Early Cambrian trilobites from northern Scandinavia

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Ptychopariid trilobites from the uppermost local Lower Cambrian north of the lake Torneträsk, northern Swedish Lappland, and eastern Troms, northern Norway, are described. The available material consists of only eleven incomplete cranidia, collected by T. Vogt in 1915 from three localities in the autochthonous sequence of the Scandinavian Caledonides. The cranidia are referred to two species: Ellipsoscephalus cf. gripi and Strenueva inflata. The former was collected from a somewhat lower level than the latter. In addition a fragmentary meraspis cranidium is described and questionably referred to the genus Ellipsoscephalus.


Along the eastern margin of the Scandinavian Caledonides, Lower Cambrian trilobites have been recorded from a variety of localities. The majority of these localities are situated in the narrow strip of autochthonous sediments of the Caledonian Front. However, important trilobite localities are also known in the allochthonous sequence, e.g. the classical locality of Tømten, Ringsaker, Norway, and the locality in the overthrusted nappe of the mountain Luopakte, south of the lake Torneträsk, northern Sweden (see Ahlberg 1979).

North of Torneträsk, northern Swedish Lappland, and in eastern Troms, northern Norway, Lower Cambrian trilobites have been recorded from three principal localities in the autochthonous sediments (Vogt 1967) (Fig. 1):

1. South of the mountain Vaivantjåkka, north of Torneträsk, northern Swedish Lappland. The locality is situated in a small brook about 2 km E of the mouth of the rivulet Vakkejåkka (Vakkejokk, Ortojokk).
2. The southeasternmost part of the mountain Doarrovarre, eastern Troms, northern Norway.
3. A small brook about 1 km S of Frihetsli in the valley Dividalen, eastern Troms, northern Norway.

In addition, a fragmentary trilobite larva is known from a boulder at Rökskar, south of the lake Altevatnet, eastern Troms.

South of Torneträsk, Lower Cambrian trilobites are known from the uppermost local Lower Cambrian of Luopakte (layer 23, profile II, Moberg 1908) in the autochthonous sequence. These have been described by Moberg (1908) and Ahlberg & Bergström (1978) and comprise the following species: Strenueva inflata Ahlberg & Bergström, 1978, Comluella? lapponica Ahlberg, 1979 and Proampyx triangularis Ahlberg & Bergström, 1978. Lower Cambrian trilobites have also been obtained from the overthrust rocks of Luopakte (see Ahlberg 1979), and they are closely comparable to the trilobites from the autochthonous sequence of Luopakte.

Eight specimens of trilobites are known from Doarrovarre and Frihetsli. They were obtained from a calcareous bed (member F 3, Vogt 1967) on top of a sequence of shales underlying the alum shales. This fossiliferous impure limestone has a maximum thickness of 1.7 m, and it is regarded as the top of the local Lower Cambrian (Vogt 1967: 14). Apart from trilobites, this bed has also yielded some inarticulate brachiopods, in Vogt (1967) referred to Obolus cf. favosus (= Glyptias cf. favosa). Probably all trilobite specimens can be referred to Strenueva inflata, known from Luopakte. As indicated by the fauna, the lithology and the position in the sequence, member F 3 of Vogt (1967), is correlatable with the trilobite-bearing bed (layer 23, profile II, Moberg 1908) in the autochthonous sequence of Luopakte. The alum shale overlying the fossiliferous limestone has not yielded any fossils and it is not certain whether it is Middle or Late Cambrian in age.

From the locality at Vaivantjåkka two trilobite cranidia associated with obolellid? and lingulid brachiopods have been collected at a somewhat lower level (member F 1, Vogt 1967) than the
faunas above. One of the cranidia is here referred to *Ellipsocephalus* cf. *gripi* (Kautsky 1945). The other is too fragmentary for identification.

