pebbles; this is covered by a 7 m thick mostly shaly, silty and sandy interval, followed by a 2 m thick conglomeratic level, which resembles the Cocriamont conglomerate in its type section in the rue Cocriamont (stop 2.7). This conglomeratic level contains besides pebbles of siltstone and sandstone also well-rolled large cobbles (up to 55 cm in length) of limestone, with up to 57% of $CaCO_3$, rich in macrofauna, indicating an eroded carbonate platform nearby. Forty samples were taken for chitinozoan studies and in five formations the organic microfossils could be extracted. As usual in most of the Condroz Inlier, the chitinozoans are dark to opaque and only moderately preserved. They have a concentration between 0.1 and 14.5 chitinozoans per gram of rock and a diversity of 1 to 10 species per sample (Fig. 30). The indicative species are illustrated on the Plates 6-9.

The biozonation with chitinozoans could corroborate the age given with graptolites for the Vitrival-Bruyère Formation and the base of the Criptia Group. For the other three formations a detailed age can now be proposed for the first time (see below). The Fosses Formation was dated earlier with trilobites and brachiopods as pre-Hirnantian Ashgill by Sheehan (1987) and Lespérance & Sheehan (1987), mainly because no Hirnantian brachiopods were encountered. Hence an broad age of early to middle Ashgill age was inaccurately adopted, but a pre-Hirnantian late Ashgill age was also possible according to these macrofossils.

The most important result from the chitinozoans is that the Fosses and Génicot formations around the *Etang du Diable* and in the *Parc de Sart-Eustache* section are middle and late Ashgill in age and for the uppermost levels possibly Rhuddanian (early Llandovery). The samples in which the chitinozoans are frequent and diversified can be correlated with several biozones of Baltoscandia (Nolvak & Grahn, 1993; Nolvak, 1999), although not all of the Baltoscandian biozones are recognised here. The chitinozoans in the basal sample of the Fosses Formation can be correlated with the local biozone 10 (Fig. 9) in the Brabant Massif, present in the Harelbeke borehole (Samuelsson & Verniers, 2000), correlatable with the Baltoscandian *Tanuchitina bergstroemi* Biozone, dated as late Vormsi or early Pirgu, middle Ashgill. This age for the basal part of the Fosses Formation is the same age or younger than the top of the Madot Formation, the unit with a similar facies in the Brabant Massif (see stop 2.2). The chitinozoan assemblage from a higher level of the formation in the top of the quarry near the *Étang du Diable* can be correlated with the *Conochitina rugata* Biozone of Baltoscandia (Nolvak & Grahn, 1993; Nolvak, 1999), corresponding to the middle Pirgu (also middle Ashgill). Hence a broad middle part of the Ashgill is proposed for the whole Fosses Formation in its new definition. Only a few but well preserved chitinozoans are present in the limestone cobbles of the Cocriamont conglomerate and indicate a late Ashgill age. The assemblage is very comparable with the assemblage in a shaly level about 4 m below that conglomerate. Samples from above the upper conglomerate contain a different chitinozoan assemblage possibly correlatable with the *Conochitina scabra* Biozone of Baltoscandia dated as late Porkuni (Nolvak & Grahn, 1993; Nolvak, 1999). The early Porkuni is considered to be the time of the Hirnantian glaciation, which on Gondwana is often expressed sedimentologically as two (very) coarse intervals. It is tempting to interpret the two coarse levels as the sedimentological expression of a sea level drop, resulting from the Hirnantian glaciation. It would be difficult to interpret otherwise the sudden presence of two coarse levels in between the dominantly fine clastic sedimentation in the Condroz Inlier. Well preserved and rich chitinozoans in the base of the Criptia Group corroborate the late Rhuddanian age proposed with graptolites in this section. The transition between the Génicot Formation and the Criptia Group is however not observed here, due to an observation gap over 17 m in the section.

In the part of the Condroz Inlier east of the city of Fosses-la-Ville, the area that we visit, the following formations are present and their descriptions are summarised from the recent revision by Verniers *et al.* (2001). The results of the study presented here however change already slightly the descriptions and ages of the formations in that revision. It appears that the Fosses Formation as defined now, e.g. on the new geological map of the area by Delcambre & Pingot (in press) corresponds only with what was previously included in the Bois de Presles Member, and that the recently defined Génicot Formation corresponds with what was called the Faulx-les-Tombes Member (Lassine *in* Martin, 1969a). The Cocriamont conglomerate would be situated in the middle part of the Génicot Formation. It can be mentioned here that after the excursion new samples of the Fosses and the Génicot Formations have been studied for chitinozoans in seven sections of the Puagne area (Vanmeirhaeghe & Verniers, submitted).

The new stratigraphical results presented above, can offer an explanation for the apparent contradiction in sedimentological interpretation for the deposition of the Fosses Formation (and the Génicot Formation) by Tourneur *et al.* (1993). Either a deposition as bioclastic turbidites with interbedded shales near a platform-ramp margin was suggested or a regressive event on a shelf followed by a transgressive sequence. Due to lack of a type section the exact position of samples in the lithostratigraphy and macrofossils was largely unknown. A

Formations	Samples	*Conochitina dolosa*	*Belenochitina capitata*	*Cyathochitina kuckersiana*	*Conochitina minnesotensis*	*Laufeldochitina stentor*	*Desmochitina* spp.	*Cyathochitina calix*	*Cyathochitina campanulaeformis*	*Desmochitina cocca*	*Desmochitina? mayensis*	*Desmochitina minor* var. A	*Desmochitina ovulum*	*Desmochitina typica*	*Conochitina* spp.	*Belonochitina* spp.	*Cyathochitina* spp.	*Rhabdochitina* spp.	*Belenochitina robusta*	*Belenochitina wesenbergensis*	*Tanuchitina bergstroemi*	*Spinachitina* spp.	*Spinachitina bulmani*	*Conochitina rugata*	*Cyathochitina jenkinsi?*	*Cyathochitina vaurealensis*	*Armoricochitina nigerica*	*Sphaerochitina* spp.	*Ancyrochitina* spp.	*Angochitina* spp.	*Eisenackitina aff. toddingensis*	*Conochitina scabra*	*Hercochitina* cf. *gamachiana*	*Eisenackitina* spp.	*Conochitina electa*	*Conochitina iklaensis*	*Densichitina densa?*	*Belenochitina postrobusta*	*Chitinozoa* spp.	Total number of chitinozoans	Weight of dissolved rock (g)	Concentration (chitinozoans per gram of rock)	Local biozones	Baltoscandian biozones (Nolvak & Grahn, 1993 and Nolvak, 1999)	Global Silurian biozones (Verniers *et al.*, 1995)
Criptia Group	BB40,10														3	1																						8	0	12	22,25	0,54	12		postrobusta
	BB40,11																12																		155	45	13	1	41	267	20,37	13,11			
Génicot	Aisemont																																						0	0	37,21	0,00		?	
	BB342000J														x	x												x					x						x	6	21,42	0,28	11		
	BB40,12														3	1																							0	4	20,06	0,20			
	BBextra1														7		1										1	1					1	5					0	16	37,21	0,43			
	BB342000I																x															x							x	6	22,22	0,27	10	scabra	
	BB342000H														x		x					x					x		x			x							x	30	22,85	1,31			
	BB342000E														x	x											x					x							x	25	20,05	1,25			
	BB342000A														x							x										x							x	15	21,95	0,68			
	BB33,20																																						0	1	12,01	0,08			
	BB342000C (pebble)																														x								x	1	13,84	0,07			
	BB33,18																																						1	1	17,58	0,06			
	BB342000D (pebble)														x													x	x		x								x	9	40,71	0,22	9		
	BB33,17																																						0	0	23,6	0,00			
	BB33,16																											2		1	19								1	23	15,5	1,48			
	BB33,11(pebble)														x														x										x	34	25,23	1,35	8		
	BB342000B														x		x		x				x				x	x											x	28	13,04	2,15			
	BB33,12													x	x		x		x				x	x			x	x											x	64	13,12	4,88	7		
	BB33,15														3	2																							0	5	12,09	0,41			
	BB15,6						3		2					3	5				4							2	7												20	46	27,44	1,68			
	BB33,14														4				2																				9	15	14,49	1,04	6		
	BB33,10																																						0	0	12,12	0,00			
Fosses	BB33,9																																						0	0	12,9	0,00			
	BB33,8																						18					1											12	31	42,68	0,73			
	BB33,6														x		x						x	x	x														x	33	13,52	2,44	5	rugata	
	BB33,5			1																				59	9														48	117	42,68	2,74			
	BB33,4														3								72																0	75	41,46	1,81	4		
	BB33,3				4											1	2						94																123	224	42,44	5,28			
	BB40,13				5															69	42																		0	116	45,25	2,56	3	bergstroemi	
Vitrival-Bruyère	BB40,8				1										1																								2	4	20,08	0,20	2		
	BB40,9		15	2	18		53		5	9	4	3	1	7																									13	130	20,08	6,47			
	BB40,7						1							1	4																								10	16	21,83	0,73			
	BB40,6														7	1																							0	8	21,82	0,37			
	BB40,5				3		2	54	3	2																													17	81	20,58	3,94			
	BB40,4													1	2																								0	3	23,75	0,13			
	BB40,3					10	3			2					3																								0	18	26,3	0,68			
	BB40,2				1											1																							8	10	22,8	0,44		?	
	BB40,1																																						0	0	20,35	0,00			
Basse-aux-Cannes	BB33,2	14	48	2																																			0	64	34,1	1,88	1		
	Total	14	63	5	32	10	62	54	10	13	4	3	1	12	45	7	15	0	6	69	42	0	184	59	9	2	8	4	0	1	19	0	1	5	155	45	13	9	305						

