

PER AHLBERG

EARLY CAMBRIAN TRILOBITES
FROM MOUNT LUOPAKTE
NORTHERN SWEDEN



UPPSALA 1979

SVERIGES GEOLOGISKA UNDERSÖKNING

SERIE C NR 765

AVHANDLINGAR OCH UPPSATSER

ÅRSBOK 73 NR 6

PER AHLBERG

EARLY CAMBRIAN TRILOBITES
FROM MOUNT LUOPAKTE
NORTHERN SWEDEN

UPPSALA 1979

ISBN 91-7158-179-0



A contribution to
PROJECT PRECAMBRIAN-CAMBRIAN
BOUNDARY
(IGCP Accession Number 29)

Kartan på sid. 4 godkänd ur sekretessynpunkt för spridning.
Statens lantmäteriverk 1979-11-08.

Address:
Per Ahlberg
Department of Historical Geology and Palaeontology
Sölvegatan 13, S-223 62 Lund, Sweden

CONTENTS

Abstract	3
Introduction	3
Systematic descriptions	5
<i>Comluella? lapponica</i> n. sp.	5
<i>Ellipsocephalus</i> cf. <i>gripi</i> (Kautsky, 1945)	8
<i>Strenuaeva</i> sp.	9
Undetermined librigenae	11
Acknowledgements	12
References	12

ABSTRACT

Ahlberg, P.: Early Cambrian trilobites from Mount Luopakte, northern Sweden. SGU C 765. Manuscript submitted 28th November, 1978.

Early Cambrian ptychopariid trilobites from sedimentary rocks of the lowermost overthrust nappe of Mount Luopakte, south of Lake Torneträsk, northern Sweden, are described. About 50 specimens, most of them distorted, have been examined and referred to three forms: *Comluella? lapponica* n. sp., *Ellipsocephalus* cf. *gripi* and *Strenuaeva* sp. This fauna agrees remarkably well with the trilobite fauna from the autochthonous beds of Mount Luopakte.

INTRODUCTION

In 1950 G. Bexell discovered a fossiliferous limestone in the thrust sediments lying above the autochthonous sequence at Mount Luopakte (Luopahta, Luovare), south of Lake Torneträsk, northern Sweden. Additional collections were made by Bexell in 1951, 1953 and 1954. According to Bexell's field note-books, the location of the outcrop is situated in the creek north of the eastern scarp of Mount Luopakte (about 500 m S of the place of sacrifice, Fig. 1). The scarp can be located on the map sheet 4 Torneträsk at point 1192 (*Generalstabens karta över Sverige, norra delen, 1:200 000*). For some reason, the creek is not marked on the latest edition of the topographical map of Sweden (*Topografisk karta över Sverige, map sheet 30J Rensjön, 1:100 000*). On this map point 1187 corresponds to point 1192. According to the UTM system, the position of the locality in the grid of the modern topographical map of Sweden is DA 373 675.

The fauna was obtained from lenses and intercalated beds of a dark, grey limestone in a slate (the thrust unit above the alum shale). The various types of fossils encountered (including, e.g. trilobites, inarticulate brachiopods and *Hyolithellus*) were listed in Kulling (1960:43), who also gave a brief account of the geology of the area. Unfortunately, the fauna has never been described or illustrated, except for three trilobite librigenae figured by Ahlberg and Bergström (1978, Pl. 4, Figs. 6–8).

