Lower Paleozoic

Commission members
Proposals and discussion
Lithostratigraphy
Chronostratigraphy

2.1.2 Tubize Formation - TUB

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Authors: Malaise, 1873: «Assise de Tubize ou des quartzites et phyllades aimantifères»; modified by Vander Auwera & Andre, 1985; De Vos et al., 1993; Herbosch et al., Ittre-Rebecq map, in press; Herbosch, 2009 (herein).

Description: The formation mainly consists of slate (mudstone and siltstone), but also of sandstone, arkose and greywacke. It is easily recognisable by the dominant greyish green colour and the frequent presence of magnetite. No contact is observed with the underlying Blanmont Formation or with the overlying Oisquercq Formation.

Its best outcrop is in the Senne basin area, where Vander Auwera & André (1985) described three (at that time) new informal lithostratigraphic units from bottom to top: the Rogissart Unit, covered by the Fabelta Unit and on its turn covered by the Forges Unit. The contacts between these units have also nowhere been observed. Geological mapping (Herbosch et al., Ittre-Rebecq map, in press) showed that the Rogissart Unit is sufficiently characteristic to be defined as the Rogissart Member (ROG) and that the facies of the two other units correspond to the lower part of the «Assise de Oisquercq (Rv1a)» as described by Legrand (1968, p. 15). Magnetite is observed in this lower part and also Oldhamia (Asselberghs, 1918). In consequence it seems more logical to include it in the upper member of the Tubize Formation under the name «Les Forges Member (FRG)». These two members were formalized in Verniers et al. (2001). The Fabelta unit was no more recognized as a separate unit.

Members: We agree with Legrand (1968) that a lower dominantly pelitic member occurs, although badly outcropping in the Senne area (only near Halle not far from Blanmont Fm.; see Piessens et al., 2004 fig. 33). During later geological mapping it was recognized in the Dyle basin and named the Mont-Saint-Guibert Member (Herbosch et al., in press). In the latter basin, whether to the W towards Genappe or to the E towards Mont-St-Guibert and Ottignies, the same general characteristics such as green colour and the occurrence of magnetite, are always present, with however an overall more fine-grained and argillaceous lithology. Nevertheless, some zones of sandstone-siltstone-slate forming decimetric Bouma sequences can be observed locally (similar to this described by Sintubin et al. (2002) at Mont-St-Guibert). The arkose or coarse-grained greywackes of the Rogissart Member and the fine and sometimes grey-blue rocks of the Les Forges Member are never observed. It is the reason why we believe that the outcropping zone Beaurieu - Mont-St-Guibert (Orne valley, Dyle basin), very close and above the Blanmont Fm., belong to the lowermost part of the Tubize formation: the new Mont-St-Guibert Member (MSG).

The middle member of the formation is the thick Rogissart Member (ROG). It contains light-coloured fine to coarse-grained quartzitic sandstone, feldspathic sandstone, arkose, greywacke in decimetric to metric beds, alternating with more or less clayey siltstone and green slate (claystone), forming together fining upward sequences. Magnetite is often present, mostly in the slate. The sandstone beds show massive, plane, oblique and sometimes convolute laminations. The rhythmic sedimentation is interpreted as high density turbidite of the Bouma (1962) type. This member seems to be absent in the Dyle Basin.

The upper unit is the Les Forges Member (FRG). It is mainly formed by grey-green to dark grey-blue homogeneous to zoned slate (mudstone to siltstone), sometimes with magnetite. The dark grey-blue colour is a distinctive characteristic of this member (Asselberghs, 1918; Legrand, 1968; Herbosch et al., in press). Mostly complete decimetric Bouma sequences in metric series or isolated within the slate continue to be observed. One can observe very green and characteristically millimetric to centrimetric beds with abundant chlorite (Vander Auwera & André, 1985). The size and the structure of these beds, and particularly the succession of fining upward wavy chlorite laminae, are very similar to the fine-grained turbidite model of Stow & Shanmugam (1980). These observations suggest an origin as low density turbidity currents modified by subsequent metamorphism (Herbosch et al., in press). This member was never observed in the Dyle Basin.

Stratotype: not yet defined. Best outcrops of the Rogissart Member are in the Hain valley (Senne basin) around Hameau du 45 where many outcrops and old quarries can be observed (e.g. Rogissart x 140,5 y 152,12). Good observation of the Mont-St-Guibert Member in the Orne valley between Mont-St-Guibert and Beaurieu (Mont-St Guibert x 168,27 y 147,00; Beaurieu x 166,07 y 148,05 and x 165,32 y 147,70; see also Delcambre & Pingot, 2002 fig. 6, 7)

Area: outcrop area in the Brabant Massif: Senne and Dyle basin. Removed by fault (Asquempont Detachment System) in the Gette basin (Raynaud, 1952; Herbosch et al., 2008). Many boreholes in the subsurface central part of the Brabant Massif.

Thickness: estimated at more than 2 km; the Rogissart Member on its own is 800 to 1.000 m thick (Herbosch et al., 2008 & in press).

Age: the trace fossil *Oldhamia* was found in all of the three members (Malaise, 1883a, 1883b, 1900; Stainier, 1889; Asselberghs, 1919; Corin, 1935; Van Tassel, 1986; Legrand, 1968; Herbosch, recent observations). One can tentatively attribute an age by comparison with the upper part of the Deville Group in the Ardennes inliers. Indeed, the occurrence of *Oldhamia* in the Rocroi inlier (lower part of the 4 Fils Aymon Formation) and in the Stavelot inlier (middle part of the Bellevaux Formation) were dated by acritarchs (Vanguestaine, 1992, fig. 2 & 4, zone 0) from the interval between the middle part of the Lower Cambrian and the lower part of the Middle Cambrian. In age this corresponds to the trilobite biozones in Baltica ranging from the *Holmia* Zone to the *Paradoxides oelandicus* Zone. In the new global Cambrian stratigraphy (Peng & Babcock in Gradstein et al., 2008) this interval is situated between the upper part of Stage 3 (Series 2) to about the 3/4 of Stage 5 (Series 3) (base of the *P. gibbus* Zone).

Remarks: Synonyms: «Formation des quartzophyllades verts de Tubize» (Beugnies in Waterlot et al.,1973; the unnamed lower member «Rv1a» of Legrand (1968) is considered a synonym of the Les Forges Member, Tubize Formation; «Tubize Group» (De Vos et al., 1993).