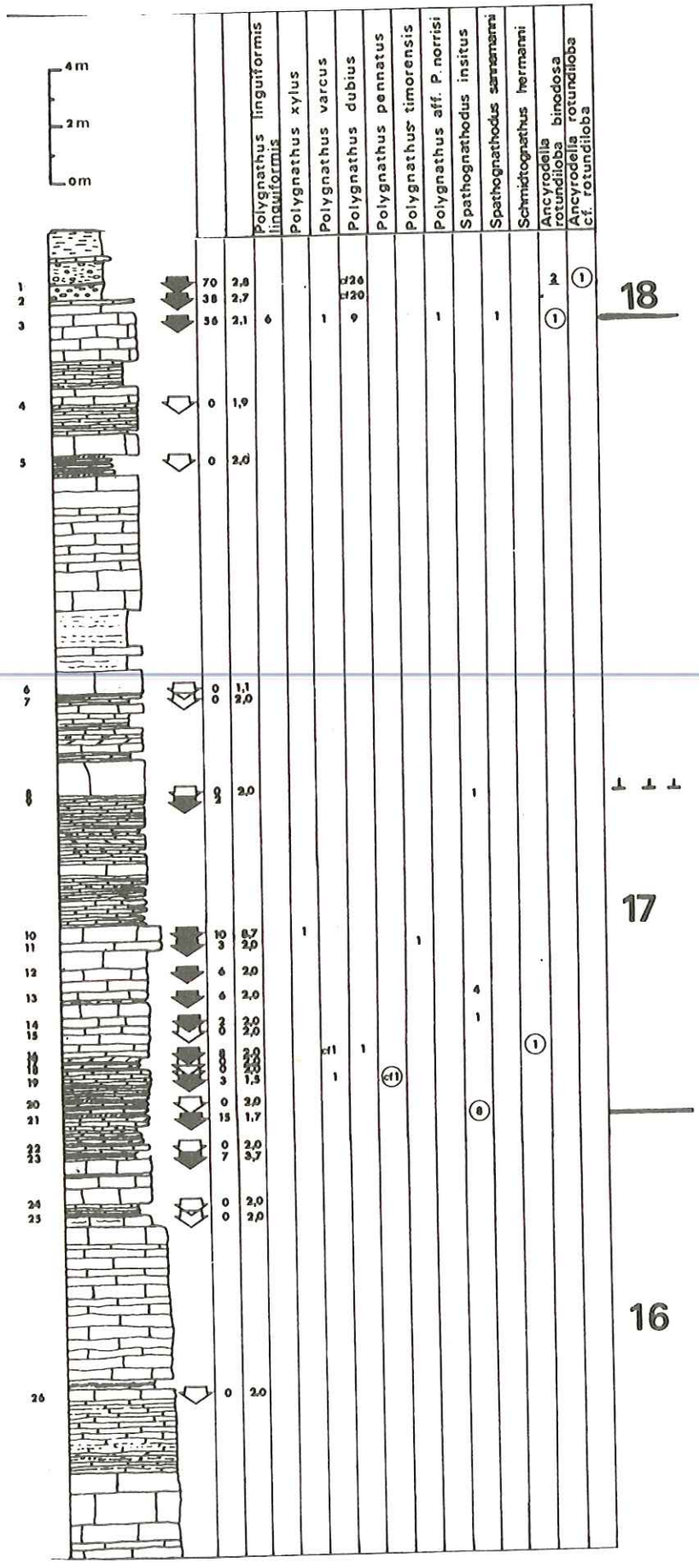
1A

FROMELENNES F①



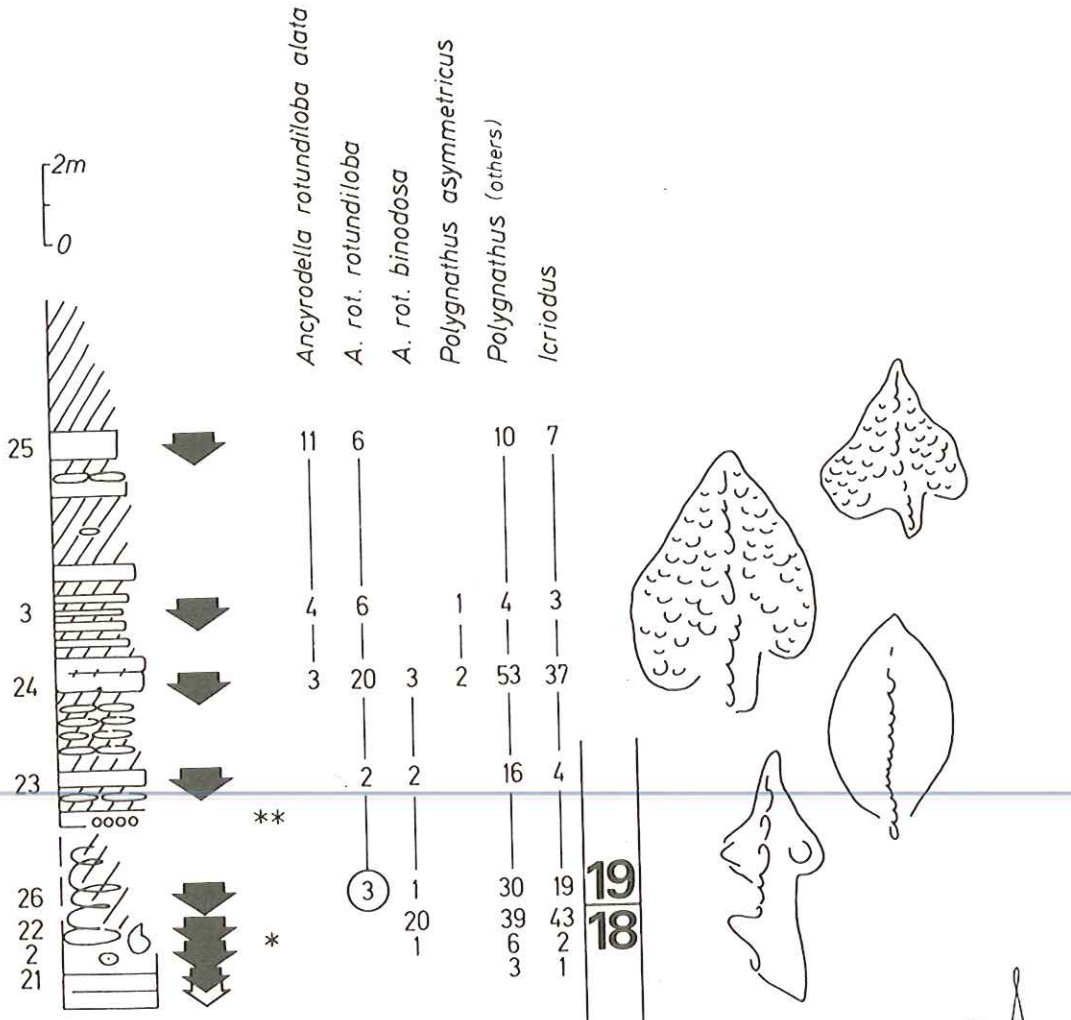
AVE et AUFFE E⑥

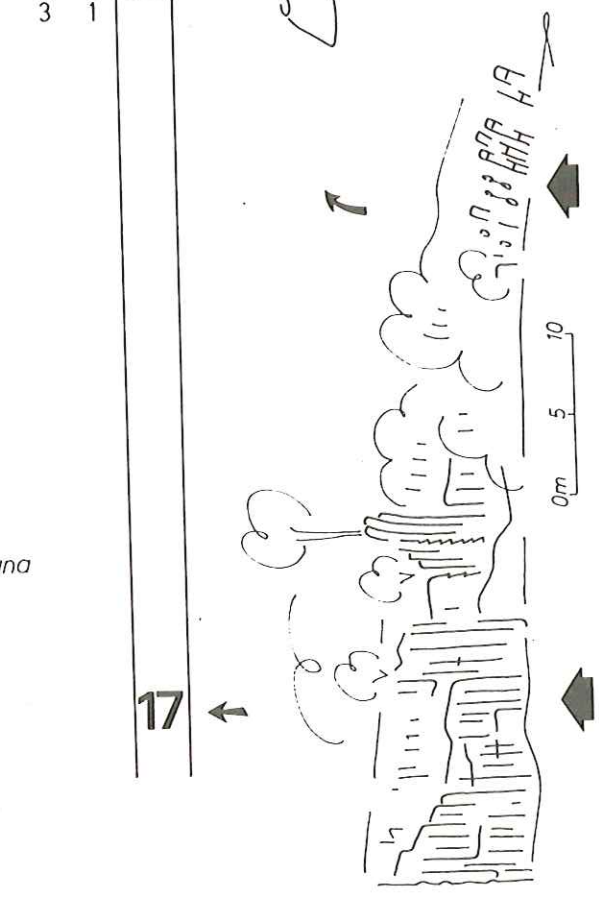
1B



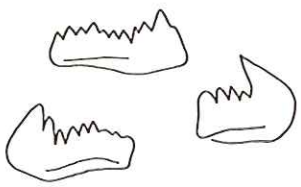
1B

NY E (10)