Figure 30. Composition of chitinozoan assemblages and concentrations in samples of the Ordovician-Silurian of the Condroz Inlier around Fosses after Billiaert (2000) and more recently studied samples, with the local biozonation and correlation with the Baltoscandian biozonation of Nolvak & Grahn (1993) and Nolvak (1999) and with the global Silurian biozonation of Verniers *et al.* (1995).

revision of the studied sedimentological samples and macrofossils should relocate these in the section. Because of the drastic environmental changes involved due to the glaciation-induced sea-level drops both sedimentological interpretations in Tourneur *et al.* (1993) are now possible, and not mutually exclusive any more.

7.2. Vitrival-Bruyère Formation

Description. Blackish, silky and fine micaceous shale with quartzite intercalations and graptolites (Maillieux, 1926); micaceous pelitic unit (Michot, 1928); the higher part contains clayey quartzitic sandstone in thick beds, covering black or blue shale with intercalations of black or dark coloured mudstone, siltstone and fine sandstone. The sedimentology has not been studied yet. The stratotype (stop 2.6) lies in the outcrops in the river bed of or along the Ruisseau Le Treko, west of the hamlet La Bruyère, 500 to 1050 m east of the church of the village Vitrival. Possibly the Oxhe Formation is a lateral equivalent or synonym for the unit in the Oxhe Inlier, situated 52 km to the NE.

Thickness: Difficult to estimate, except for the upper part with quartzite beds: 20-30 m.

Age. Graptolites in a locality at Vitrival-Bruyère in the upper part of the unit indicate the *Climacograptus peltifer* Biozone (Maillieux, 1933). A restudy of the fauna by Bulman (1950) confirmed the presence of the *Climacograptus peltifer* Biozone (now equivalent to the *Diplograptus foliaceus* Biozone), which is situated in the uppermost Costonian to lower Longvillian substages (uppermost Aurelucian and most of the Burrellian stages, Caradoc) (Fortey *et al.,* 1995). The chitinozoans in the present study indicate the same assemblage, and the sampled levels belong to the local biozone 2 (Fig. 30) with as age indicators *Cyathochitina calix* and *Laufeldochitina stentor*. Comparing the range of these species with Baltoscandia (Nolvak, 1999), a broad late Llanvirn to early Caradoc age is attributed. By the presence of the first species it is more or less correlatable with the local biozone 4 of the Brabant Massif present in the Rigenée Formation (Samuelsson & Verniers, 2000).

7.3. Basse-aux-Canes Formation

Description. Greenish grey or dark grey silty shale, often sandy siltstone, with irregular jointing. White mica often present. The siltstone weathers with dark or rusty patches of iron and manganese oxides, described as a characteristic shining blue colour on freshly broken surface. No sandstone beds observed. The formation overlays the Sart-Bernard Formation. The unit resembles slightly the Vitrival-Bruyère Formation, but has no sandstone beds; it is possibly a lateral facies change of (a part of) that formation. The stratotype area lies in the southern part of the Puagne area, south-east of Sart-Eustache but a section is not defined yet (Michot, 1934, 1954; Martin, 1969a; Delcambre & Pingot, in press; Verniers *et al.*, 2001).

Thickness. Estimated 100 to 150 m.

Age. Without fossils it could only be estimated as Llanvirn or early Caradoc (Middle or Late Ordovician). Two samples with chitinozoans described in the present study form the local biozone 1 (Fig. 30). The range of *Belonechitina capitata* and *Conochitina dolosa* compared to Baltoscandia (Nolvak, 1999) narrow the age down from the late Llanvirn to middle Caradoc.

7.4. Fosses Formation

Description. From top to bottom green and dark green fine sandy shale, with trilobites and brachiopods; greywacke, calcareous shale with locally some limestone beds rich in brachiopods (Michot, 1934). Martin (1969a after Michot, 1927, 1934) divided the formation in two members: a lower Bois de Presles Member with clayey limestone, calcareous shale, fossiliferous with brachiopods, cystoids and trilobites, in an alternation of thin-bedded muddy limestone and calcareous shale, in and in the upper part of the formation calcareous shale with thin limestone layers. The brachiopods and trilobites were described by Sheehan (1987) and Lespérance & Sheehan (1987), the crinoids, bryozoans, echinoderm debris, cystoids, molluscs and algae were described by Tourneur *et al.* (1993) and the corals by Servais *et al.* (1997). The base is not yet observed. Several sections were informally designated as stratotype: the northern bank of the Fuette and Rosière rivers one km east of the city of Fosses (Malaise, 1900) and the area between the city of Fosses and the village of Sart-Eustache. In the present study we propose the outcrops and the abandoned quarry north of the *Etang du Diable* and the section in the *Parc de Sart-Eustache* as the stratotype section (Fig. 31).

Thickness. About 50 m (Tourneur *et al.*, 1993); more than 38 m in the *Parc de Saint*-Eustache section; estimated at more than 75 m.

Age. Based on trilobites and brachiopods: pre-Hirnantian Ashgill (Sheehan, 1987; Lespérance & Sheehan, 1987); based on chitinozoans: local biozones 3 to part of 6 (Fig. 30); Baltoscandian biozones of Nolvak & Grahn (1993) and Nolvak (1999): at the base of the formation *Tanuchitina bergstroemi* Biozone (upper Vormsi to lower Pirgu) and in the middle of the formation the *Conochitina rugata* Biozone (middle Pirgu), middle to late Ashgill.

7.5. Génicot Formation

Description. Black shale, dark grey laminated siltstone and often thin beds of medium grey sandstone. In the middle part two sandstone beds occur, separated by a sandy-shaly unit from an overlying conglomeratic bed with large limestone cobbles. The latter bed was sometimes described as the Cocriamont conglomerate, a coarse crinoidal limestone above a basal conglomerate, which was considered by earlier authors (Michot, 1931) as the base of the Fosses Formation. High in the formation a few meters thick bed occurs with dark coloured microbioturbations, a few mm long (*Chondrites* sp.?) dispersed in the shale or siltstone. They were called "*schistes mouchetés*" by Lassine (unpublished *in* Martin, 1969a) or described as green sandy shale with on breaking surfaces blackish elliptic or fusiform spots and a rare macrofauna level (Martin, 1969a after Michot, 1927, 1934). The base of the formation is located above the highest rich macrofossil bearing horizon of the Fosses Formation. The top of the formation is formed by the highest siltstone/sandstone bed below the Criptia Group. It was considered by Martin (1969a) as the Faulx-les-Tombes Member, the upper member of the Fosses Formation. The *Parc de Sart-Eustache* section is proposed herein as the stratotype section.