About 50 specimens of trilobites are available for examination. Mainly

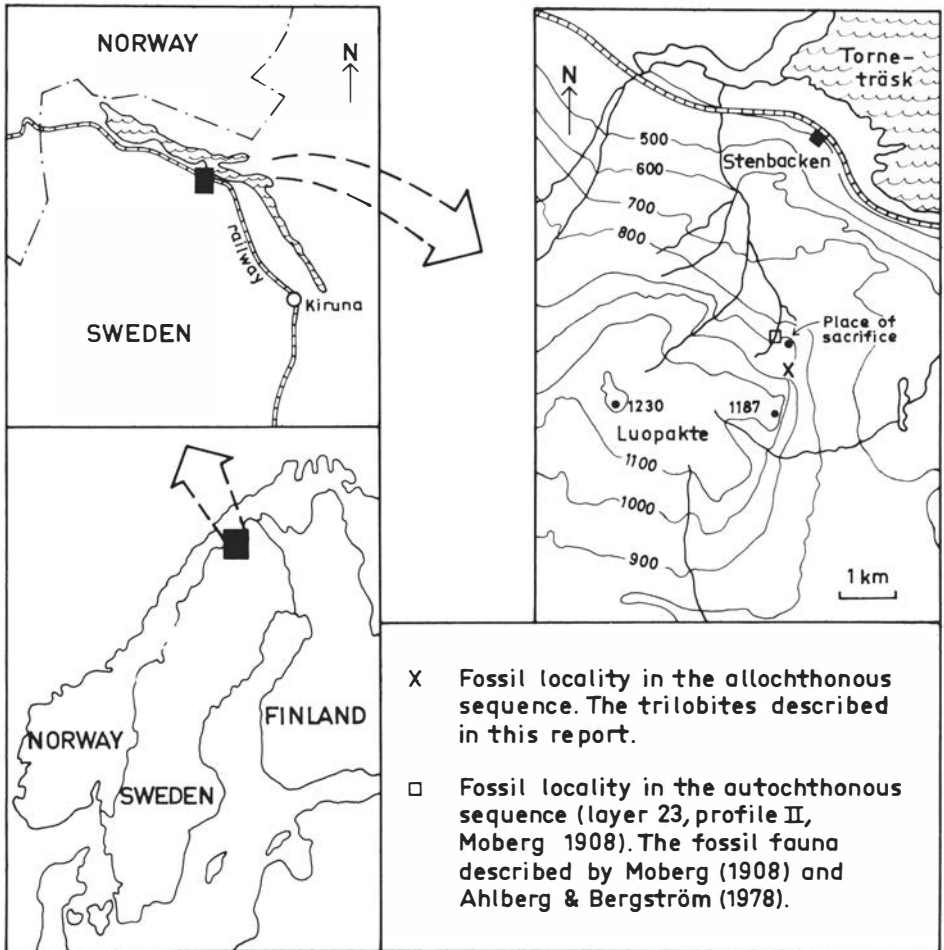


Fig. 1. Map showing the location of the fossil collecting site. Slightly modified from the topographical map of Sweden (*Topografisk karta över Sverige*, map sheets 30I Abisko and 30J Rensjön, 1:100 000).

cranidia are present. Most of them are preserved with the exoskeleton (as a mineral replacement). However, internal moulds are not uncommon. Almost every specimen is badly distorted tectonically, which makes determinations difficult. According to the fossil list in Kulling (1960:43), Bexell probably referred all specimens to *Strenuella* cf. *gripi* Kautsky, 1945. This species was referred to the genus *Ellipsocephalus* by Ahlberg and Bergström (1978). However, only two cranidia in the collection are reminiscent of *Ellipsocephalus gripi*, as known from Aistjakk, Lappland, northern Sweden. The others fall into two different forms, referred to *Comluella?* *lapponica* n. sp. and *Strenu-*

aeva sp. The fauna probably belongs to zone 4 of Ahlberg and Bergström (1978, Fig. 1). It agrees remarkably well with the trilobite fauna from the autochthonous beds of Mount Luopakte (see Fig. 1).

The classification is according to Bergström (1973) and Ahlberg and Bergström (1978). The terminology employed is mainly that defined by Harrington, Moore and Stubblefield (*in* Moore 1959). As all specimens are distorted to a greater or lesser degree, no dimensions are included in the descriptions. Numbers preceded by "SGU" refer to specimens in the type collections of the Geological Survey of Sweden. The symbols used in the synonymy lists are explained by Matthews (1973:717–718). All the illustrated specimens have been whitened with magnesium oxide prior to photography.