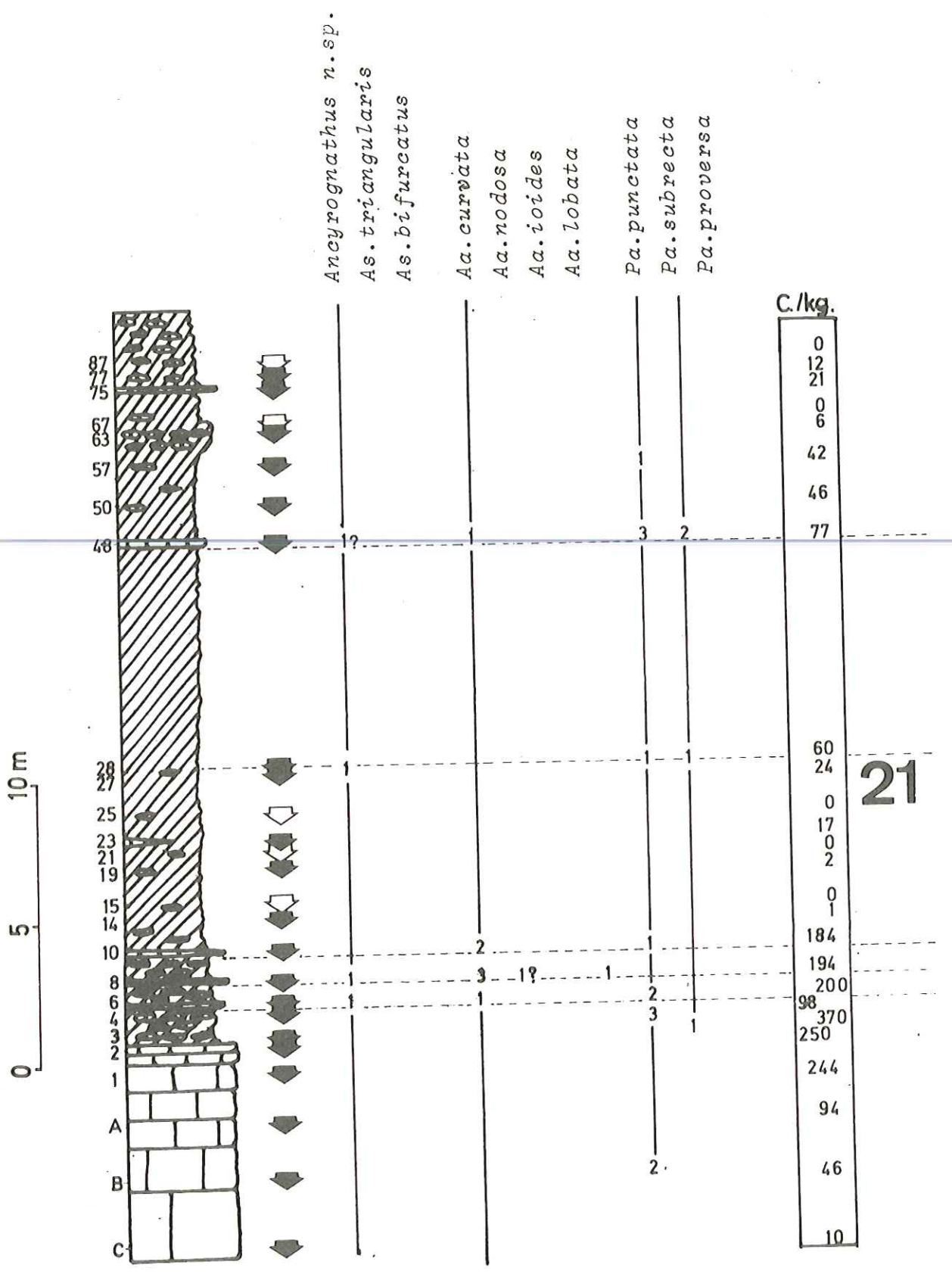


Spathognathodus insitus fauna



more than 60 specimens

FRASNES F④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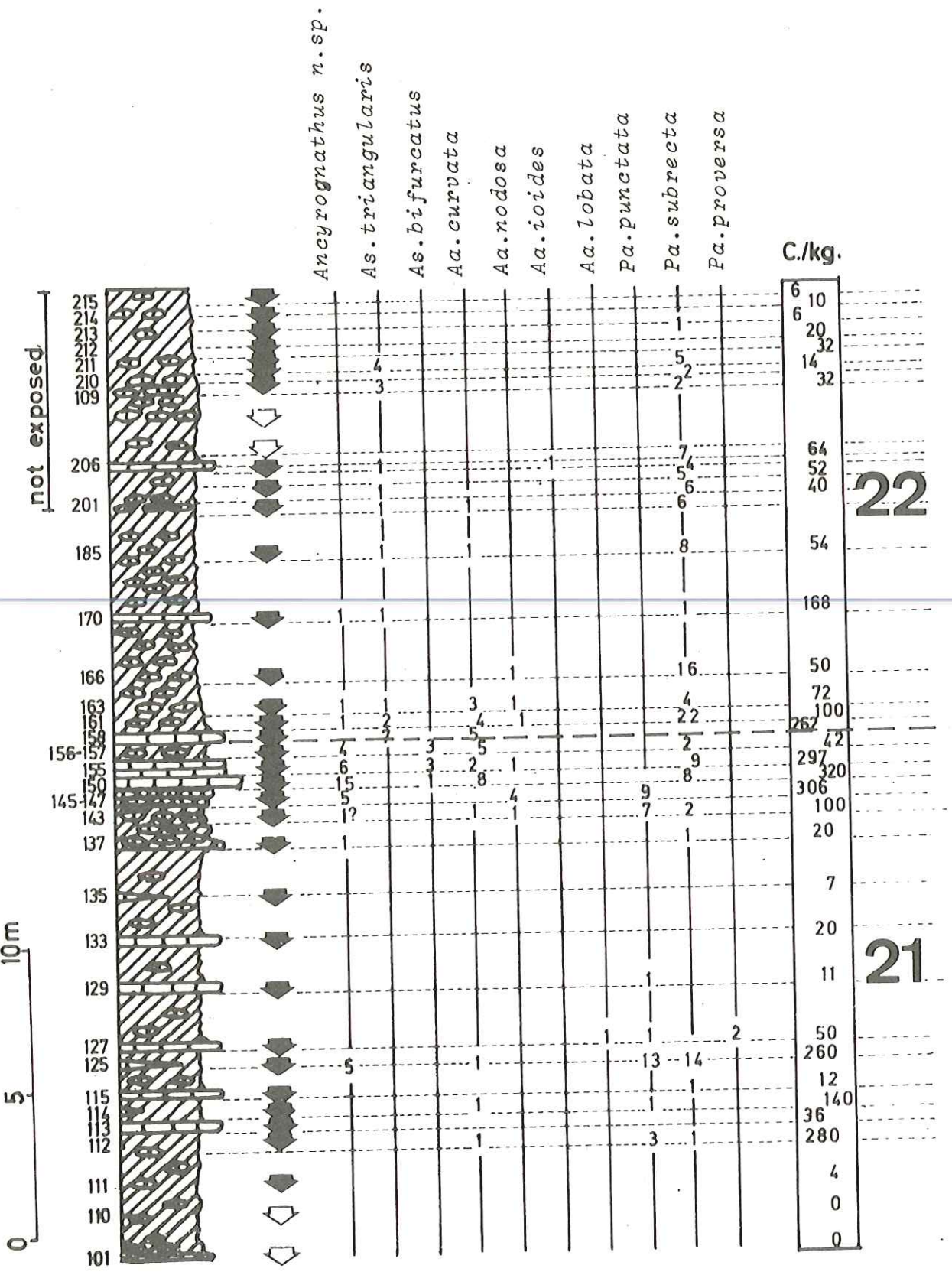
As. triangularis
As. bifurcatus
Aa. curvata
Aa. nodosa
Aa. ioides
Aa. lobata
Pa. punctata
Pa. subrecta
Pa. proversa
C./kg.
0 5 10 m
87 77 75 67 63 57 50 48 28 27 25 23 21 19 15 14 10 8 6 4 3 2 1 A B C
0 12 21 0 6 42 46 77 60 24 0 17 0 2 0 1 184 194 200 98 370 250 244 94 46 10
21

2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As. triangularis
As. bifurcatus
Aa. curvata
Aa. nodosa
Aa. ioides
Aa. lobata
Pa. punctata
Pa. subrecta
Pa. proversa
C./kg.
not exposed
215
214
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212
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210
109
206
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185
170
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163
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10 m
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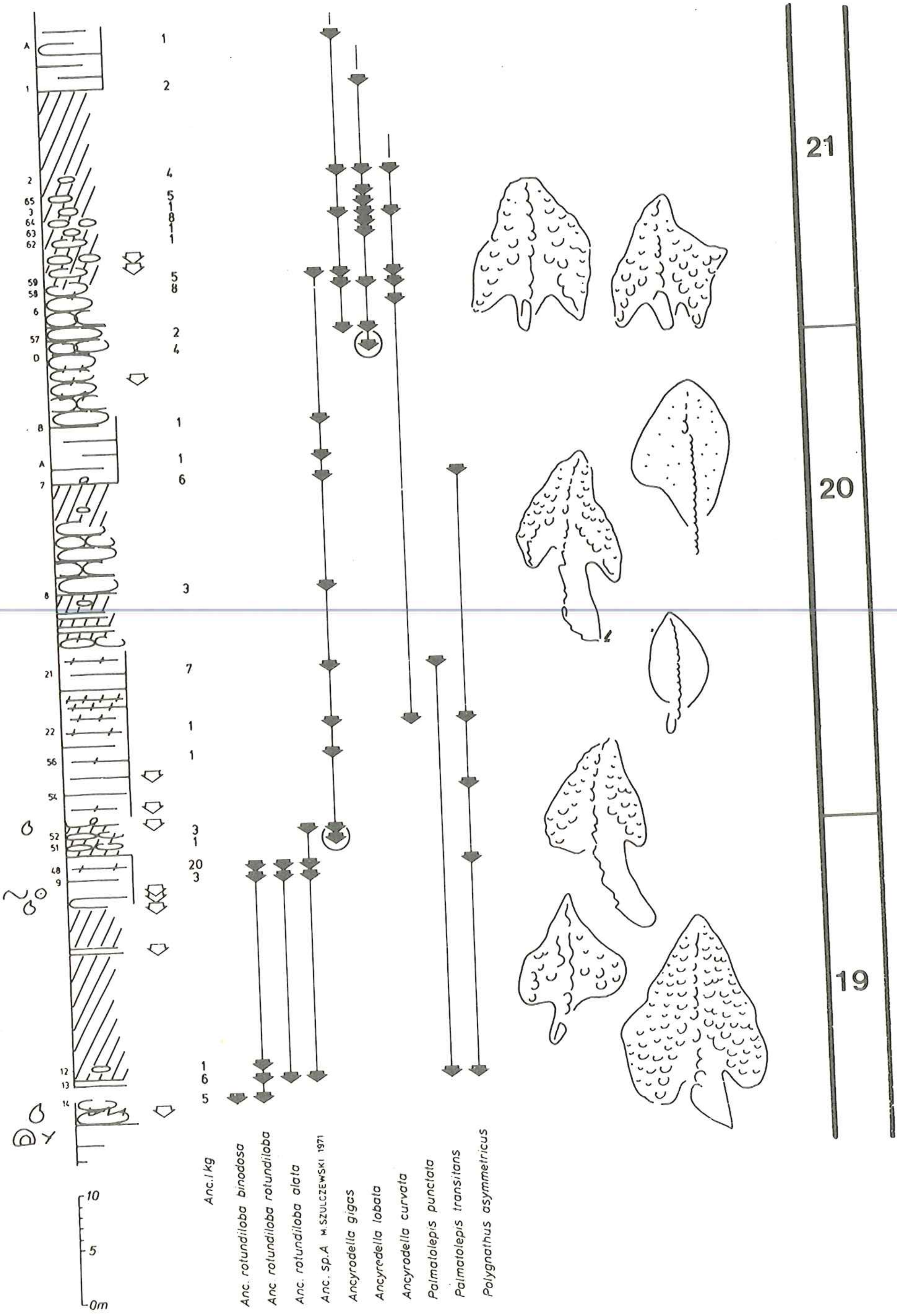
DURBUY

I (9)