Thickness. At least 85 m in the stratotype section (this study), but probably between 150 and 200 m (Delcambre & Pingot, in press).

Age. The chitinozoan assemblages allow the distinction between local biozones 6 (part) to 11 (Fig. 30). All of them contain the rare but distinct *Armoricochitina nigerica*, indicative for the late Ashgill. Above the conglomerate of Cocriamont level, the *Conochitina scabra* Biozone occurs, dated as late Porkuni by Nolvak & Grahn (1993) and Nolvak (1999), the part of the latest Ashgill after the Hirnantian glaciation. *Hercochitina* cf. *gamachiana* in this assemblage resembles the similar or same species in the local chitinozoan biozone 11 of the Brabant Massif in Samuelsson & Verniers (2000). If this can be confirmed by more studies it would place this biozone 11 also in the post-Hirnantian glaciation latest Ashgill. No chitinozoans were discovered yet in the top of the formation.

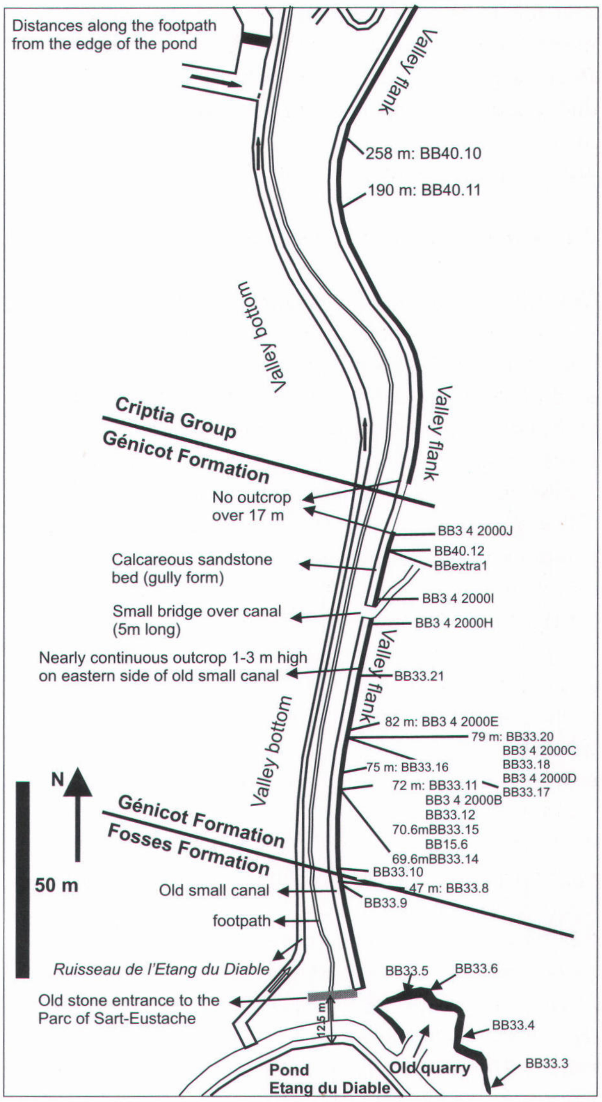

Figure 31. Detailed location map of the samples for chitinozoan studies in the quarry near the *Etang du Diable* and in the *Parc de Sart-Eustache*, the proposed new type locality and section of the Fosses and the Génicot formations, changed after Billiaert (2000).

7.6. Criptia Group

Description. A group described as "Schistes de Criptia" by Michot (1928) and re-used by Delcambre & Pingot (in press) for a thick unit of shale and silty shale, homogeneous with various colours (greenish, grey, ochre) and a stratification difficult to distinguish. In the group a green to greenish grey soft shale unit can be differentiated. The fine-grained and compact sedimentation points to a deep shelf environment. The Génicot Formation is supposed to be the underlying unit. The covering unit is a more silty and darker coloured unnamed shale unit. The stratotype area is around the village of Sart-Eustache, but not defined yet.

Thickness. Unknown, tentatively estimated at several hundred meters.

Age. Only at the base well preserved and frequent chitinozoans are described in this study belonging to the *Belonechitina postrobusta* global Biozone of Verniers *et al.* (1995) of the Rhuddanian (early Llandovery).

Graptolites are found in higher levels but are still unstudied; an early Llandovery or possibly Wenlock to early Ludlow age is tentatively postulated (Delcambre & Pingot, in press; Verniers *et al.*, 2001).

8. Description of excursion stops DAY 2 afternoon

Stop 2.6. Vitrival-Bruyère section

Location. Outcrops along a track and in the river bed of the Ruisseau Le Treko, west of the hamlet La Bruyère, 500 to 1050 m east of the church of the village Vitrival.

General structure. Subvertical bedding with stratification only visible in the decimetre to metre thick sandstone beds.

Lithostratigraphy. Vitrival-Bruyère Formation.

Lithology. Micaceous pelitic unit, with dark grey, black or blue, silty and fine micaceous shale with some thick quartzite intercalations and other beds of black or dark coloured mudstone, siltstone and fine sandstone. The sedimentology is unstudied yet.

Biostratigraphy. See above in chapter 7.2.

Remarks. The outcrop shows the difficulty to describe complete lithostratigraphical sections in the Condroz Inlier. The complexity of the Variscan deformation is enhanced by the suspected Quaternary mass movements along the steep hill side. The thickness of the formation cannot be determined. The lithology is however considered typical for the formation and chitinozoans allowed a corroboration of the earlier dating (see above in 7.2).

Stop 2.7. Cocriamont conglomerate type section

Location. Rue de Cocriamont, Le Roux, Fosses-la-Ville. low escarpment in the west side of the road.

General structure. Steeply dipping beds, normal to overturned.

Lithostratigraphy. Cocriamont conglomerate level.

Lithology & sedimentology. See in 7.5.

Biostratigraphy. See in 7.4 and 7.5. One chitinozoan sample at 1.0 to 1.2 m above the conglomerate contains some specimens of species of the *Conochitina scabra* Biozone, suggesting tentatively the latest Ashgill.

Stop 2.8. Outcrop east of the "Etang du Diable", Sart-Eustache

Location. Escarpment in an outcrop at the corner of the road, east of the "*Etang du Diable*".

General structure. Steeply dipping beds and northwards younging.

Lithostratigraphy. Fosses Formation (lower part).

Lithology. Typical (slightly) calcareous mudstone with macrofossils dispersed or in centimetre thick layers.

Sedimentology. Not studied yet here.

Biostratigraphy. The chitinozoans are rather rich and belong to the *Tanuchitina bergstroemi* Biozone, middle Ashgill (see in 7.5).

Stop 2.9. Abandoned quarry north the "Etang du Diable" and section in the "Parc of Sart-Eustache", Sart-Eustache

Location. A continuous section can be followed from an abandoned quarry, along a public path, north of the "Etang du Diable" and in the private property of the Park of Sart-Eustache in a 750 m long nearly continuous section along a small disused canal (written permission should be asked to enter the property).

General structure. Steeply bedded normal to overturned beds with a main strike of N110-290. The sequence youngs to the north, evidenced by sedimentological structures.

Lithostratigraphy. In the first 250 m successively the Fosses and Génicot formations, with the Cocriamont conglomerate and the Criptia Group is outcropping (Fig. 31).

Lithology & sedimentology. See above in 7.4, 7.5 and 7.6.

Biostratigraphy. See above; the chitinozoan succession indicates the presence of middle and late Ashgill to Rhuddanian.

Remarks. In this section the presence of the Hirnantian glaciation could be postulated for the first time in Belgium.