SYSTEMATIC DESCRIPTIONS

Class TRILOBITA Walch, 1771

Order PTYCHOPARIIDA Swinnerton, 1915

Superfamily SOLENOPLEURACEA Angelin, 1854

Family SOLENOPLEURIDAE Angelin, 1854

Subfamily ELLIPSOCEPHALINAE Matthew, 1887

Genus *Comluella* Hupé, 1953

Comluella? lapponica n. sp.

Fig. 2 A–H

v. 1908 *Ellipsocephalus Nordenskiöldi* Linrs. – Moberg, p. 27, Pl. 1, Figs. 6–7.

v. 1974 *Strenuaeva linnarssoni* – Martinsson, p. 236.

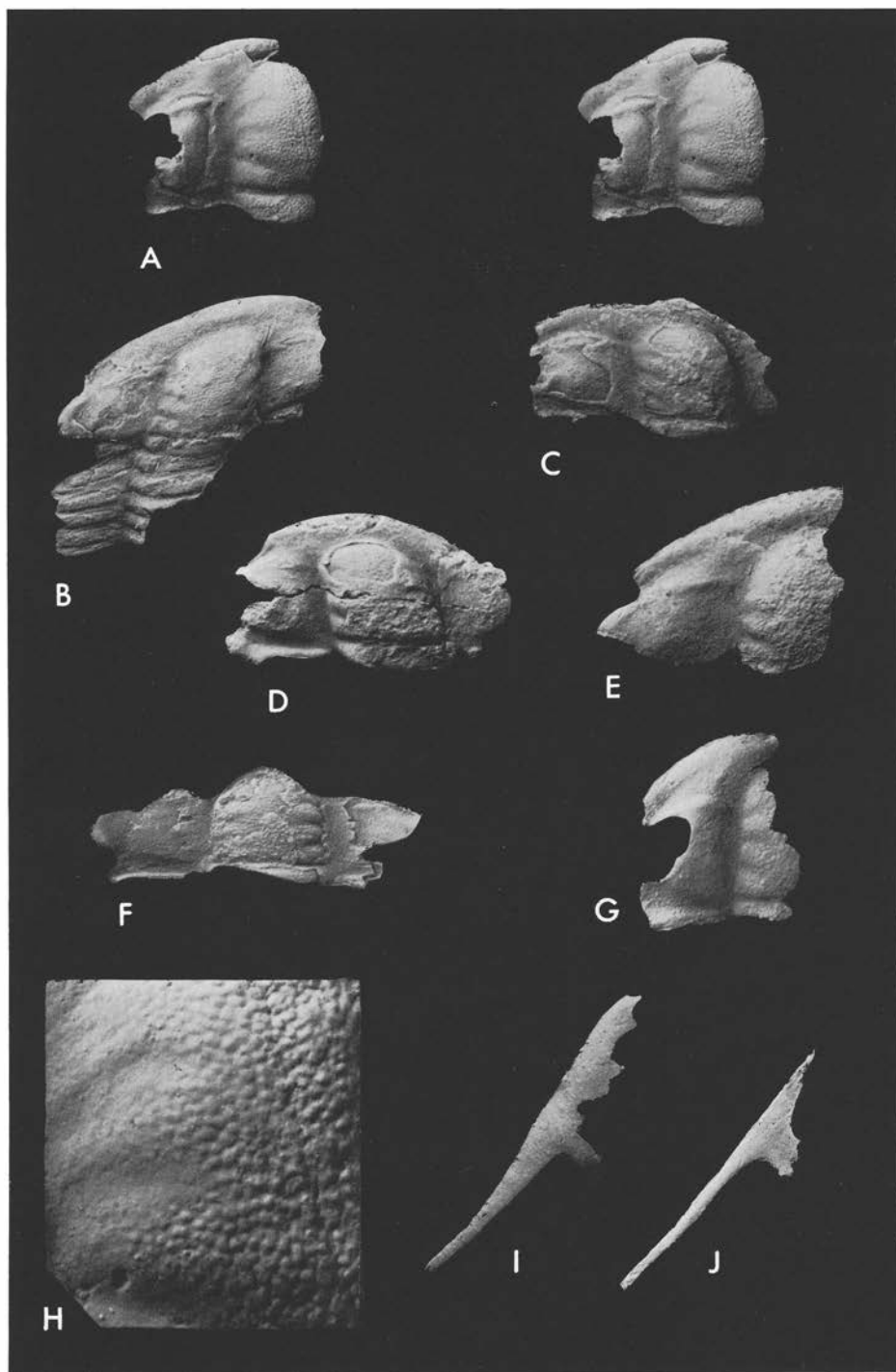
v. 1978 *Comluella?* sp. – Ahlberg and Bergström, p. 30, Pl. 4, Figs. 11–12.