2a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Anc./kg
Anc. rotundiloba binodosa
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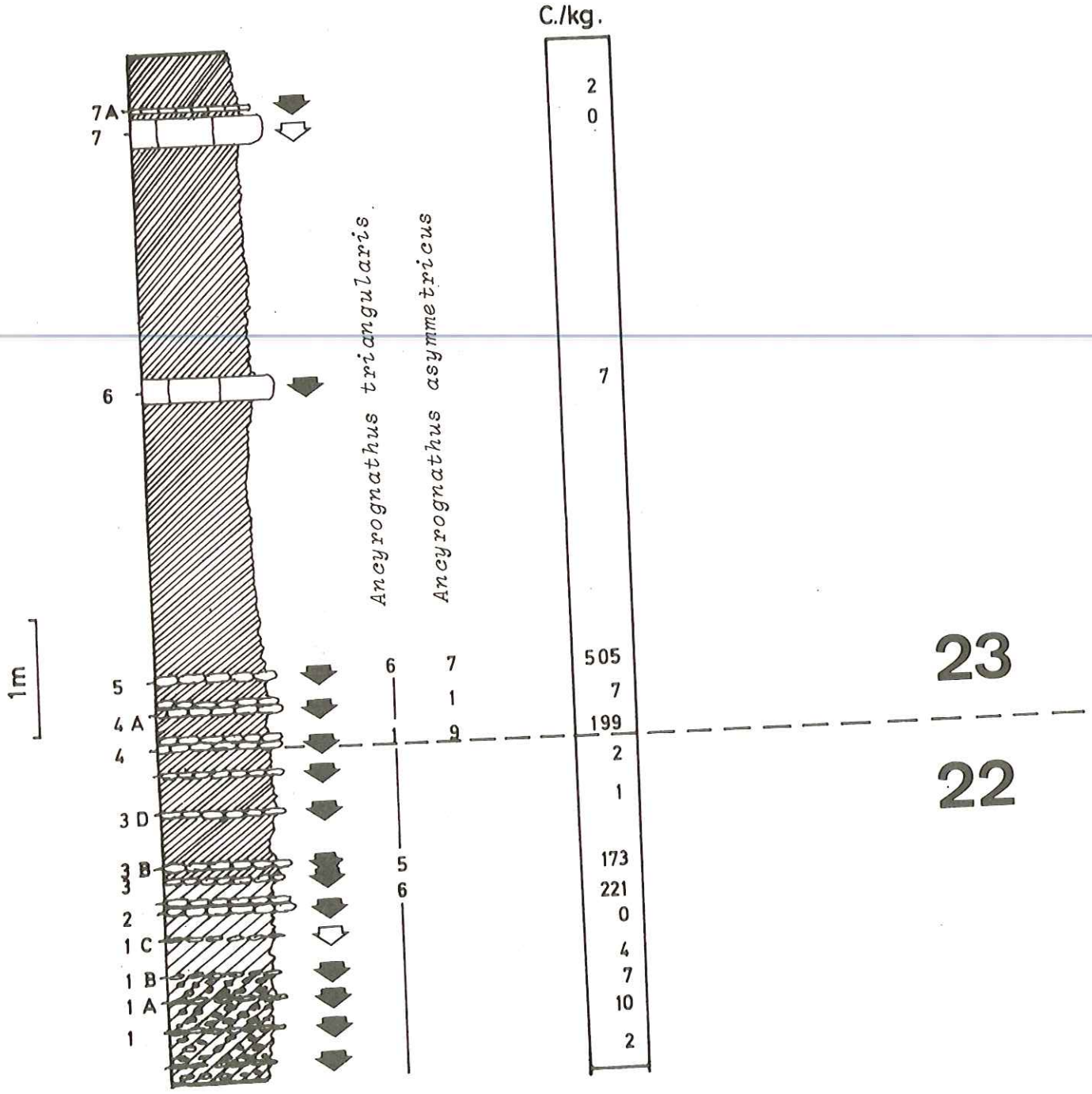
Anc. Sp.A M. SZULCZEWSKI 1971
Ancyrodella gigas
Ancyrodella lobata
Ancyrodella curvata
Palmatolepis punctata
Palmatolepis transitans
Polygnathus asymmetricus
10
5
0m