9. Acknowledgements

This excursion guide was prepared for the pre-symposium excursion of the International Symposium on "Early Palaeozoic Palaeogeographies and Biogeographies of Western Europe and North Africa", Lille USTL, Villeneuve d'Ascq, France, (September 22-26, 2001). The international symposium was supported by Geologica Belgica. The guide book was also used for the post-symposium excursion of the International Meeting and Workshops of the "Commission Internationale pour l'étude de la palynoflore du Paléozoïque (C.I.M.P.), at Lille USTL (September 8, 2002).
M. Vanguestaine and W. De Vos are acknowledged for critically refereeing the manuscript. Mrs. S. Van Cauwenberghe (Ghent University) is acknowledged for the palynological preparation and the SEM photography, Dr. S. Louwye (Ghent University) for the development of the photos and Mrs. Nelly Reynaert (Ghent University) for retyping different versions of the manuscript. Bernard Delcambre and Jean-Louis Pingot are sincerely thanked for introducing us to the *Parc de Sart-Eustache* section. Due to their extensive mapping fieldwork in the area, they convinced us that this section was one of the most complete in the area, which still will need more study in the Silurian part. Mr. d'Orjo de Marcovelette (Sart-Eustache) and the Marquis de Trazegnies (Corroy-le-Château) are acknowledged for their authorisation to visit the outcrops on their properties during this excursion. The NMBS/SNCB is acknowledged for allowing to study the outcrops along the railway in the Orneau Valley. This research project forms part of the FWO research project N° G.0094.01 (K. U. Leuven & Ghent University), and the FNRS grant F.R.F.C. N°2.4506.97 (A. Herbosch, U.L.B.). A. Howard is acknowledged for the English translation. Tim Debacker was, during this study, research assistant of the Fund for Scientific Research - Flanders (Belgium) at the Ghent University.

10. References

ANDRÉ, L., 1991. The concealed crystalline basement in Belgium and the "Brabantia" microplate concept: constraints from the Caledonian magmatic and sedimentary rocks. *In* André, L., Herbosch, A., Vanguestaine, M. & Verniers, J. (eds.), *Proceedings of the international meeting on the Caledonides of the Midlands and the Brabant Massif, 1989*. Annales de la Société Géologique de Belgique, 114: 117-139.

ANDRÉ, L., HERBOSCH, A., VANGUESTAINE, M., SERVAIS, T., VAN GROOTEL, G., LOUWYE, S. & VERNIERS, J., 1991. Guidebook of the excursion on the stratigraphy and magmatic rocks of the Brabant Massif, Belgium. *In* André, L., Herbosch, A., Vanguestaine, M. & Verniers, J. (eds.), *Proceedings of the International Meeting on the Caledonides of the Midlands and the Brabant Massif, Brussels, 20-23 September 1989.* Annales de la Société Géologique de Belgique, 114 (2): 283-323.

ANTHOINE, R. & ANTHOINE, P., 1943. Les assises de Mousty et de Villers-la-Ville du bassin supérieur de la Dyle. *Annales de la Société Géologique de Belgique*, 66: M53-181.

BELMANS, M., 2000. *Structurele geologie van het Siluur uit de Orneauvallei, Massief van Brabant.* Unpublished M.Sc. thesis, Laboratorium voor Paleontologie, Ghent University.

BILLIAERT, B., 2000. *Kartering, lithostratigrafie en biostratigrafie met Chitinozoa van de Ordovicium-Siluur typesecties rond Fosses (westelijke Condroz-Strook).* M.Sc. thesis, Laboratorium voor Paleontologie, Ghent University.

BOUMA, A.H., 1962. Sedimentology of some flysch deposits. Elsevier, Amsterdam.

BROCKE, R., FATKA, O., MOLYNEUX, S.G. & SERVAIS, T., 1995. First appearance of selected Early Ordovician acritarch taxa from Peri-Gondwana. *In* Cooper, J.D., Droser, M.L. & Finney, S.C. (eds.), *Ordovician Odyssey*. The Pacific Section Society for Sedimentary Geology, 473-476.

BULMAN, O. M. B., 1950. On some Ordovician graptolite assemblages of Belgium. *Bulletin de l'Institut Royal des Sciences naturelles de Belgique*, 26(5): 1-8.

BULTYNCK, P., COEN-AUBERT, M., DEJONGHE, L., GODEFROID, J., HANCE, L., LACROIX, D., PREAT, A., STAINIER, P., STEEMANS, P., STREEL, M., TOURNEUR, F., 1991. Les formations du Devonien moyen de la Belgique. *Mémoires pour servir à l'Explication des Cartes géologiques et Minières de la Belgique*, 30, 1-106.

CHACKSFIELD, B.C., DE VOS, W., D'HOOGE, L., DUSAR, M., LEE, M.K., POITEVIN, C., ROYLES, C.P. & VERNIERS, J., 1993. A new look at Belgian aeromagnetic and gravity data through image-based display and integrated modelling techniques. *Geological Magazine*, 130: 583-591.

COCKS, L.R.M. & FORTEY, R.A., 1982. Faunal evidence for ocean separations in the Palaeozoic of Britain. *Journal of the Geological Society, London,* 139: 465-478.

COCKS, L.R.M., MCKERROW, W.S. & VAN STAAL, C.R., 1997. The margins of Avalonia. *Geological Magazine,* 134: 627-636.

CORIN, F., 1963. Sur les roches éruptives de la tranchée d'Hasquempont, canal de Charleroi. *Bulletin de la Société belge de Géologie*, 72: 94-98.

CORIN, F., 1965. Atlas des roches éruptives de Belgique. *Mémoires pour servir à l'Explication des Cartes géologiques et Minières de la Belgique*, 4: 190 pp.

CRIMES, T.P., 1992. Changes in the trace fossil biota across the Proterozoic-Phanerozoic boundary. *Journal of the Geological Society, London*, 149: 637-646.

DEAN, T.W., 1991. Ordovician trilobites from the inlier at Le Petit Fond d'Oxhe, Belgium. *Bulletin de l'Institut Royal des Sciences Naturelles de Belgique, Sciences de la Terre*, 61: 135-155.

DEBACKER, T., 1999. Folds trending at various angles to the transport direction in the Marcq area, Brabant massif, Belgium. *Geologica Belgica*, 2: 159-172.

DEBACKER, T., 2001. *Palaeozoic deformation of the Brabant Massif within eastern Avalonia: how, when and why?* Unpublished Ph.D. Thesis, Ghent University.

DEBACKER, T.N., SINTUBIN, M. & VERNIERS, J., 1999. Cleavage/fold relationships in the Silurian metapelites, southeastern Anglo-Brabant fold belt (Ronquières, Belgium). *Geologie & Mijnbouw,* 78(1): 47-56.

DEBACKER, T., SINTUBIN, M. & VERNIERS, J., 2001. Large-scale slumping deduced from structural relations and sedimentary features: a study in the Lower Palaeozoic Anglo-Brabant fold belt, Belgium. *Journal of the Geological Society, London*, 158: 341-352.

de la VALLÉE-POUSSIN, J., 1930. Contribution à l'étude du massif "cambrien" dans la vallée de la Dyle et de la Gette. *Mémoire de l'Institut de Géologie*, Université de Louvain, 6(3): 319-353.

DELCAMBRE, B & PINGOT, J.L., in press. Carte géologique de Wallonie, échelle 1/25.000, Carte Biesme-Mettet n°53/1-2, Notice explicative, Ministère de la Région Wallonne, Namur.

DELCAMBRE, B., PINGOT, J.L. & HERBOSCH, A., 2002. Carte Géologique de Wallonie, échelle 1/25.000. Carte Chastre-Gembloux n°40/5-6, Ministère de la Région Wallonne, Namur.

de MAGNÉE, I. & ANCIAUX, P., 1945. Note préliminaire sur le métamorphisme à grenat du Brabant. *Bulletin de la Société belge de Géologie,* 54: 77-85.

de MAGNÉE, I. & RAYNAUD, J., 1944. Etude magnétique de la tectonique du cambrien du Brabant à l'est de Court-St-Etienne. *Annales de la Société Géologique de Belgique*, 67: M495-M548.