DERIVATION OF NAME. – Latinized from Lappland (Latin: *Lapponia*), the northernmost province of Sweden.

HOLOTYPE. – SGU Type 83. An external mould of an incomplete cranidium with a sagittal length of 12.5 mm. Illustrated in Fig. 2 A.

OTHER MATERIAL. – 14 incomplete and more or less distorted cranidia, and one flattened cranidium with five articulated thoracic tergites.

TYPE STRATUM AND TYPE LOCALITY. – The type specimen was collected by G. Bexell from limestone lenses of the lowermost overthrust nappe of Mount Luopakte, south of Lake Torneträsk, northern Sweden. The outcrop is



situated in the creek about 500 m S of the northeasternmost scarp of Mount Luopakte (the place of sacrifice, Fig. 1).

DISTRIBUTION. – In addition to the type stratum and type locality where it occurs in the same lump of rock as *Strenuaeva* sp. (described below), the species is known from the autochthonous sediments of Mount Luopakte (layer 23, profile II, Moberg 1908).

DIAGNOSIS. – A species questionably assigned to *Comluella* with distinct eye ridges, subparallel-sided glabella which is rounded in front, short (sag.) frontal area and convex (tr.) palpebral lobes. The main part of the fixigenae slopes inwards towards the dorsal furrow. The exterior surface of the exoskeleton is granulose.

DESCRIPTION. – The glabella is subparallel-sided, tapering gently forwards, and is evenly rounded anteriorly. It is of medium convexity and provided with three pairs of distinct lateral glabellar furrows, which are deepest in the middle. The occipital furrow and the posterior border furrow is deeply incised throughout. The occipital ring is of medium length (sag.) and its posterior margin is rounded. The dorsal furrows are well defined. The frontal area is comparatively short (sag.). Parallel with the anterior margin there extends a faint anterior border furrow. Contact between furrow and anterior border marked by only slight change in relief. Transversely, the anterior border is convex. The anterior sections of the facial suture diverge forward.

The fixigenae are wide (tr.) and distinctly raised between the dorsal and the palpebral furrows. The main part of the fixigenae slopes inward towards the dorsal furrow. The palpebral lobes are prominently raised and convex (tr.).