2b

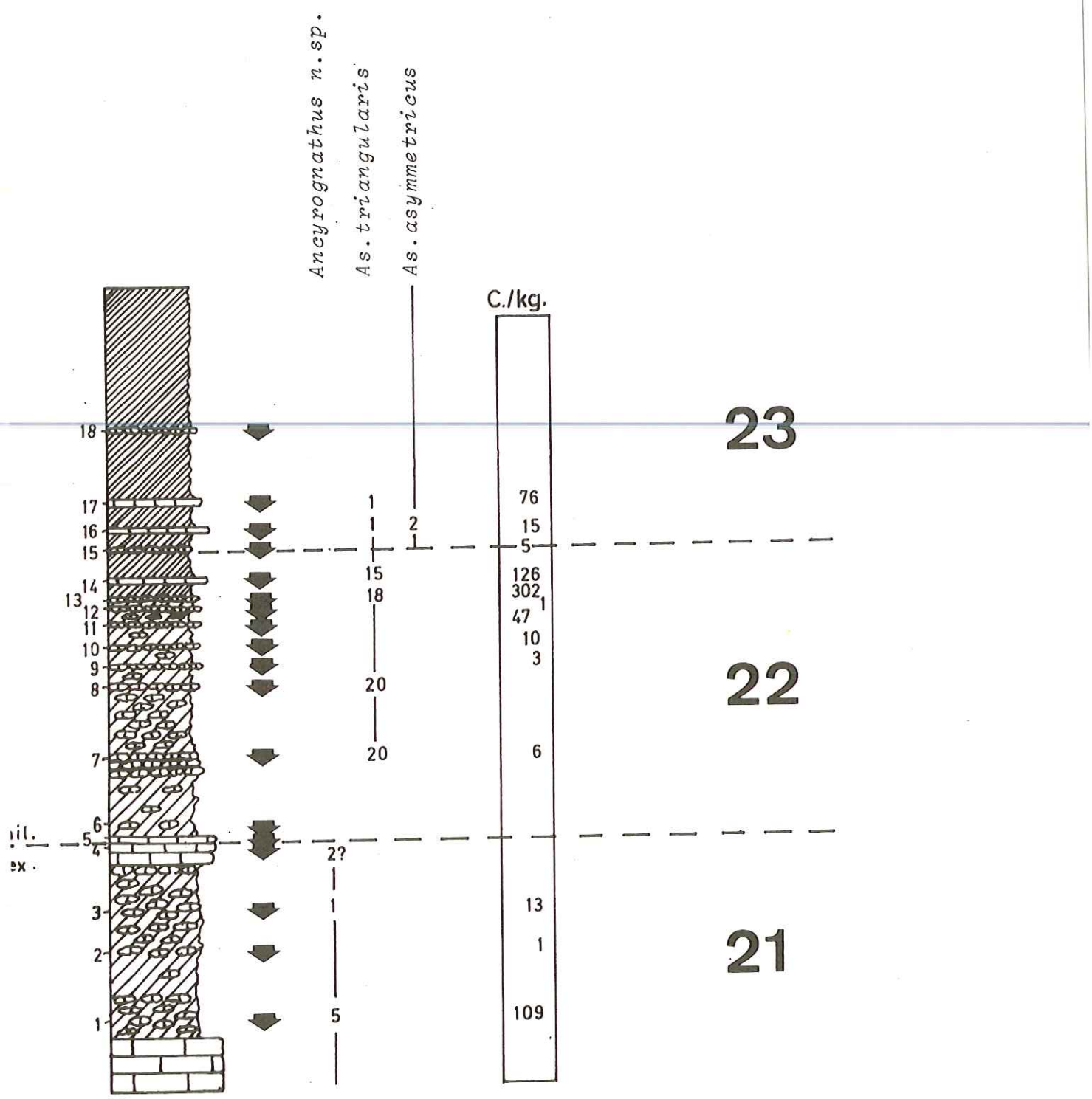
FRASNES

F 5



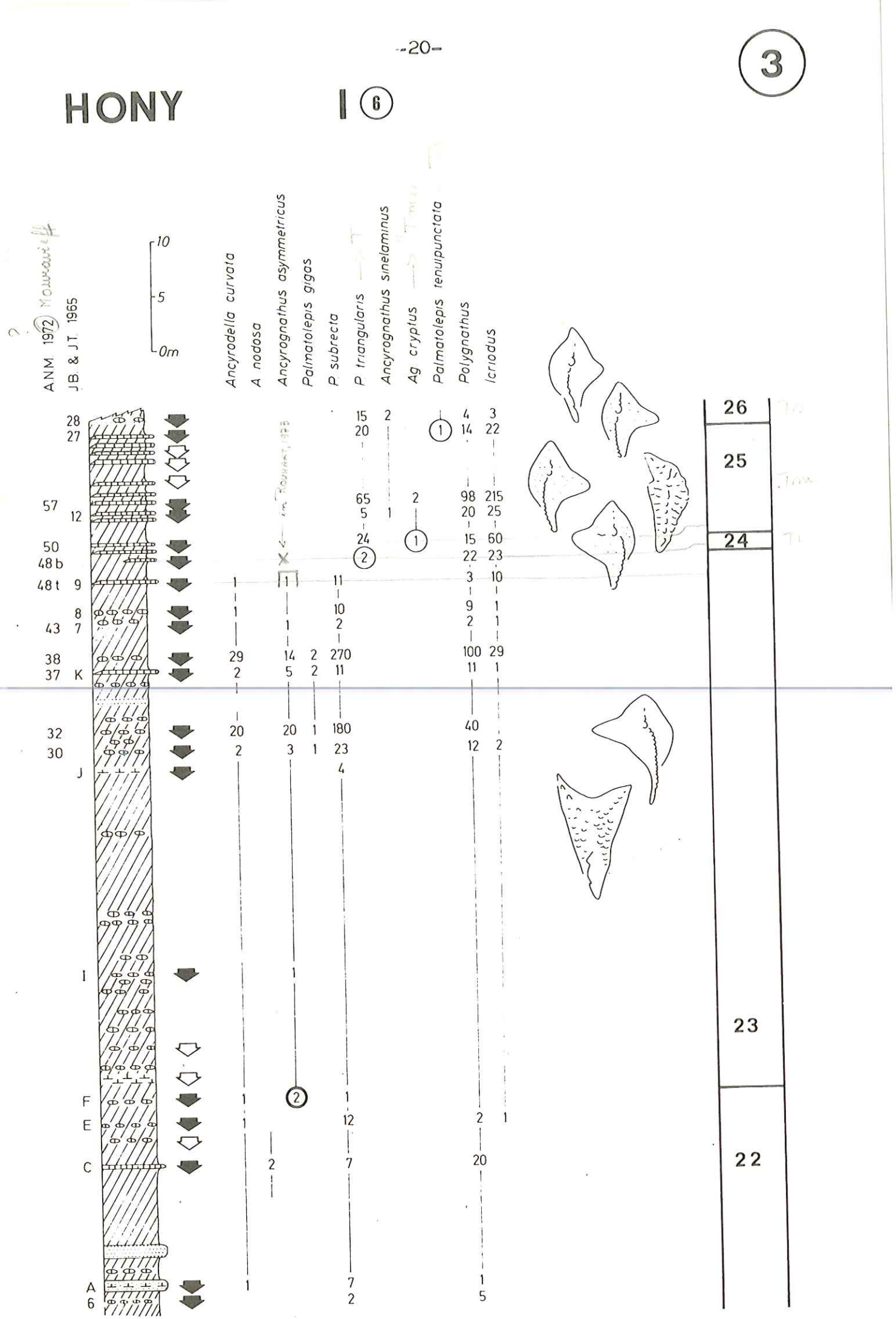
2b

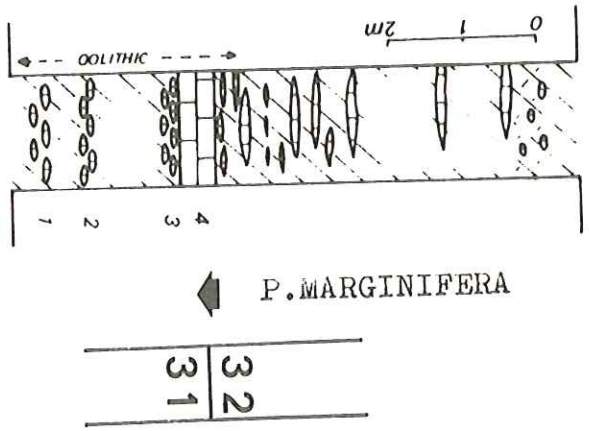
NEUVILLE F⑥



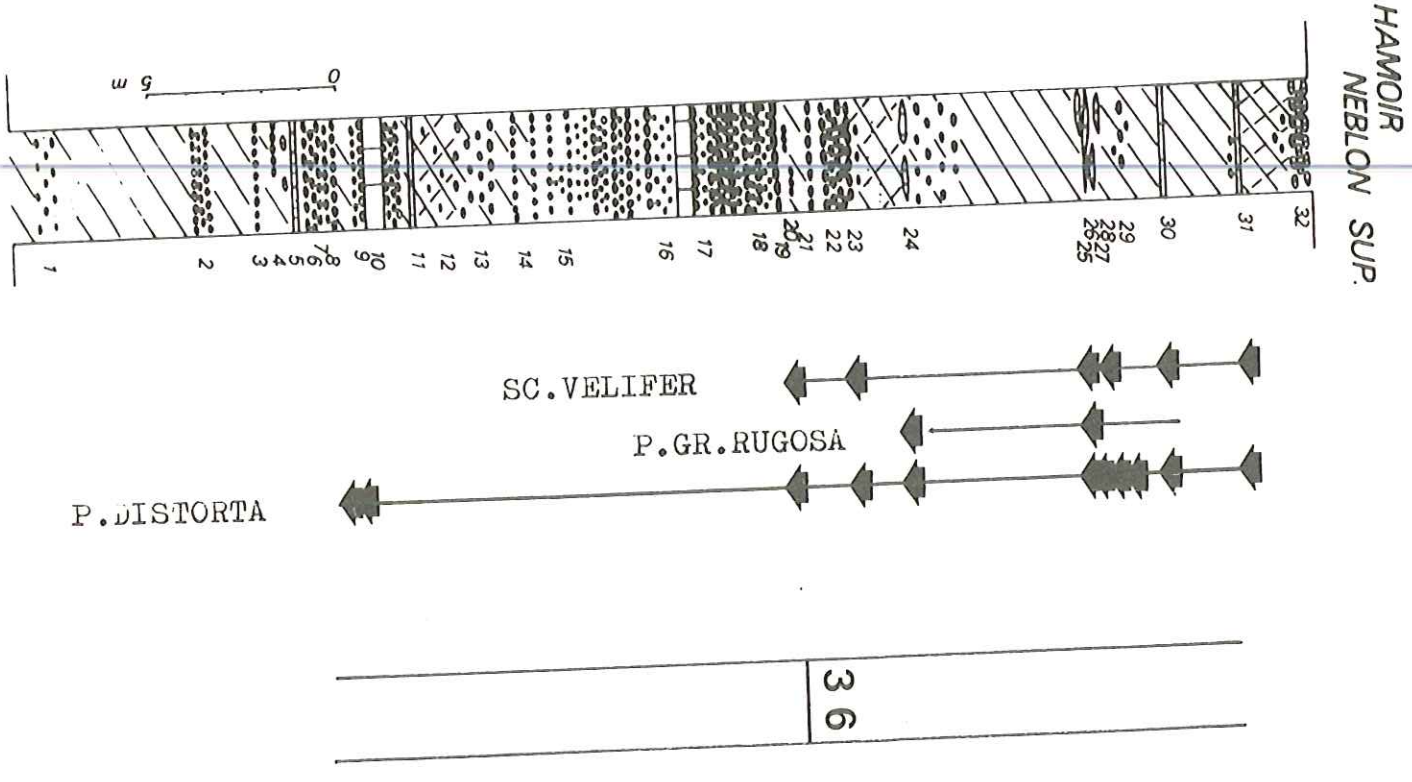
3

HONY I ⑥


ANM 1972
JB. & J.T. 1965
10
5
0m
Ancyrodella curvata
A nodosa
Ancyrognathus asymmetricus
Palmatolepis gigas
P subrecta
P triangularis
Ancyrognathus sinelaminus
Ag cryptus
Palmatolepis tenuipunctata
Polygnathus
Icriodus
28
27
57
12
50
48b
48t
9
8
43
7
38
37
K
32
30
J
I
F
E
C
A
6
26
25
24
23
22