DE SCHEPPER, S., 2000. *De typelokaliteiten van de Siluurformaties van het Massief van Brabant: Kartering, lithostratigrafie en biostratigrafie met Chitinozoa in de Orneauvallei.* Unpublished M.Sc. thesis, Laboratorium voor Paleontologie, Ghent University.

DE VOS, W., VERNIERS, J., HERBOSCH, A. & VANGUESTAINE, M., 1993. A new geological map of the Brabant Massif. *In* Pharaoh, T.C., Molyneux, S.G., Merriman, R.J., Lee, M.K. & Verniers, J. (eds.), Special Issue on the Caledonides of the Anglo-Brabant Massif. *Geological Magazine*, 130(5): 605-611.

DE WINTER, W. (1998). *Kartering, lithostratigrafie en biostratigrafie met Chitinozoa van het Siluur te Landenne, Massief van Brabant.* Unpublished M.Sc. thesis, Laboratorium voor Paleontologie, Ghent University.

DUMONT, A., 1847. Mémoire sur les terrains ardennais et rhénan de l'Ardenne, du Rhin, du Brabant et du Condroz. I. Terrain ardennais. *Mémoires de l'Académie Royale de Belgique, Classe des Sciences*, 20: 1-163.

DUMONT, A., 1848. Mémoire sur les terrains ardennais et rhénan de l'ardenne, du Rhin, du Brabant et du Condroz. II. Terrain rhénan. *Mémoires de l'Académie Royale de Belgique, Classe des Sciences,* 22: 1-451.

EVERAERTS, M., 2000. *L'interprétation structurale de la Manche au Rhin: apport du filtrage des champs potentiels.* Unpublished Ph.D. Thesis, Université Catholique de Louvain, 167 pp.

FORTEY, R.A., HARPER, D.A.T., INGHAM, J.K., OWEN, A.W. & RUSHTON, A.W.A., 1995. A revision of Ordovician series and stages from the historical type area. *Geological Magazine*, 132(1): 15-30.

FOURMARIER, P., 1921. La tectonique du Brabant et des régions voisines. *Mémoires de l'Académie Royale de Belgique, Classe des Sciences*, 2è Série, 4(6), 95: 41-50.

GEERKENS, B. & LADURON, D. 1996. *Etude du métamorphisme du Massif du Brabant.* Unpublished BNRE-report, Ministry of the Flemish Community, Brussels.

GERLACHE, L., 1956. Contribution à l'étude du massif siluro-cambrien du Brabant dans la vallée de l'Orneau. *Bulletin de l'Institut Agronomique de Gembloux,* 24(2): 131-141.

HENNEBERT, M. & EGGERMONT, B., 2002. Carte Braine-le-Comte - Feluy n° 39/5-6, Carte géologique de Wallonie, échelle 1/25.000. Ministère de la Région Wallonne, Namur.

HERBOSCH, A., 1991. Le trémadocien du Massif du Brabant (Belgique): turbidites de faible densité et facies pélagiques associés. *3ème Congrés Français de Sédimentologie*, Brest, abstract, 159-160.

HERBOSCH, A., 1996. Stratigraphie et sedimentologie du Cambro-Ordovicien du Massif du Brabant. *Bulletin de la Société belge de Géologie*, 105: 3-4.

HERBOSCH, A. & BLOCKMANS, S., in press a. Carte Wavre-Chaumont-Gistoux, n° 40/1-2, Carte géologique de Wallonie, échelle 1/25.000. Ministère de la Région Wallonne, Namur.

HERBOSCH, A., DUMOULIN, V., BLOCKMANS, S. & DEBACKER, T., in prep. b Carte Rebecq-Ittre n° 39/1-2, Carte géologique de Wallonie, échelle 1/25000. Ministère de la Région Wallonne, Namur.

HERBOSCH, A. & LEMONNE, E., 2000. Carte Nivelles-Genappe n° 39/7-8, Carte géologique de Wallonie, échelle 1/25.000. Ministère de la Région Wallonne, Namur.

HERBOSCH, A., VANGUESTAINE, M., DEGARDIN, J.M., DEJONGHE, L., FAGEL, N. & SERVAIS, T., 1991. Etude lithostratigraphique, biostratigraphique et sédimentologique du sondage de Lessines (Massif du Brabant). *Annales de la Société Géologique de Belgique*, 114(1): 195-212.

JODARD, C., 1986. *Etude cartographique et pétrologique de l'Ordovicien inférieur de la Thyle.* Unpublished M.Sc. Thesis, Université Libre Bruxelles.

JOHNSON, J.G., KLAPPER, G. & SANDBERG, C.A., 1985. Devonian eustatic fluctuations in Euramerica. *Bulletin of the Geological Society of America,* 96: 567-587.

KAISIN, F. 1933. Contribution à l'étude tectonique du Bassin de Namur, Troisième note: Etude de la bordure septentrionale du bassin et conclusions generales. *Annales de la Société belge de Géologie,* 43: 334-377.

KALJO, D.L., BOUCOT, A.J., CORFIELD, M., LE HÉRISSÉ, A., KOREN, T.N., KRIZ, J., MÄNNIK, P., MÄRSS, T., NESTOR, V., SHAVER, R.H., SIVETER, D.J. & VIRA, V., 1995. Silurian Bioevents. *In* O.H. Walliser. Global Events and Event Stratigraphy in the Phanerozoic. 173-224. Springer Verlag.

KNELLER, B.C., KING, L.M. & BELL, A.M. (1993). Foreland basin development and tectonics on the northwest margin of eastern Avalonia. *Geological Magazine*, 130: 691-697.

LAMENS, J., 1985. Transition from turbidite to shallow-water sedimentation in the lower Salmian (Tremadocian, Lower Ordovician) of the Stavelot Massif, Belgium. *Sedimentary Geology*, 44: 121-142.

LAUFELD, S., 1979. Biostratigraphy of Ordovician, Silurian and Devonian Chitinozoans. *In*: Historical biogeography; Plate tectonics and the changing environment (eds. J. GRAY, A. J. BOUCOT), 75-90. Oregon: Oregon State University Press.

LECOMPTE, M., 1948. Existence du trémadocien dans le Massif du Brabant. *Bulletin de l'Académie Royale des Sciences, Lettres et Beaux Arts de Belgique, Classe des Sciences*, 5è Série, 34: 677-687.

LECOMPTE, M., 1949. Découverte de nouveaux gites à Dictyonema dans le Tremadocien du Massif du Brabant. *Bulletin de l'Institut royal des Sciences Naturelles de Belgique*, 25(45): 1-8.

LEE, M.K., PHARAOH, T.C., WILLIAMSON, J.P., GREEN, C.A. & DE VOS, W., 1993. Evidence on the deep structure of the Anglo-Brabant Massif from gravity and magnetic data. *Geological Magazine,* 130: 575-582.

LEGRAND, R., 1961. Mise à jour de la légende stratigraphique du Gothlandien inférieur du Massif du Brabant. *Bulletin de la Société belge de Géologie, de Paléontologie et d'Hydrologie,* 70: 186-195.

LEGRAND, R., 1967. Ronquières, documents géologiques. *Mémoires pour servir à l'Explication des Cartes géologiques et Minières de la Belgique*, 6: 1-60.

LEGRAND, R., 1968. Le Massif du Brabant. *Mémoires pour servir à l'Explication des Cartes Géologiques et Minières de la Belgique*, 9: 1-148.

LENOIR, J.L., 1987. *Etude cartographique, pétrographique et palynologique de l' Ordovicien inférieur du bassin de la Senne*. Unpublished M.Sc. Thesis, Université Libre de Bruxelles.

LESPÉRANCE, P.J. & SHEEHAN, P.M., 1987. Trilobites et Brachiopodes ashgilliens (Ordovicien supérieur) de l'"Assise" de Fosse, Bande de Sambre-Meuse (Belgique). *Bulletin de l'Institut Royal des Sciences Naturelles de Belgique, Sciences de la Terre*, 57: 91-123.