Fig. 2. A–H. *Comluella? lapponica* n. sp. Unless otherwise stated the specimens were collected by G. Bexell from the allochthonous sequence of Mount Luopakte, northern Sweden. A. Holotype, incomplete cranidium, partly exfoliated. Stereo pair. Plastiform cast from external mould. SGU Type 83. X 2.1. B. Incomplete, flattened and obliquely deformed cranidium with five articulated thoracic tergites. Mainly unexfoliated. SGU Type 84. X 3.0. C. Incomplete cranidium, partly exfoliated. Slightly deformed. SGU Type 85. X 2.1. D. Incomplete cranidium, partly exfoliated. Slightly deformed. SGU Type 86. X 2.1. E. Anterior left half of a cranidium. SGU Type 87. X 2.0. F. Incomplete, sagittally compressed cranidium, partly exfoliated, showing the convex (tr.) palpebral lobe. SGU Type 88. X 2.1. G. Internal mould of an incomplete cranidium from the autochthonous sequence of Mount Luopakte (layer 23, profile II, Moberg 1908). Coll. J. C. Moberg, 1908. Figured by Moberg 1908, Pl. 1, Fig. 7. Preserved in the Palaeontological Department, the University of Lund, Lund, as No. LO 2107 t. X 3.7. H. Enlargement of area on the glabella to show granulation. Holotype. Plastiform cast from external mould. SGU Type 83. Approx. X 8. I–J. Librigenae, which may belong to *C.? lapponica* n. sp. Collected by G. Bexell from the allochthonous sequence of Mount Luopakte. I. Incomplete left librigena, dorsal view. The genal spine is incomplete. Plastiform cast from external mould. SGU Type 89. X 3.4. J. Incomplete left librigena, dorsal view. Figured by Ahlberg and Bergström 1978, Pl. 4, Fig. 6. SGU Type 16. X 2.0.

They are set off from the *fixigenae* by a wide (tr.) palpebral furrow. A well marked eye ridge extends from the anterior end of the palpebral lobe towards the posterior part of the frontal lobe of the glabella. It is highest at midlength. It is faintly marked at the dorsal furrow, where it seems to merge with the glabella. In front of the lateral part of the eye ridges, the cranidium slopes steeply towards the anterior border furrow. The posterior border furrow is deep and widens outwards.

On the cranidium, the surface of the exoskeleton is covered with closely spaced granules which are considerably larger on the glabella and the occipital ring where they can be seen without a lens (Fig. 2H).

The thorax is known only from five incomplete and poorly preserved tergites, attached to a distorted cranidium (Fig. 2B). It has the general appearance of a solenopleurid (in the sense of Ahlberg and Bergström 1978), and it shows no diagnostic characters.

The pygidium is not yet known.

REMARKS. – This form is probably identical with the cranidia referred to *Comluella?* sp. in Ahlberg and Bergström (1978:30, Pl. 4, Figs. 11–12). However, the granulose surface is not seen in these specimens, but this may be due to the mode of preservation. These cranidia were also collected from Mount Luopakte, but in the autochthonous sequence (layer 23, profile II, Moberg 1908).

The species was first described by Moberg (1908:27) who incorrectly referred it to *Ellipsocephalus nordenskiöldi* Linnarsson, 1883 (cf. Ahlberg and Bergström 1978:14).

Genus *Ellipsocephalus* Zenker, 1833

Ellipsocephalus cf. *gripi* (Kautsky, 1945)

Fig. 3H

cf. 1978 *Ellipsocephalus gripi* (Kautsky, 1945). – Ahlberg and Bergström, pp. 15–17, Pl. 1, Figs. 6–7, 10 (this reference gives a complete synonymy list).

MATERIAL. – One almost complete cranidium and the left half of another cranidium. The complete cranidium is 14 mm long and only slightly deformed. They are preserved as internal moulds with remnants of the exoskeleton.

REMARKS. – The general shape and outline of the cranidia is very similar to *E. gripi* from Aistjakk, the type locality, and they probably can be referred to that species. However, the material is too poor for a definite assignment. It is worth

noting that the frontal area is long (sag.), the glabella is subparallel-sided and rounded in front, and the anterior border is downsloping as in *E. gripi*. It is well seen that the relief of the cranidium becomes lower when the exoskeleton is preserved. The preglabellar furrow is distinct on the internal mould.

Genus *Strenuaeva* Richter & Richter, 1940

Strenuaeva sp.