For further information regarding the collecting sites, and the geology and stratigraphy of the Troms area, northern Norway, the reader is referred to Vogt (1967). The Caledonian geology in the northern part of the Swedish Lappland has been treated by Kulling (1960, 1964). The geology and stratigraphy of the autochthonous Cambrian rocks of the Scandinavian Caledonides are summarized by Martinsson (1974:233–238).
Table 1. Generalized stratigraphic table of the autochthonous sequence in northern Swedish Lappland (Luopakte) and eastern Troms, northern Norway, showing the distribution of selected fossils.

<table>
<thead>
<tr>
<th>Layer Number</th>
<th>Description</th>
<th>Location</th>
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<tbody>
<tr>
<td>21-22</td>
<td>Impure limestone</td>
<td>F1, Vogt (1967)</td>
</tr>
<tr>
<td>20</td>
<td>Impure limestone</td>
<td>F1, Vogt (1967)</td>
</tr>
<tr>
<td>24</td>
<td>Alum shale</td>
<td>Moberg 1908</td>
</tr>
<tr>
<td>23</td>
<td>Marly shale and limestone</td>
<td>Moberg 1908</td>
</tr>
<tr>
<td>22</td>
<td>Impure limestone</td>
<td>Moberg 1908</td>
</tr>
<tr>
<td>21</td>
<td>Green shale</td>
<td>Moberg 1908</td>
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</tbody>
</table>

**Fig. 2.** Generalized stratigraphic table of the autochthonous sequence in northern Swedish Lappland (Luopakte) and eastern Troms, northern Norway, showing the distribution of selected fossils. The occurrence of *Vendotaenia* sp. according to personal communication by G. Vidal, 1979. *Ellipsocephalus cf. gripi* and inarticulate brachiopods recorded from member F1 of Vogt (1967), from the locality at Vaivantjåkka, north of Torneträsk, northern Swedish Lappland, have been included in the Troms section because of the stratigraphic importance.
Systematic palaeontology

**Material.** – 11 cranidia and some indeterminable fragments. All the material was collected by T. Vogt in 1915. Since then no additional specimens have been added, and the collection of Vogt forms the basis for this paper.

**Preservation.** – Most cranidia are preserved as internal or external moulds. Two specimens are preserved with the exoskeleton. Remnants of the exoskeleton are present in three cranidia. The majority of the cranidia are probably affected by dorso-ventral compression, and in a few cases they have also undergone tectonic distortion to some extent.

**Repository.** – All figured specimens except the holotype of *Strenuaeva inflata* are deposited in Palaeontologisk museum, Oslo, Norway (catalogue numbers preceded by PMO). The unfigured material is also housed in that museum. The cited specimen of *S. inflata* is in the collections of the Geologiska institutionen, Lunds universitet, Lund, Sweden.

**Terminology.** – Morphological terms used are in accordance with Harrington, Moore & Stubblefield (in Moore 1959). The symbols used in the synonymy lists are explained by Matthews (1973:717–718).

**Order** PTYCHOPARIIIDA

**Superfamily** SOLENOPLEURACEA Angelin, 1854

**Family** SOLENOPLEURIDAE Angelin, 1854

**Subfamily** ELLIPSOCEPHALINAE Matthew, 1887

**Genus** Ellipsocephalus Zenker, 1833

*Ellipsocephalus cf. gripi* (Kautsky, 1945)

Fig. 3, C


**Material.** – The right half of a single cranidium, preserved as an internal mould with remnants of the exoskeleton.

**Description.** – The glabella tapers gently forwards and occupies about two-thirds the total cranidial length. Three pairs of lateral glabellar furrows are evident, none of them deeply incised. The dorsal furrows are only slightly impressed and the glabella is set off from the fixigenae mainly by its convexity. The occipital ring is sagittally comparatively wide. The occipital furrow is distinct, wide and bowed forward medially. The frontal area is convex and slopes down to the anterior margin. The cranidium is evenly rounded anteriorly. The anterior sections of the facial suture diverge forwards. The fixigena is incomplete but seems to be more or less horizontal. Distinct eye ridges are not present.