MAILLIEUX, E., 1926, Remarques sur l'Ordovicien de la Belgique. *Bulletin de la Société belge de Géologie, Paléontologie et Hydrologie*, 36: 67-85.

MAILLIEUX, E., 1930a. Observations nouvelles sur le Silurien de Belgique sur la présence du Ludlowien supérieur dans le Silurien de Sambre-Meuse. *Bulletin du Musée Royal d' Histoire naturelle de Belgique*, 6(15): 1-8.

MAILLIEUX, E., 1930b. Contribution à l'étude du silurien du sous-sol de Hesbaye. *Bulletin du Musée Royal d'Histoire naturelle de Belgique*, 6 (14): 1-4.

MAILLIEUX, E., 1933. Terrains, roches et fossiles de la Belgique, 2 édition. Publications du Musée Royal d'Histoire naturelle de Belgique, 1933: 13-38.

MALAISE, C., 1873. Description du terrain Silurien du centre de la Belgique. *Mémoire couronné de l'Académie Royale da Belgique*, 37: 1-122.

MALAISE, C., 1883. Etudes sur les terrains silurien et cambrien de la Belgique. *Bulletin de l'Académie Royale de Belgique, Classe des Sciences*, 5: 1-30.

MALAISE, C., 1900. Etat actuel de nos connaissances sur le Silurien de la Belgique. *Annales de la Société Géologique de Belgique*, liber memoriales, 25bis, in -4.

MALAISE, C., 1903, Compte rendu de la Session extraordinaire de la Société Géologique de Belgique tenue à Namur, le 19, 20 septembre 1903. *Annales de la Société géologique de Belgique*, 30: 132-134.

MALAISE, C., 1909a. Echelle stratigraphique du Silurien de Belgique et âge géologique des Schistes noirs de Mousty. *Annales de la Société géologique de Belgique,* 36: M31-39.

MALAISE, C., 1909b. Modifications de l'échelle stratigraphique du Silurien de Belgique. *Bulletin de la Société belge de Géologie, de Paléontologie et d'Hydrologie,* 23: 6-8.

MALAISE, C., 1910. Sur l'évolution de l'échelle du siluro-cambrien de Belgique. *Bulletin de la Société belge de Géologie, de Paléontologie et d'Hydrologie,* 24: 415-437.

MALAISE, C., 1911. Sur l'évolution de léchelle stratigraphique du Siluro-Cambrien de Belgique. In: Texte explicatif du levé de la planchette de Genappe. *Service Géologique de Belgique*, pp. 10-12. (also in *Bulletin de la Société belge de Géologie,* 24: 415-437 and *Annales de la Société géologique de Belgique,* 38(1911): 7-28.)

MALETZ, J., 1999. Lowermost Silurian graptolites of the Deerlijk 404 well, Brabant Massif (Belgium). *Jahrbuch für Geologie und Paläontologie, Abhandlungen*, 213: 335-354.

MALETZ, J. & SERVAIS, T., 1998. Upper Ordovician graptolites from the Brabant Massif, Belgium. *Geobios*, 31: 21-37.

MARTIN, F., 1969a. Les acritarches de l'Ordovicien et du Silurien belge. Détermination et valeur stratigraphique. *Mémoires de l'Institut Royal des Sciences naturelles de Belgique*, 160: 1-176.

MARTIN, F., 1969b. Ordovicien et Silurien belge: données nouvelles apportées par l'étude des acritarches. *Bulletin de la Société belge de Géologie*, 77: 175-181.

MARTIN, F., 1976. Acritarches du Cambro-Ordovicien du Massif du Brabant, Belgique. *Bulletin de l'Institut Royal des Sciences naturelles de Belgique*, 51(1)(1975): 1-33.

MARTIN, F. & RICKARDS, B., 1979. Acritarches, chitinozoaires et graptolithes ordoviciens et siluriens de la vallée de la Sennette (Massif du Brabant, Belgique). *Annales de la Société Géologique de Belgique*, 102: 181-197.

MCKERROW, W. S., SCOTESE, C.R. & BRASIER, M.D. 1992. Early Cambrian reconstructions. *Journal of the Geological Society, London,* 149: 599-606.

MICHOT, P., 1927. Sur un gite de graptolithes du Silurien. *Annales de la Société géologique de Belgique*, 50(6): B. 184-185.

MICHOT, P., 1928. La bande silurienne de Sambre-et-Meuse entre Fosse et Boufioulx. *Annales de la Société géologique de Belgique*, 51: M 57-103.

MICHOT, P., 1930. Sur un gite à graptolithes à Voroux-Goreux. Annales de la Société géologique de Belgique, 53: B.198-200.

MICHOT, P., 1931. Une discordance à la base du Caradocien dans la bande silurienne de Sambre-et-Meuse. *Bulletin de l'Acadelmie royale de Belgique, Cl. Sciences. 5è serie,* 17(6): 823-826.

MICHOT, P., 1934. La stratigraphie du Silurien de la bande Sambre-et-Meuse. *Académie royale Belge, Classe Sciences, Mémoires in -8, 2e série,* 13 (2): 1-108.

MICHOT, P., 1954. Le Silurien. *In*: Prodrôme d'une description géologique de la Belgique. pp. 39-82. Imprimerie H. Vaillant Carmanne, Liège.

MICHOT, P., 1957. Description of different formations. *In Pruvost, P., ed., Lexique Stratigraphique International. Volume 1: Europe, Fascicule 4a1: France, Belgique, Pays-Bas, Luxembourg, Antécambrien et Paléozoique Inférieur*, 432 p.

MICHOT, P., 1978. L'Ordovicien de la vallée de la Thyle (Brabant); structure tectonique, stratigraphie et lithologie. *Annales de la Société Géologique de Belgique*, 100: 223-231.

MORTELMANS, G., 1954. Efforts calédoniens et efforts hercyniens dans le silurien de la vallée de l'Orneau, avec discussion. Bull. Soc. belge de géologie, Paléontologie, Hydrologie. 62 (1953). 143-164.

MULLINS, G.L., 1998. Shelf to basin correlation: integrating the Silurian Chitinozoan and graptolite biostratigraphical schemes. *In*: Programme and Abstracts of the CIMP Symposium and workshops (September 11-15, 1998). Pisa, p. 19-20.

NESTOR, V., 1994. Early Silurian chitinozoans of Estonia and North Latvia. *Academia*, 4: 1-163.

NÕLVAK, J. & GRAHN, Y., 1993: Ordovician Chitinozoa zones from Baltoscandia. *Review Palaeobotany and Palynology,* 79: 245-269.

NÕLVAK, J., 1999. Ordovician Chitinozoan biozonation of Baltoscandia. *Acta Universitatis Carolinae-Geologica*, 3(1/2): 287-290.

OMALIUS d'HALLOY, J.J. d', 1842. Coup d'oeil sur la géologie de la Belgique. Bruxelles Hayez.

PACE TMR Network Team & WINCHESTER, J.A., 2002. Palaeozoic amalgamation of Central Europe: new results from recent geological and geophysical investigations. *Tectonophysics*, 360(1-4: 5-21.

PARIS, F., 1981. Les Chitinozoaires dans le Paléozoïque du Sud-Ouest de l'Europe. *Mémoire de la Société Géologique et Minéralogique de Bretagne*, 26: 1-412.

PATIJN, R.J.H. (1963). Het Carboon in de ondergrond van Nederland en de oorsprong van het Massief van Brabant. *Geologie en Mijnbouw*, 42: 341-349.

PHARAOH, T.C.., BREWER, T.S. & WEBB, P.C. (1993b). Subduction-related magmatism of late Ordovician age in eastern England. *In* Pharaoh, T.C., Molyneux, S.G., Merriman, R.J., Lee, M.K. & Verniers, J. (eds.), Proceedings of the International Conference on the Caledonides of the Anglo-Brabant Massif (Nottingham, September 1992). Special Issue on the Caledonides of the Anglo-Brabant Massif. *Geological Magazine*, 130(5): 647-656.