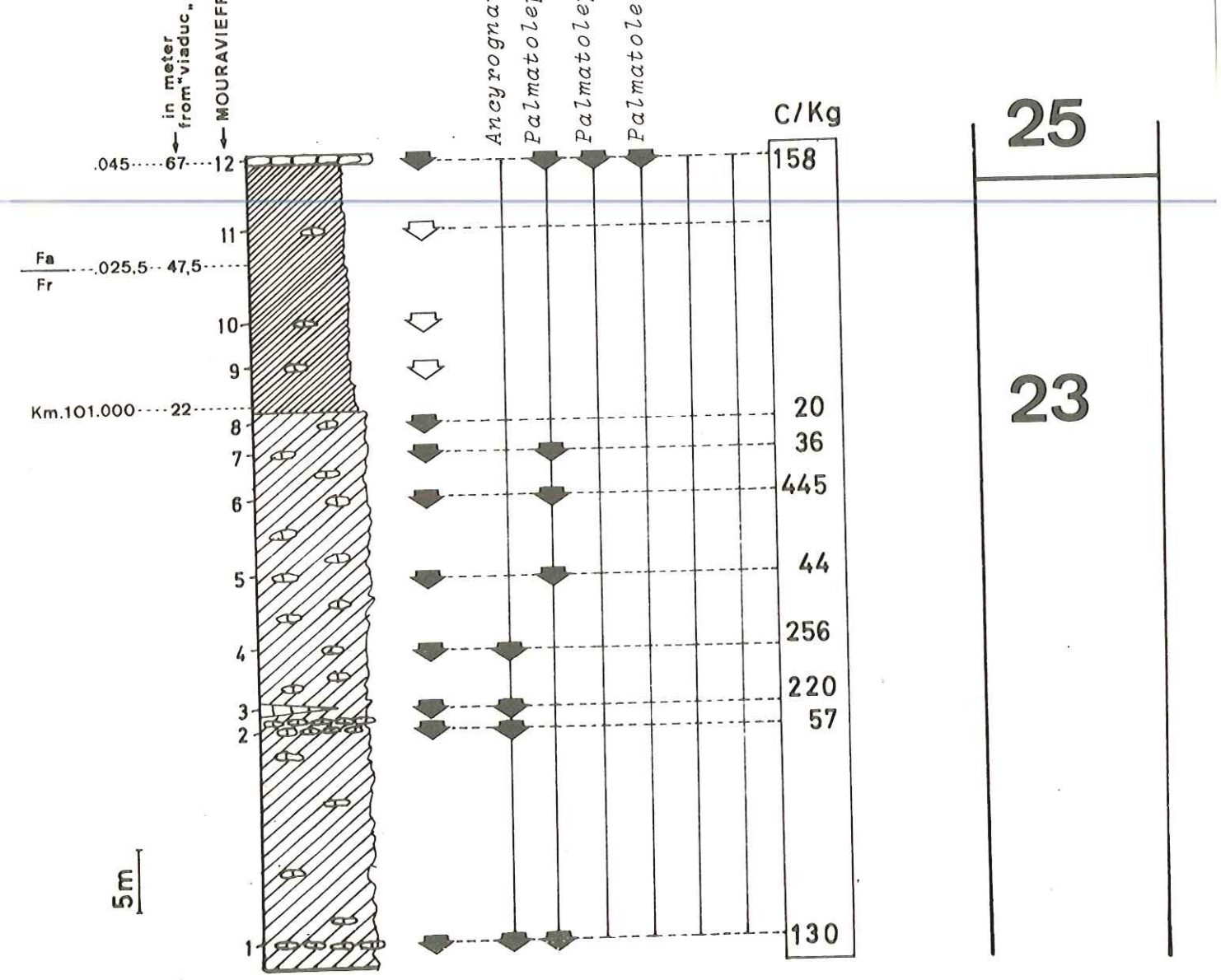

HAMOIR
NORD
0
1
2m
OOLITHIC
1
2
3
4
P.MARGINIFERA
31
32

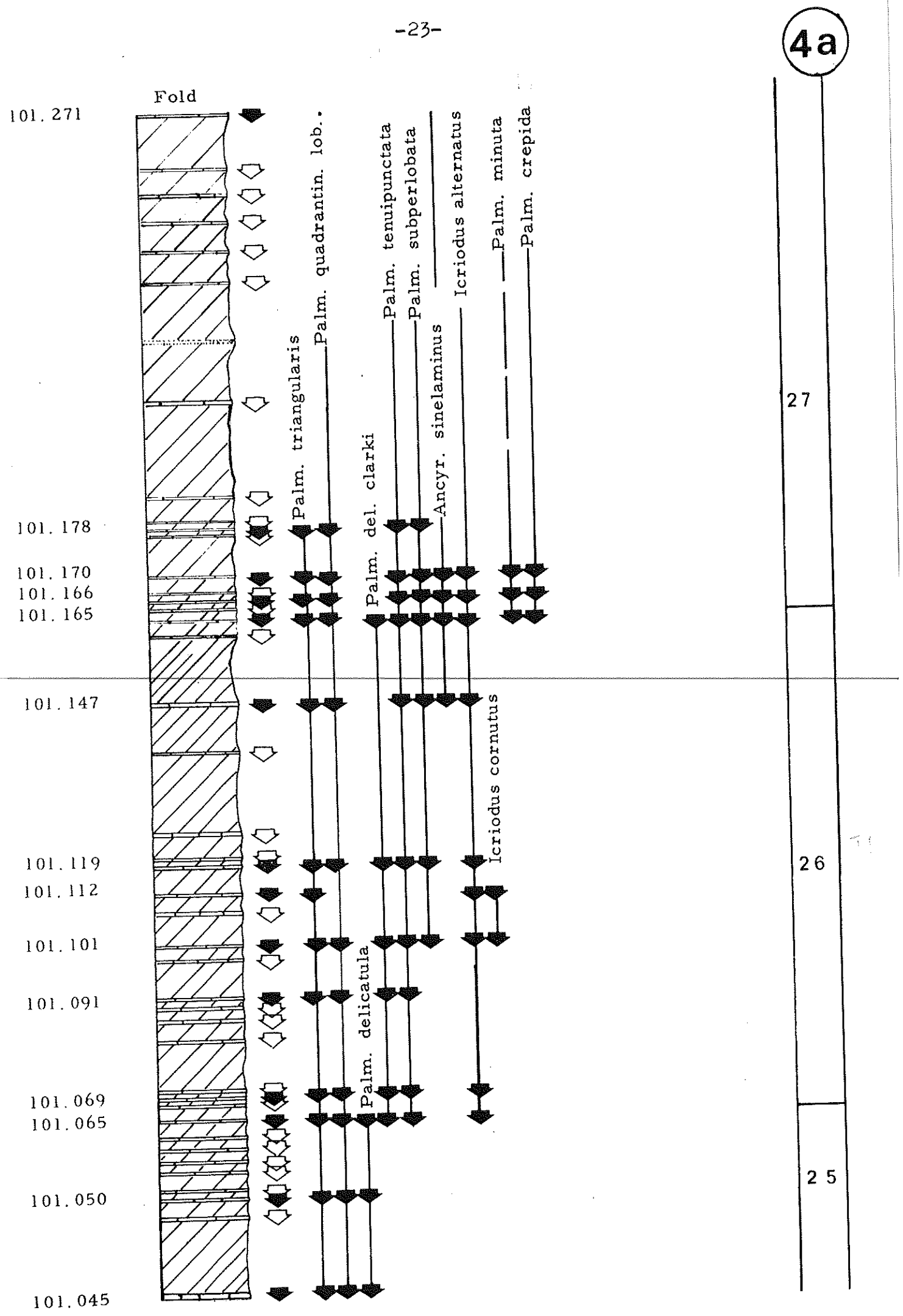
4A

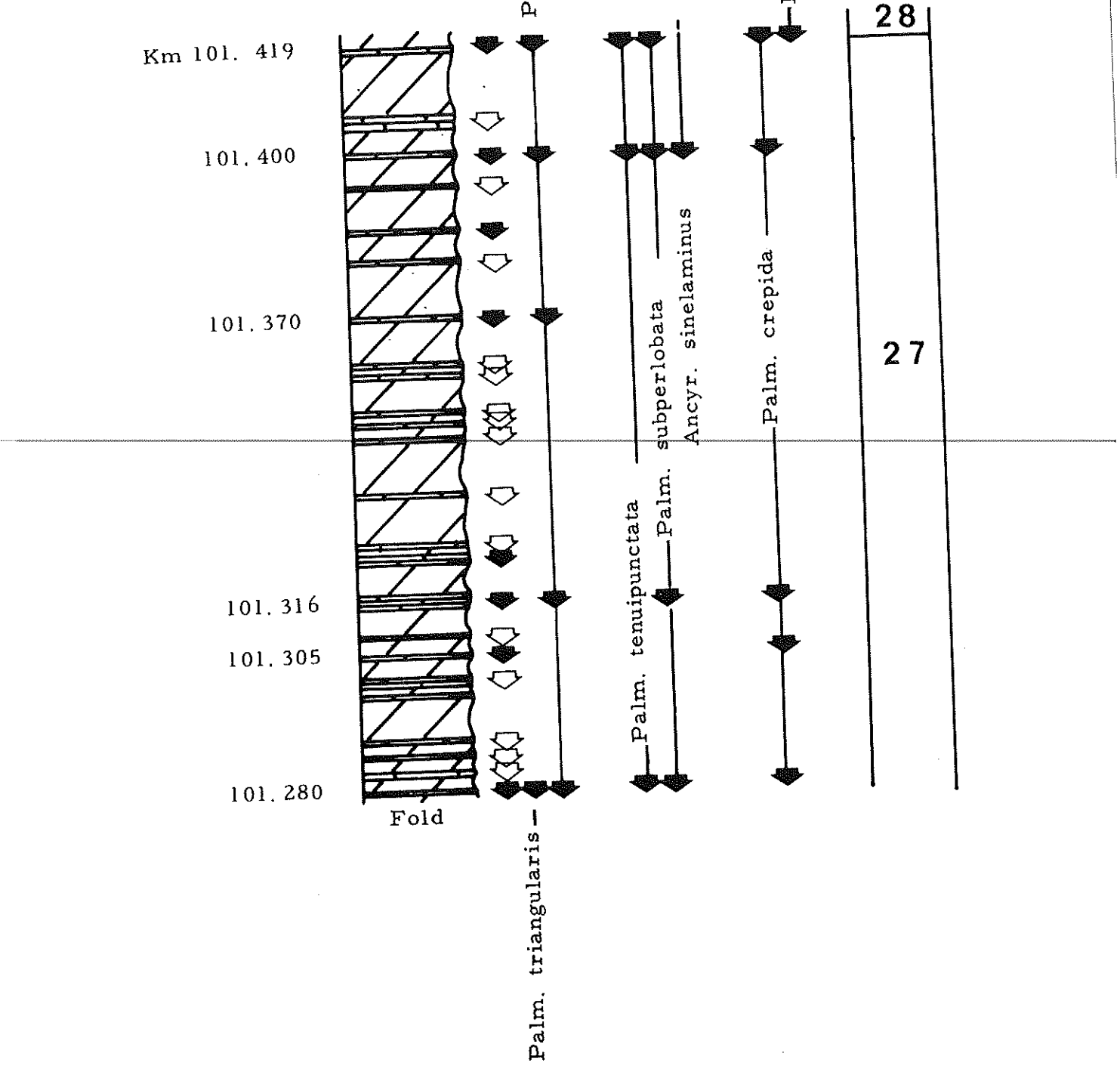

HAMOIR
NEBLON SUP.
0
5 m
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
SC.VELIFER
P.GR.RUGOSA
P.DISTORTA
36

4B

SENZEILLES. F⑦

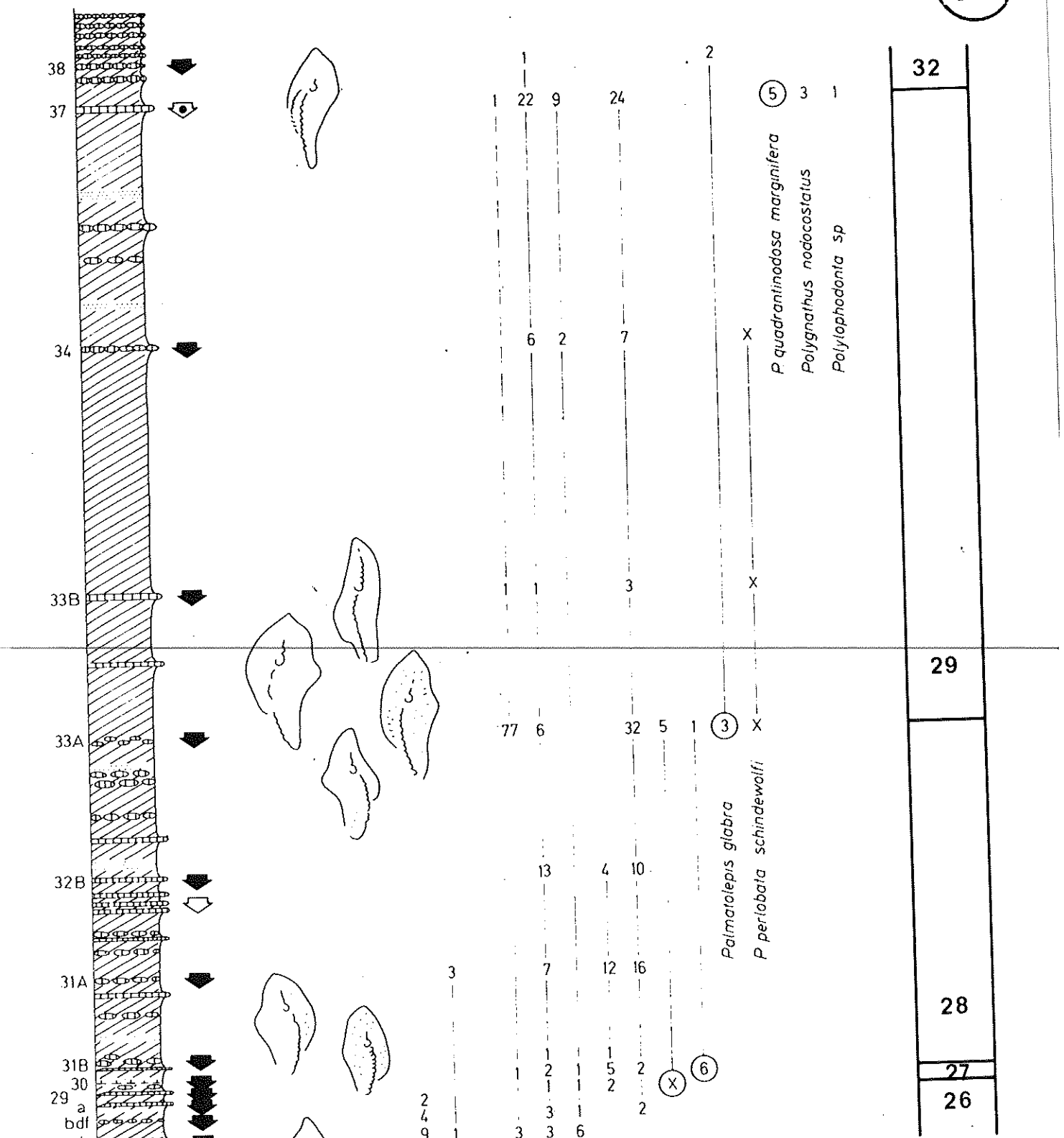



4a
Fold
101.271
101.178
101.170
101.166
101.165
101.147
101.119
101.112
101.101
101.091
101.069
101.065
101.050
101.045
Palm. triangularis
Palm. quadrantin. lob.
Palm. del. clarki
Palm. tenuipunctata
Palm. subperlobata
Ancyr. sinelaminus
Icriodus alternatus
Palm. minuta
Palm. crepida
Icriodus cornutus
Palm. delicatula
27
26
25


Km 101. 419
101. 400
101. 370
101. 316
101. 305
101. 280
Fold
Palm. triangularis
Palm. quadrantin. lob.
Palm. tenuipunctata
Palm. subperlobata
Ancyr. sinelaminus
Palm. crepida
Palm. termini
28
27