Fig. 3A–F

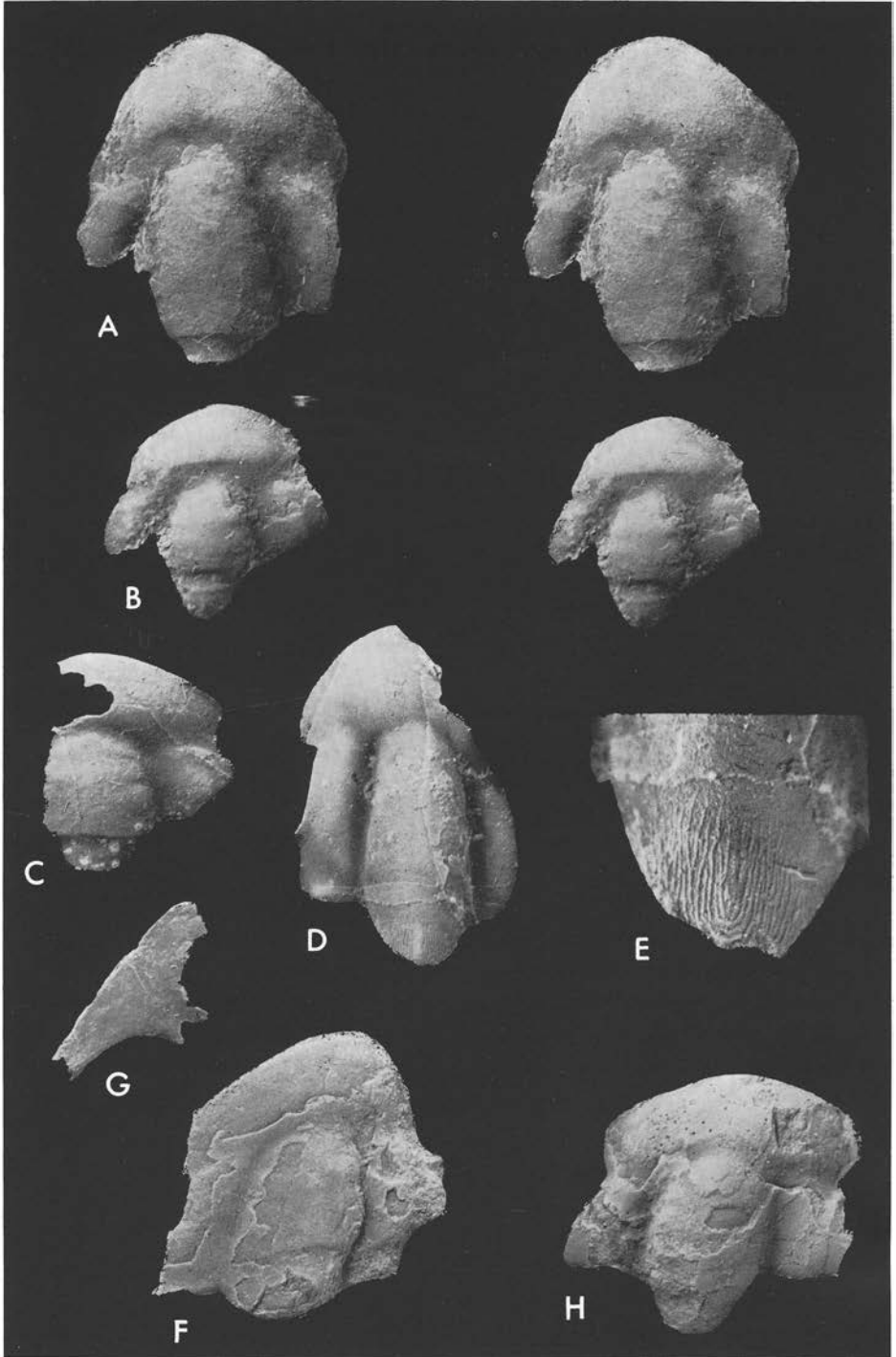
v. 1908 *Arionellus primævus* Brögger. – Moberg, Pl. 1, Fig. 2 (*non* Figs. 1, 3).