PRICE, N.J. & COSGROVE, J.W. (1990). *Analysis of geological structures*, 502 p. Cambridge: Cambridge University Press.

PRIGMORE, J.K., BUTLER, A.J. & WOODCOCK, N.H., 1997. Rifting during separation of Eastern Avalonia from Gondwana: Evidence from subsidence analysis. *Geology*, 25: 203-207.

READING, H.G. (Ed.), 1978. Sedimentary Environments and Facies, Blackwell, 569 pp.

REGNELL, G., 1951. Revision of the Caradocian-Ashgillian cystoid fauna of Belgium with notes on isolated pelmatozoan stem fragments. *Mémoires de l'Institut royal des Sciences naturelles de Belgique*, 120: 1-47.

ROBASZYNSKI, F. & DUPUIS, C., 1983. Belgique. Guides Géologiques Régionaux. Masson, Paris, 204 pp.

SAMUELSSON, J. & VERNIERS, J., 1999. Middle to Late Ordovician Chitinozoan Biozonation of the Sennette, Dyle-Thyle and Orneau Valleys, Brabant Massif, Belgium. *Acta Universitatis Carolinae-Geologica*, 43(1/2): 299-302.

SAMUELSSON, J. & VERNIERS, J., 2000. Ordovician chitinozoan biozonation of the Brabant Massif, Belgium. *Review of Palaeobotany and Palynology*, 113: 105-129.

SAMUELSSON, J., VECOLI, M. & BEIER, H. 2001. Ordovician - Silurian palynostratigraphy (Chitinotoa and acritarchs) of the G 14-1/86 borehole, southern Baltic Sea. *Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen*, 222: 259-290.

SERVAIS, T., 1991a. Discovery of turbiditical levels in the late Ordovician of the Sennette valley (Brabant Massif, Belgium). *Annales de la Société Géologique de Belgique*, 114: 247-251.

SERVAIS, T., 1991b. Contribution to the stratigraphy of the Ordovician Rigenée Formation (Brabant Massif, Belgium) with a preliminary study on acritachs. *Annales de la Société Géologique de Belgique*, 114: 233-245.

SERVAIS, T., 1993. A critical review of some Ordovician acritarch taxa and their strtaigraphical implications in Belgium and Germany, 3 volumes. Unpublished Ph.D. Thesis, Université de Liège.

SERVAIS, T., HERBOSCH, A. & VANGUESTAINE, M., 1993. Review of the stratigraphy of the Ordovician in the Brabant Massif, Belgium. *Geological Magazine*, 130: 699-710.

SERVAIS, T., POTY, E. & TOURNEUR, F., 1997. The Upper Ordovician coral fauna of Belgium and its palaeobiogeographical significance. *Boletin de la Real Sociedad Espanola de Historia Natural*, 92 (1-4): 259-270.

SHEEHAN, P. M., 1987. Late Ordovician (Ashgillian) Brachiopods from the region of the Sambre and Meuse rivers, Belgium. *Bulletin de l'Institut royal des Sciences naturelles de Belgique, Sciences de la Terre*, 57: 5-81.

SINTUBIN, M., 1997a. Cleavage-fold relationships in the Lower Palaeozoic Brabant massif (Belgium). *Aardkundige Mededelingen*, 8: 161-164.

SINTUBIN, M., 1997b. Structural implications of the aeromagnetic lineament geometry in the Lower Palaeozoic Brabant massif (Belgium). *Aardkundige Mededelingen*, 8: 165-168.

SINTUBIN, M., 1999. Arcuate fold and cleavage patterns in the south eastern part of the Anglo-Brabant Fold Belt (Belgium): tectonic implications. *Tectonophysics*, 309: 81-97.

SINTUBIN, M., BRODKOM, F. & LADURON, D., 1998. Cleavage-fold relationships in the Lower Cambrian Tubize Group, southeast Anglo-Brabant Fold Belt. *Geological Magazine*, 135: 217-226.

SINTUBIN, M. & EVERAERTS, M. (2002). A compressional wedge model for the Lower Palaeozoic Anglo-Brabant Belt (Belgium) based on Potential Field Data. *In* Winchester, J., Pharaoh, T.C. & Verniers, J. (eds.), *Palaeozoic Amalgamation of Central Europe.* Geological Society, London, Special Publications, 201, 327-343.

STEEMANS, P., 1994. Géologie de la région de Puagne, Bande de Sambre-et-Meuse (Belgique). Hypothèses basées sur l'état de maturation des palynomorphes fossiles *Compte Rendu Académie Sciences de Paris, série II*, 318: 1551-1556.

STOW, D.A.V., 1986. Deep clastic seas. *In* Reading, H.G. (ed.), *Sedimentary Environments and Facies*. Blackwell, London, pp. 399-344.

STOW, D.A.V. & PIPER, D.J.W., 1984. Deep-water fine-grained sediments: facies models. *In* Stow D.A.V. & Piper D.J.W. (eds.), *Fine-grained sediments: Deep-water processes and Facies*. Geological Society, London, Special Publications 15: 245-256.

STOW, D.A.V. & SHANMUGAM, G., 1980. Sequence of structures in fine-grained turbidites; comparison of recent deep-sea and ancient flysch sediments. *Sedimentary Geology*, 25: 23-42.

TAIT, J.A., BACHTADSE, V., FRANKE, W. & SÖFFEL, 1997. Geodynamic evolution of the European Variscan fold belt: palaeomagnetic and geological constraints. Geologische Rundschau, 86: 565-598.

TONDEUR, F., GERARDY, I., LICOUR, C. & DUBOIS, N., 1994. Répartition géographique et géologique du risque radon en Belgique francophone. *Annales de l'Association Belge Radioprotection*, 19: 205-226.

TONDEUR, F., GERARDY, I., COUWENBERG, C., HERBOSCH, A. & FESTRAETS, M., 2001. Search and mapping of small radon-prone areas in Walloon Brabant (Belgium) on a geological basis. *Third Eurosymposium on Protection against Radon (Liège)*. extend Abstract, 4 pp.

TORSVIK, T.H., TRENCH, A., SVENSSON, I. & WALDERHAUG, H., 1993. Mid Silurian palaeomagnetic results from the East Mendips Inlier, Southern Britain: Palaeogeographic significance and major revision of the apparent polar wander path for Eastern Avalonia. *Geophysical Journal International*, 133: 651-668.

TOURNEUR, F., VANGUESTAINE, M., BUTTLER, C., MAMET, B., MOURAVIEFF, N., POTY, E. & PRÉAT, A., 1993. A preliminary study of Ashgill carbonate beds from the lower part of the Fosses Formation (Condroz, Belgium). *Geological Magazine* 130(5): 673-679.

TRENCH, A. & TORSVIK, T.H., 1991. A revised Paleozoic apparent polar wander path for south Britain (eastern Avalonia). *Geophysical Journal International,* 104:227-233.

VAN DEN HAUTE, P. & VERCOUTERE, C., 1990. Apatite fission-track evidence for a Mesozoic uplift of the Brabant Massif: preliminary results. *Annales de la Société Géologique de Belgique*, 112 (1989): 443-452.

VANDENVEN, G., 1967. Les remaniements de la schistosité des roches siluriennes dans la bordure méridionale du massif du Brabant. *Annales de la Société Géologique de Belgique*. 90: 519-531.

VANDER AUWERA, J. & ANDRÉ, L., 1985. Sur le milieu de dépot, l'origine des matériaux et le faciès métamorphique de l'Assise de Tubise (Massif du Brabant, Belgique). *Buletin de la Société belge de Géologie*, 94(2): 171-184.

VAN GROOTEL, G., VERNIERS, J., GEERKENS, B., LADURON, D., VERHAEREN, M., HERTOGEN, J. & DE VOS, W., 1997. Timing of magmatism, foreland basin development, metamorphism and inversion in the Anglo-Brabant fold belt. *Geological Magazine*, 134(5): 607-616.