**Measurements.** – Length (sag.) of cranidium 16.6 mm; length (sag.) of glabella 10.5 mm; length (sag.) of occipital ring 2.5 mm; width (sag.) of occipital furrow 1.0 mm.

**Remarks.** – The frontal area seems to be slightly shorter (sag.) and the occipital ring is comparatively longer (sag.) than in specimens of *E. gripi* from the type locality at Aistjakk, east of the village of Laisvall, northern Sweden. Furthermore, the present cranidium does not display a raised rectangular field on the fixigena, as in internal moulds of Aistjakk material of *E. gripi*.

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A closely comparable form is known from the allochthonous sequence of Luopakte (see Ahlberg 1979:8, fig. 3H), but it is also provided with a longer frontal area and a shorter occipital ring than the present cranidium.

**Occurrence.** – Member F 1 (Vogt 1967) at Vaivantjåkka, north of Torneträsk, northern Swedish Lappland.

**Genus Strenuaeva Richter & Richter, 1940**

**Strenuaeva inflata Ahlberg & Bergström, 1978**

<table>
<thead>
<tr>
<th>Fig.</th>
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<th>Remarks.</th>
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<tr>
<td>3, A-B, D-E</td>
<td>– One incomplete cranidium with the exoskeleton. It is slightly obliquely distorted. Seven incomplete cranidia are doubtfully assigned to the species.</td>
<td>– The cranidium is wider than long. The posterior portion of the glabella is parallel-sided, narrow, and separated from the fixigenae by well impressed dorsal furrows. The glabella is expanded anteriorly and reaches to the inner margin of the anterior border furrow. However, the anteriorly expanded part of the glabella is ill defined. Distinct transglabellar furrows are not present. The anterior border is narrow and well defined. It is of uniform width. Behind the border there is a wide and distinct anterior border furrow. The fixigenae are gently convex. Eye ridges are not apparent. The palpebral furrow is wide (tr.) and distinct.</td>
<td>– Axial length of cranidium (estimated) 1.0 mm; width of cranidium at eyes (estimated) 1.4 mm; width of posterior part of glabella 0.3 mm.</td>
<td>– Particularly one specimen (Fig. 3, B) measuring 5.1 mm in length agrees well with the description given by Ahlberg &amp; Bergström (1978:20). However, the fixigenae are not as inflated and the dorsal furrows are not as impressed as in the specimens from the type locality, but this may be due to dorso-ventral compression. Furthermore, all known specimens of <em>S. inflata</em> from the type locality are preserved as internal moulds, and this can also explain the lower relief in the present cranidium, which is preserved with the exoskeleton. However, the shape of the inflated part of the fixigenae (they are curved and narrow forwards) indicates that the specimen in question must be referred to <em>S. inflata</em>. In addition to the description of Ahlberg &amp; Bergström (1978) it can be noted that terrace lines are present on the exterior surface of the exoskeleton along the anterior margin. Otherwise the surface seems to be smooth. Unfortunately the occipital ring in the specimen is too poorly preserved to show any sculpture. The specimens questionably referred to the species differ mainly in having considerably lower facial topography than the specimens from the type locality, but this may be the effect of compression. Besides flattening, the majority of</td>
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these specimens are probably also sagittally elongated (the L-form of Henningsmoen 1960) due to tectonic distortion. They are very similar to transversely compressed specimens of the form referred to *Strenuaeva* sp. from the allochthonous sediments of Luopakte (see Ahlberg 1979), and without hesitation they belong to the same species. A typical character in some well preserved cranidia from the allochthonous sequence of Luopakte is the prosopon of fine raised lines on the occipital ring (Ahlberg 1979, fig. 3E). Also one specimen (Fig. 3, E) in the collection of Vogt exhibits traces of similar lines on the occipital ring. The other specimens are too fragmentary to show any similar details.

**Occurrence.** – Member F 3 (Vogt 1967) at the southeasternmost part of Doarrovarre and at Frihetsli in Dividalen.

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References