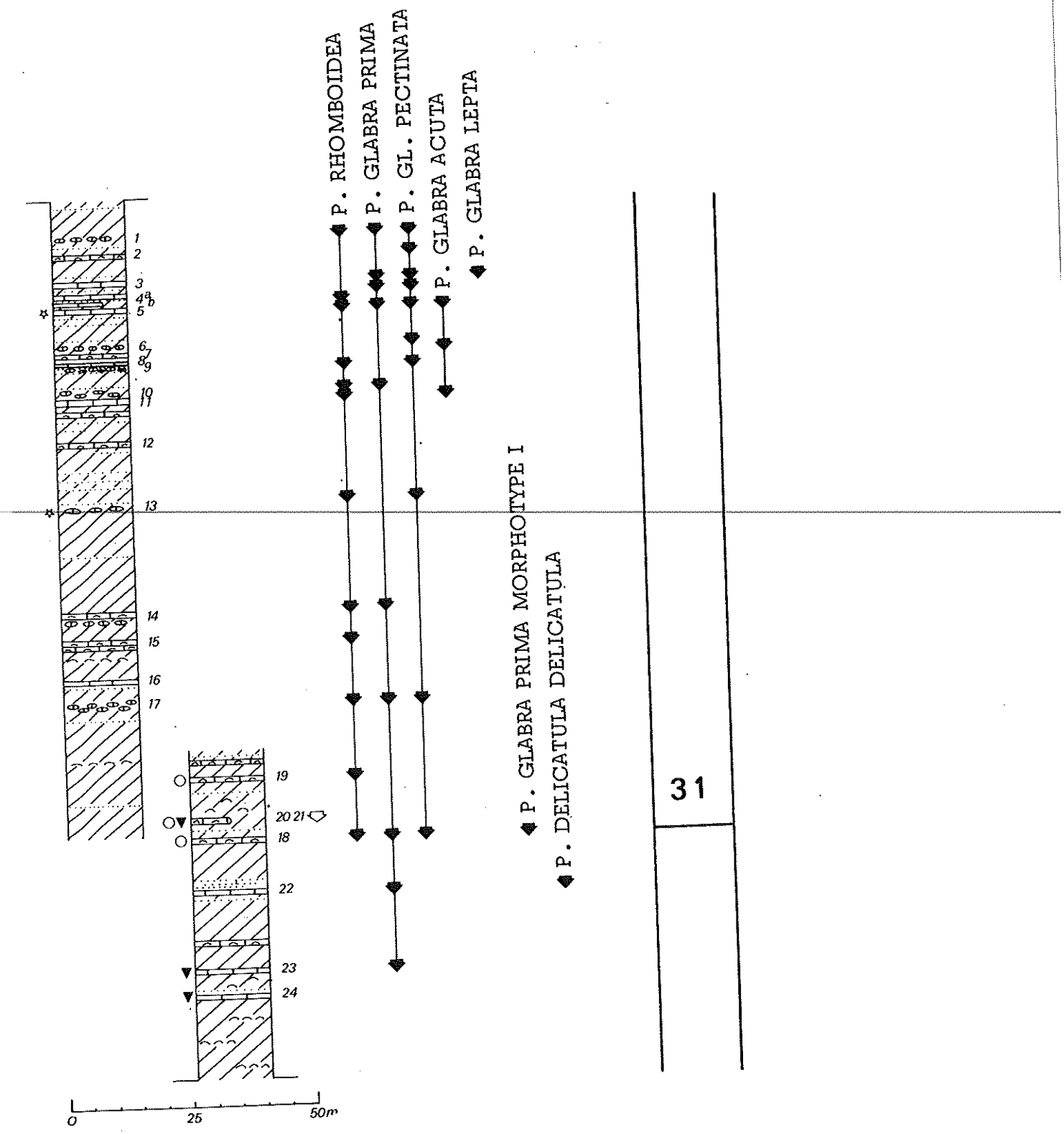
HONY

4a


38
37
34
33B
33A
32B
31A
31B
30
29
a
bdf
gh
k
10
5
0m
Palmatolepis triangularis
Ancyrognathus sinelaminus
Palmatolepis tenuipunctata
Polygnathus
Icriodus
Palmatolepis subperlobata
P. quadrantinodosalobata
P crepida
P termini
Palmatolepis glabra
P perlobata schindewolfi
P quadrantinodosa marginifera
Polygnathus nodocostatus
Polylophodonta sp
32
29
28
27
26

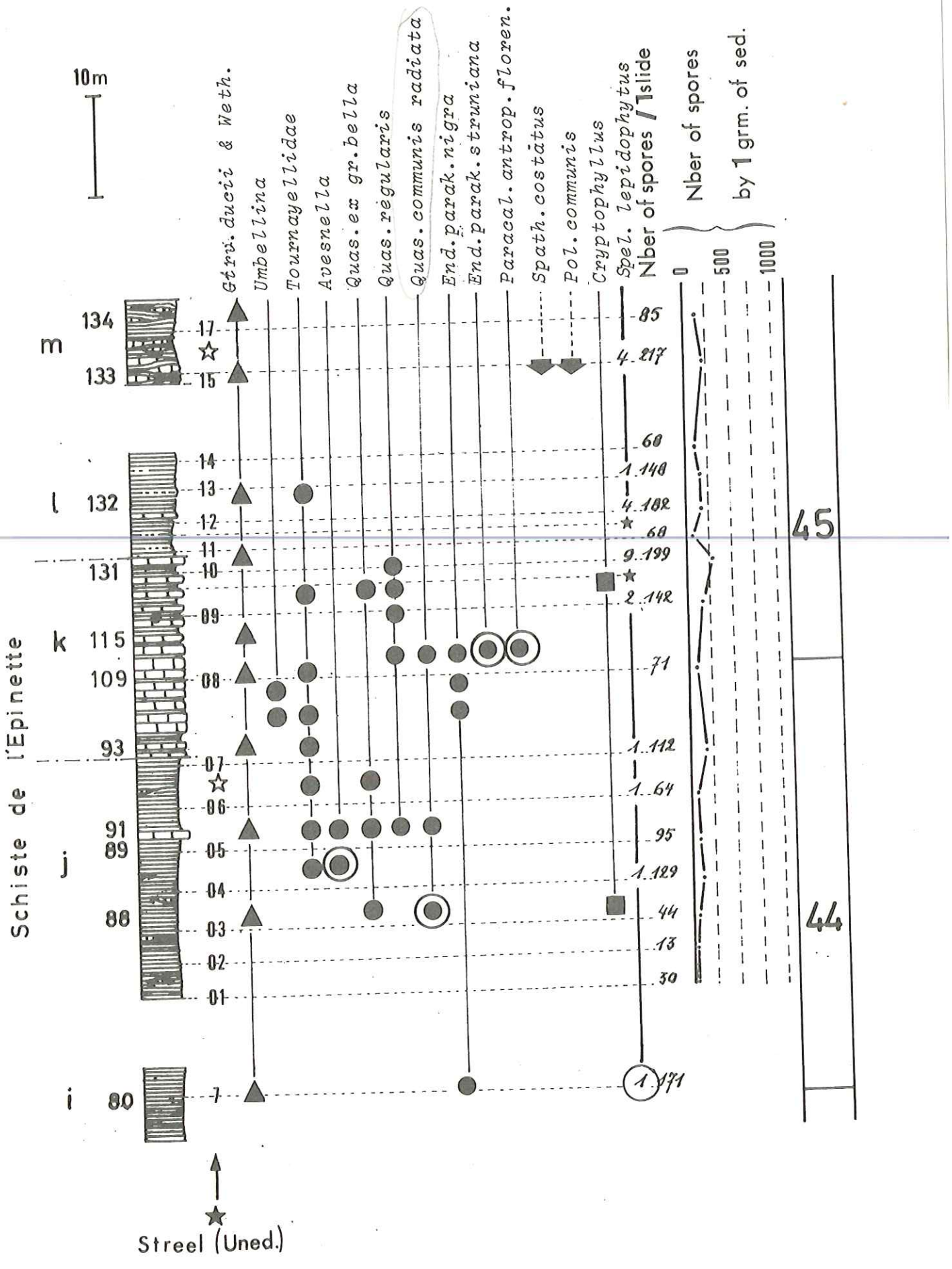
4b

TIGE DE HOGNE

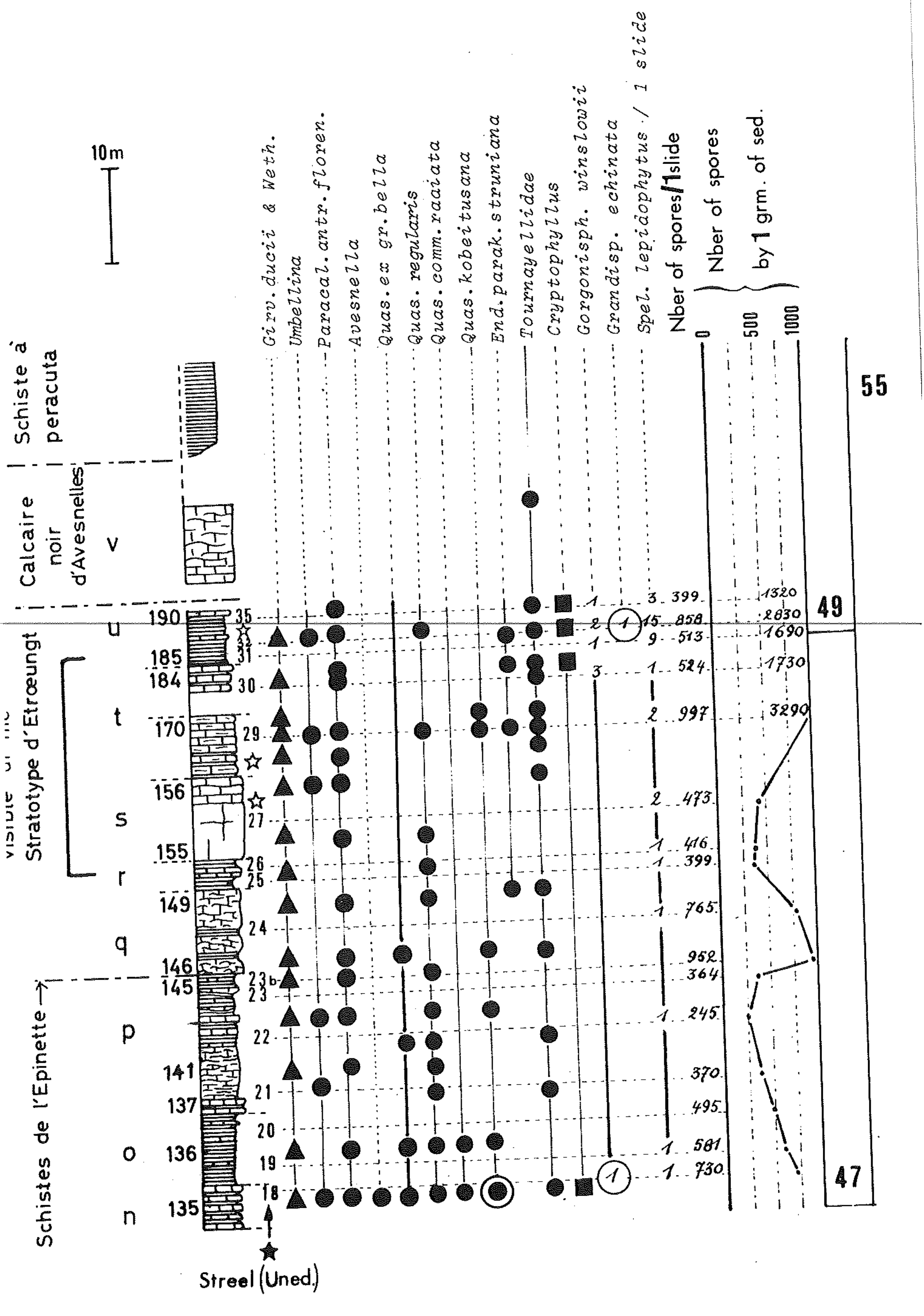


5A

AVESNELLES H (2)