VAN GROOTEL, G. & VERNIERS, J, 1998. The Upper Ordovician of Fauquez area (Brabant Massif, Belgium), Lithostratigraphy and Biostratigraphy. In: G. Van Grootel, J. Samuelsson and J. Verniers (Authors), 1998. Project NAT/96-3.3 Micropaleontologie en biostratigrafie van het Ordovicium. Unpublished report to the Belgian Geological Survey, 17-55.

VAN GROOTEL, G., ZALASIEWICZ, J., VERNIERS, J. & SERVAIS, T., 1998. Chitinozoa and graptolite biozonation of the Aeronian and lower Telychian in the Brabant Massif (Belgium). *Temas Geológico-Mineros ITGE* (Madrid), 23: 135-136.

VANGUESTAINE, M., 1978. Données palynologiques nouvelles dans l'Ordovicien inférieur de la Senne, Massif du Brabant, Belgique. *Annales de la Société Géologique de Belgique*, 100(1977): 193-198.

VANGUESTAINE, M., 1991. Datation par acritarches des couches cambro-trémadociennes les plus profondes du sondage de Lessines (bord méridional du Massif du Brabant, Belgique). *Annales de la Société Géologique de Belgique*, 114: 213-227.

VANGUESTAINE, M., 1992. Biostratigraphie par acritarches du Cambro-Ordovicien de Belgique et des régions limitrophes: synthèse et perspectives d'avenir. *Annales de la Société Géologique de Belgique*, 115: 1-18.

VANGUESTAINE, M., SERVAIS, T. & STEEMANS, P., 1989. Biostratigraphy of 28 boreholes in the Brabant Massif. Abstracts of the International Meeting on the Caledonides of the Midlands and the Brabant Massif, p. 46.

VANMEIRHAEGHE, J. & VERNIERS, J. (submitted). Chitinozoan biostratigraphy and lithostratigraphy of the Fosses and Génicot Formations: the Hirnantian glaciation in Belgium? *Review of Palaeobotany and Palynology*.

VAN TASSEL, R., 1986. Contribution à la lithologie du segment caledonien des vallées de la Dyle et de la Thyle, Brabant, Belgique. *Aardkundige Mededelingen,* 3: 239-268.

VERNIERS, J., 1976. *Het Siluur van de Mehaigne. Stratigrafie en Chitinozoa,* 2 delen. Unpublished Ph.D. Thesis, Laboratorium voor Paleontologie, Rijksuniversiteit Gent.

VERNIERS, J., 1981. The Silurian of the Mehaigne Valley (Brabant Massif, Belgium); Biostratigraphy (Chitinozoa). *Revue of Palaeobotany and Palynology*, 34: 165-174.

VERNIERS, J., 1982. The Silurian chitinozoa of the Mehaigne area (Brabant Massif, Belgium). *Professional Paper of the Geological Survey of Belgium,* 192: 1-76.

VERNIERS, J., 1983a. The Silurian of the Mehaigne area (Brabant Massif, Belgium), lithostratigraphy and features of the sedimentary basin. *Professional Paper of the Geological Survey of Belgium,* 203: 1-117.

VERNIERS, J., 1983b. L'Ordovicien-Silurien du Massif du Brabant et le Dévono-Carbonifère du Synclinorium de Namur dans la Vallée de l'Orneau. Première journée: L'Ordovicien et le Silurien du Massif du Brabant. In: Itinéraire 9 in Belgique (F. ROBASZYNSKI, C. DUPUIS, eds.), pp. 147-151. Guides Géologiques Régionaux. Paris: Masson. ISBN 2-225-75394-6.

VERNIERS, J., 1999. Calibration of Wenlock Chitinozoa versus graptolite biozonation in the Wenlock of Builth Wells district (Wales, U.K.), compared with other areas in Avalonia and Baltica. Bollettino della Società paleontologica italiana, 38 (2-3): 359-380.

VERNIERS, J., ANDRE, L., HERBOSCH, A. & VANGUESTAINE, M. (1991). Introduction to the International Meeting on the Caledonides of the Midlands and the Brabant Massif. *Annales de la Société géologique de Belgique*, 114 (1): 1-3.

VERNIERS, J. & DE VOS, W., 1995. Recent research on the Brabant Massif. *Studia Geophysica et Geodaetica,* 39: 347-353.

VERNIERS, J., HERBOSCH, A., VANGUESTAINE, M., GEUKENS, F., DELCAMBRE, B., PINGOT, J.L., BELANGER, I., HENNEBERT, DEBACKER, T., SINTUBIN, M. & DE VOS, W., 2001. Cambrian-Ordovician-Silurian lithostratigraphical units (Belgium). *In* Bultynck, P. & Dejonghe, L. (eds.), *Guide to a revised lithostratigraphical scale of Belgium.* Geologica Belgica, 4 (1-2): 5-38.

VERNIERS, J., NESTOR, V., PARIS, F., DUFKA, P., SUTHERLAND, S. & VAN GROOTEL, G., 1995. A global Chitinozoa biozonation for the Silurian. *Geological Magazine*, 132(6): 651-666.

VERNIERS, J., PHARAOH, T., ANDRÉ, L., DEBACKER, T., DE VOS, W., EVERAERTS, M., HERBOSCH, A., SAMUELSSON, J., SINTUBIN, M. & VECOLI, M., 2002a. The Cambrian to mid Devonian basin development and deformation history of Eastern Avalonia, east of Midlands Microcraton, new data and a review. *In* Winchester, J., Pharaoh, T. & Verniers, J. (eds.), *Palaeozoic Amalgamation of Central Europe.* Geological Society, London, Special Publications 201, 47-93.

VERNIERS, J. & RICKARDS, B., 1979. Graptolithes et chitinozoaires Siluriens de la vallée de la Burdinale, Massif du Brabant, Belgique. *Annales de la Société Géologique de Belgique,* 101 (1978): 149-161.

VERNIERS, J., SAMUELSSON, J., VAN GROOTEL, G., DE GEEST, P. & HERBOSCH, A., 1999. The Ordovician in Belgium: new litho- and biostratigraphical data with Chitinozoa from the Brabant Massif and the Condroz Inlier (Belgium). *Acta Universitatis Carolinae-Geologica*, 43(1/2): 93-96.

VERNIERS, J. & VAN GROOTEL, G., 1991. Review of the Silurian in the Brabant Massif, Belgium. *In* André, L., Herbosch, A., Vanguestaine, M. & Verniers, J. (eds.), *Proceedings of the international meeting on the Caledonides of the Midlands and the Brabant Massif (Brussels, 20-23 September 1989).* Annales de la Société Géologique de Belgique 114(1): 163-193.

VERNIERS, J., VAN GROOTEL, G., LOUWYE, S. & DIEPENDAELE, B., 2002b. The chitinozoan biostratigraphy of the Silurian of the Ronquières-Monstreux area (Brabant Massif, Belgium). *Review of Palaeobotany and Palynology,* 118 (1-4), 287-322.

WATERLOT, G., BEUGNIES, A., BONTE, A., CHARLET, J.M., CORSIN, P., BINTZ, J., HARY, A., & MULLER, A., 1973. Ardenne - Luxembourg. Ardennes. Guides Géologiques Régionaux. Itinéraire 10: 89-98. Masson, Paris.

WEBBY, B.D., 1998. Steps towards a global standard for the Ordovician stratigraphy. *Newsletter Stratigraphy*, 36(1): 1-33.

ZALASIEWICZ, J., WILLIAMS, M., VERNIERS, J. & JACHOWICZ, M., 1998. A revision of the graptolite biozonation and calibration with the chitinozoa and acritarch biozonations for the Wenlock succession of the Builth Wells district, Wales, U.K. *Temas Geológico-Mineros ITGE (Madrid)*, 23: 141.

ZALASIEWICZ, J. & WILLIAMS, M., 1999. Graptolite biozonation of the Wenlock Series (Silurian) rocks of the Builth Wells district, central Wales. *Geological Magazine*, 136: 263-283.

Manuscript received on 1.07.2002 and accepted for publication on 15.12.2002.