5B

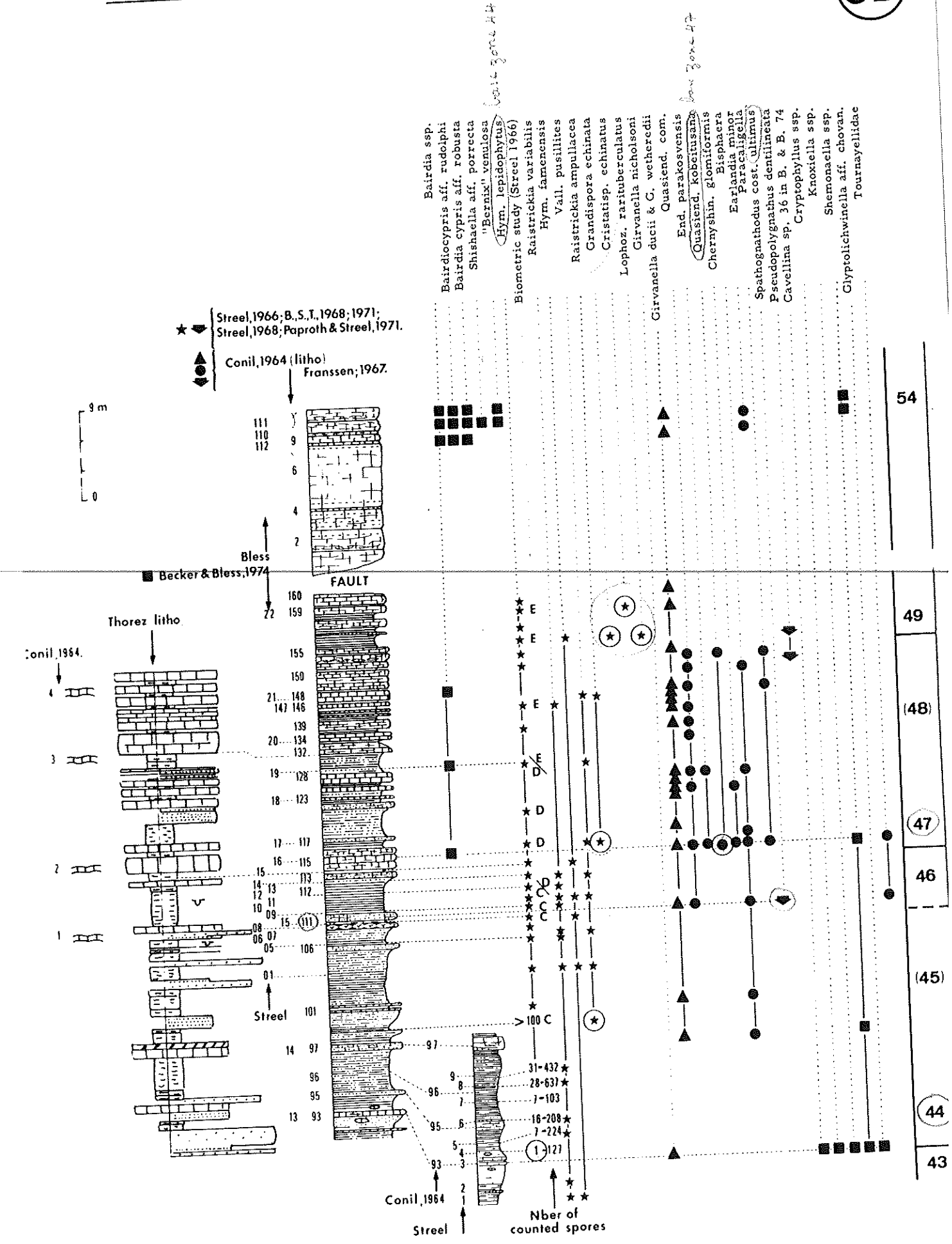

10m
Schiste à peracuta
Calcaire noir d'Avesnelles
Stratotype d'Etrœungt
Schistes de l'Epinette
Streel (Uned.)
Girv. ducii & Weth.
Umbellina
Paracal. antr. floren.
Avesnella
Quas. ex gr. bella
Quas. regularis
Quas. comm. radiata
Quas. kobeitusana
End. parak. struniana
Tournayellidae
Cryptophyllus
Gorgonisph. winslowii
Grandisp. echinata
Spel. lepidophytus / 1 slide
Nber of spores/1slide
Nber of spores by 1 grm. of sed.
0
500
1000
55
49
47
v
u
t
s
r
q
p
o
n
190
185
184
170
156
155
149
146
145
141
137
136
135
35
32
31
30
29
27
26
25
24
23b
23
22
21
20
19
18
399
858
513
524
997
473
416
399
765
952
364
245
370
495
581
730
1320
2830
1690
1730
3290

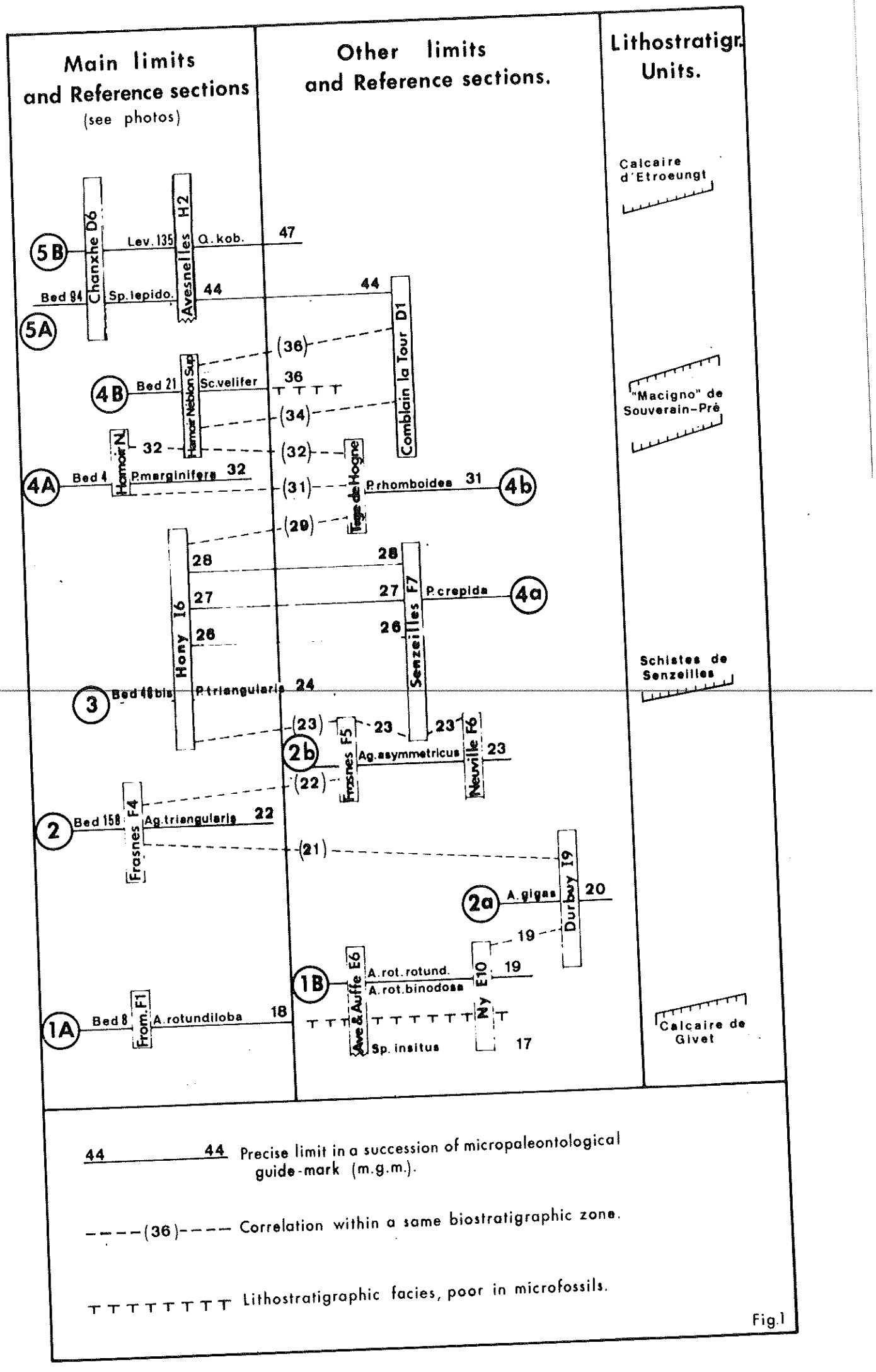
5A

5B

CHANXHE

D (6)



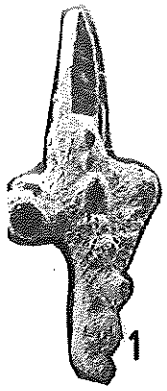


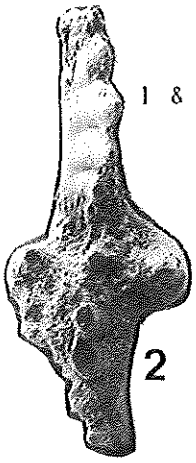
44 ——— 44 Precise limit in a succession of micropaleontological guide-mark (m.g.m.).

– – – – (36) – – – – Correlation within a same biostratigraphic zone.

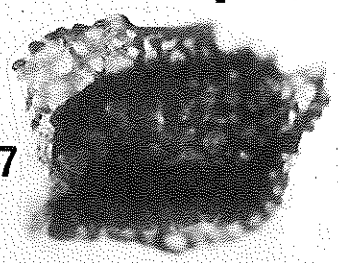
T T T T T T T T Lithostratigraphic facies, poor in microfossils.

Fig.1

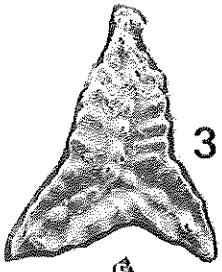




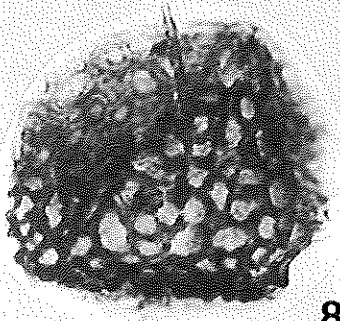
1 & 2 : *Ancyrodella rotundiloba binodosa.*
1 : Fromelennes, F1 : bed 10, x 50.
2 : Fromelennes, F1 : bed 11, x 50.

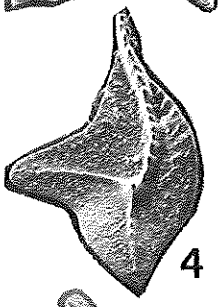


7 & 8 : *Spelaeotriletes lepidophytus.*
Chanxhe, D6 : bed 95, x 1000.
7 : slide 8865 : 2990 ; 8 : slide 8866 : 2235.



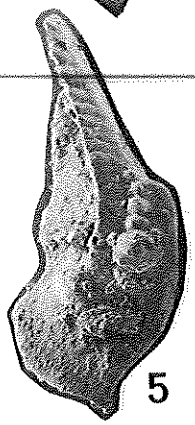
3 : *Ancyrognathus triangularis.*
Frasnes, F4 : bed 158, x 50.



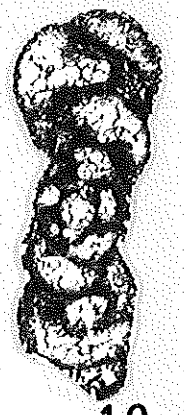


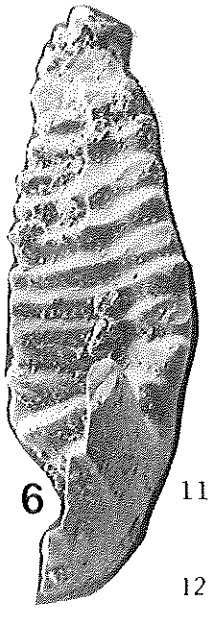
4 : *Palmatolepis triangularis.*
Hony, I6 : bed 48 bis, x 50.

5 : *Palmatolepis quadrantinodosa* morphotype 1
⟶ *marginifera marginifera.*
Hamoir Nord : bed 04, x 50.

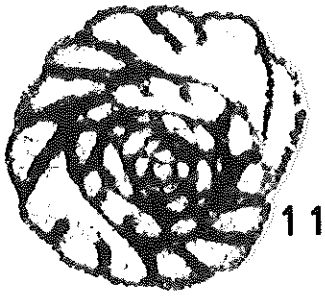


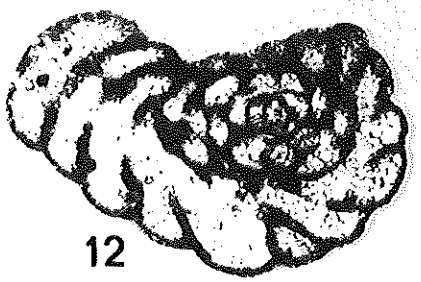
9 & 10 : *Quasiendothyra (Quasiendothyra) kobeitusana* subsp. *Kobeitusana* - Avesnelles, lev. 135 a, x 75.
9 : (7799) RC 7099; 10 : (7964) RC 7240.





6 : *Scaphignathus velifer.*
Hamoir Neblon sup. : bed 26, x 50.

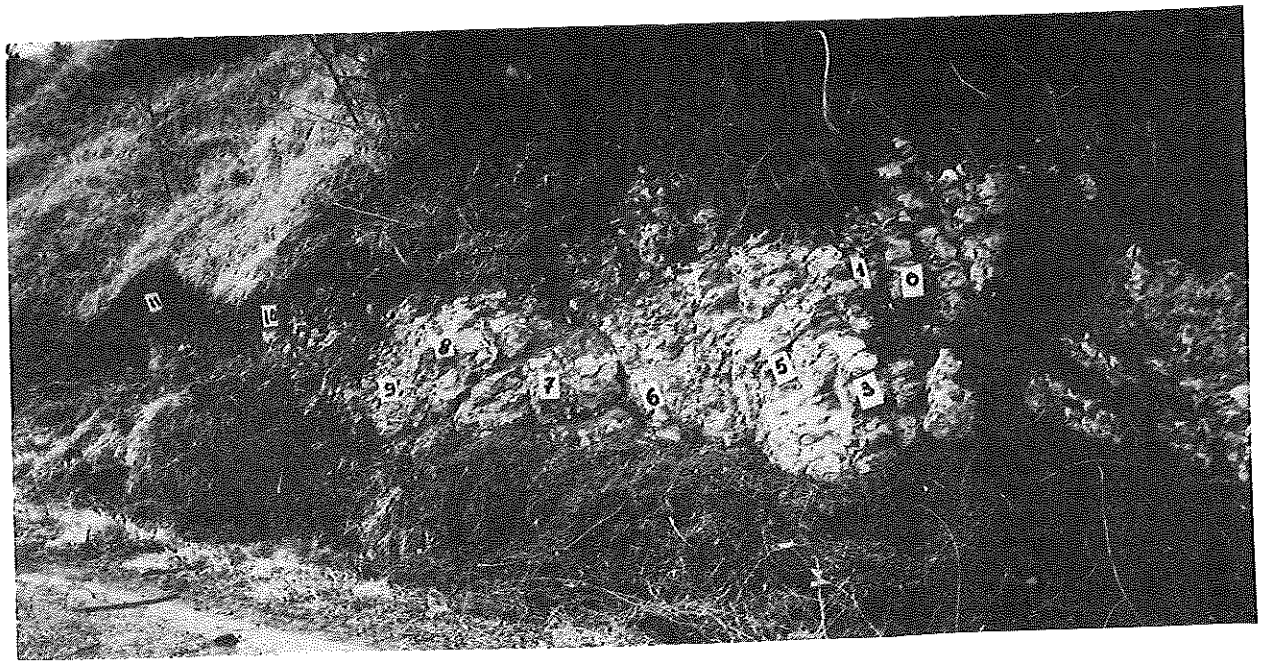




11 : *Quasiendothyra (Quasiendothyra) substricta* - Avesnelles, lev. 135a, x 75. (11422) RC 11011.

12 : *Mubovella* sp. Avesnelles, lev. 135 a, x 75. (11424) RC 11011.

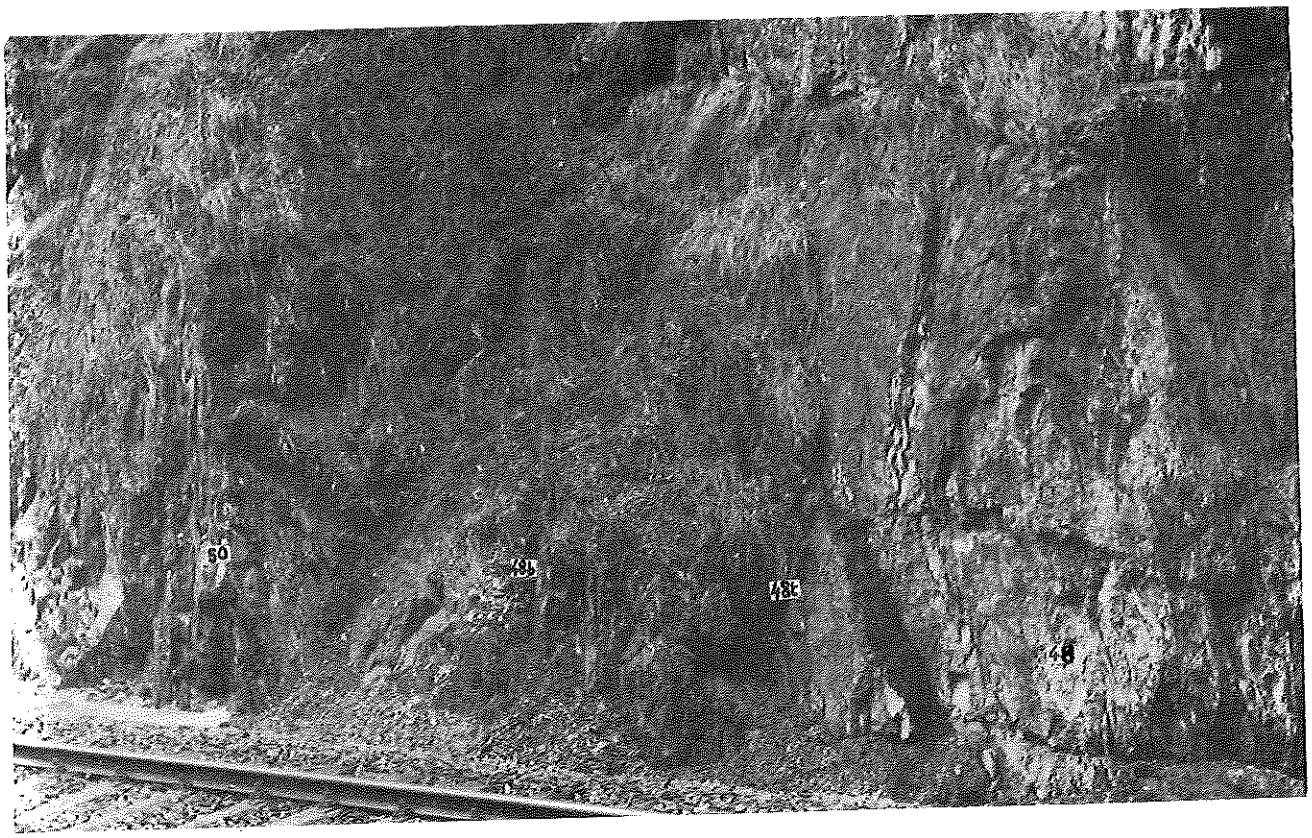
pl 2



Section of Fromelennes.
Excursion F1 in Namur Guidebook 1974.
Base of *Ancyrodella rotundiloba* : bed 8.

Section of Frasnes.
Excursion F4 in Namur Guidebook 1974.
Base of *Ancyrognathus triangularis* : bed 158.

pl 3



Section of Hony.
Excursion I6 in Namur Guidebook 1974.
Base of *Palmatolepis triangularis* : bed 48 b.

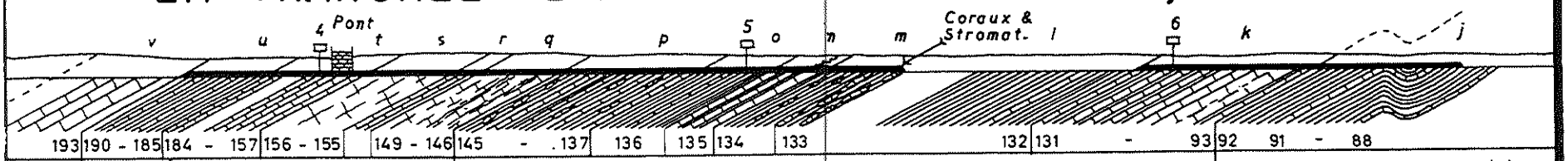
Section of Hamoir Nord.
See DREESEN & DUSAR, public. n° 13, 1975.
Base of *Palmatolepis marginifera marginifera* : bed 04.

pl 4

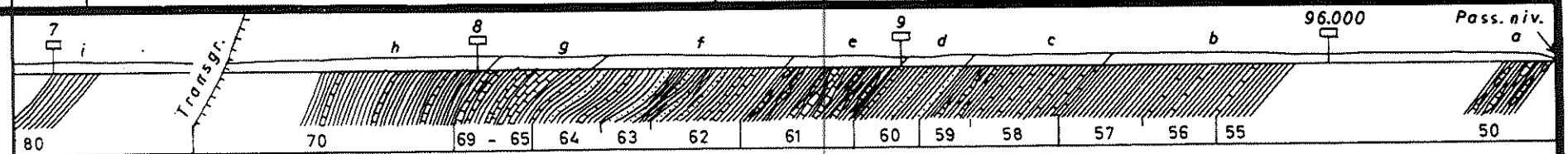
Section of Hamoir Néblon.
See DREESEN & DUSAR, public. n° 13, 1975.
Base of *Scaphignathus velifer* : bed 21.

Section of Chanxhe.
Excursion D6 in Namur Guidebook 1974.
Base of *Spelaeotriletes lepidophytus* : 20 centimeters on 94.

NW — LA TRANCHÉE D'AVESNELLES . Conil & Lys 1970 . — SE



A	Hast.	Strunien calcaire Tn1a γ	Strunien gréseux Tn1a β		Strunien schis-
B	Hastière	Etr. Z.6 à *Qu. kobeitus.*	Z.5 à *Qu. communis*	Z.4 à *Quas. ex gr. communis*	Z.3 à *Quasiend.*
C	Hast.	Calcaire d'Etroeungt s.l.	Schistes de l'Epinette		
D	Hast.	* E	*	* *	*pusillites – lepidophytus*
E	Hast.	*Quas. kobeitusana*	?	*Qu. comm. & regul. v. radiata (Fa2d)*	*Avesnella*
F	Hast.	*Quas. kobeitusana* *Septabrunsiina kingirica* *Tournayellina beata* *Nombreuses Endothyra & Paracaligella*		*Quas. communis comm. var. radiata* *Quas. comm. regularis var. radiata* *Endothyra bilaminaires* *Paracaligella*	*Avesnella* *Endoth. parakosv. nigra*



A	teux Tn1a α	Famennien	
B	*ex gr. communis*	Z.2 à *Tournayelles*	
C	Epinette	Schistes de Sains (pars)	
D	* *PL*	★ ★ ★ *VU (=Fa2c)*	
E		*Quas. communis*	
F		*Quas. communis* *(in g) Septabruns. postchusovensis*	

A Conil & Lys 1964-1966. B Mamet, Mortelmans & Sartenaer 1965. C Conil & Lys 1967.
D Streel 1970. E Conil & Lys 1969-70. F Conil & Lys 1970-71.

pl 5

Erratum

p. 109 - L'indication des directeurs de l'excursion n° 66 C est à modifier comme suit :

"Excursion n° 66 C du XXVIe Congrès géologique international dirigée par :

- MM. J.M. BLESS, J.P.M.Th. MEESSEN et M. STREEL (Pays-Bas et Belgique)

- M.F. ROBASZYNSKI (Belgique et Nord France)

- M. R. MEDIONI (France) (avec la collaboration de Mme M. NEUMANN, MM. G. ALCAYDE, P. JUIGNET et J.P. PLATEL)