MATERIAL. – About 30 incomplete cranidia, most of them distorted to a greater or lesser degree. The length of the cranidia ranges from about 5 to 25 mm.

DESCRIPTION. – The glabella is defined laterally by well impressed dorsal furrows. It tapers forwards and is rounded in front. Three pairs of faintly marked glabellar furrows are present, but in many specimens they are effaced. The occipital ring is comparatively long (sag.) and, on internal moulds, separated from the glabella by a wide and well defined occipital furrow. In two cranidia, the occipital ring is provided with a faint occipital node, extended in the sagittal line. An occipital spine is not present. In some specimens, the exoskeleton of the occipital ring bears a faint prosopon of raised lines, approximately parallel with the sagittal line (see Fig. 3E).

The frontal area (in this form: anterior border + preglabellar furrow) is long (sag.). The anterior border is inflated and convex both transversely and sagittally. In most cranidia it attains the same level as the glabella. The preglabellar furrow extends from the front of the glabella outwards towards the sides, delimiting the anterior border. The anterior border becomes narrower (exsag.) laterally. The fixigenae are moderately inflated and raised above the level of the palpebral lobes. Eyes ridges are faintly marked, in some cases effaced.

REMARKS – The shape of the anterior border, the well impressed dorsal furrows and the comparatively long (sag.) occipital ring, indicates that this form must be referred to the genus *Strenuaeva*. As the material is distorted it is hard to compare it with other known species of *Strenuaeva*. However, it differs from *S. inflata* Ahlberg and Bergström, 1978, which is known from the autochthonous sediments of Mount Luopakte, mainly in its considerably less inflated fixigenae and shallower dorsal furrows, but this may be the effect of



compression. *S. primaeva* (Brøgger, 1879) from the Mjøsa district, Norway, seems to have a narrower and more truncated glabella, straighter glabellar flanks, narrower occipital furrow and deeper dorsal furrows. In the present form the preglabellar furrow (in front of the glabella) seems to be slightly deeper than in *S. primaeva* and *S. inflata*.

This form probably occurs also in the autochthonous sequence of Mount Luopakte, as one of the cranidia referred to *Arionellus primaevus* (= *Strenuaeva primaeva*) by Moberg (1908, Pl. 1, Fig. 2) seems to be identical with the present cranidia. This specimen was questionably referred to *Proampyx triangularis* n. sp. by Ahlberg and Bergström (1978:27), but now I transfer it to the form described above.

UNDETERMINED LIBRIGENAE

Figs. 2I–J and 3G in this paper and Pl. 4, Figs. 6–8 in Ahlberg and Bergström 1978.

In the collection there are also six isolated, incomplete librigenae. There seems to be three different types. All of them are provided with a long genal spine. No taxonomic assignment is attempted, although I am inclined to believe that the forms with a slender genal spine (Fig. 2I–J) belong to *Comluella? lapponica* n. sp. Fig. 3G might belong to *Strenuaeva* sp.

Fig. 3. A–F. *Strenuaeva* sp. Collected by G. Bexell from the allochthonous sequence of Mount Luopakte. A. Internal mould of an almost complete cranidium, transversely slightly compressed. Stereo pair. SGU Type 91. X 2.6. B. Internal mould of an almost complete cranidium, longitudinally slightly compressed. Stereo pair. SGU Type 90. X 3.7. C. Internal mould of an incomplete cranidium, longitudinally compressed. SGU Type 92. X 2.8. D. Incomplete, transversely compressed cranidium with the exoskeleton. Note the shallow, almost effaced, occipital furrow. SGU Type 93. X 3.5. E. Close-up of occipital ring showing details of ornamentation (raised lines). Same specimen as D. SGU Type 93. Approx. X 10. F. Obliquely distorted cranidium, mainly exfoliated. SGU Type 94. X 1.6. G. Incomplete left librigena which may belong to *Strenuaeva* sp. The allochthonous sequence of Mount Luopakte. Coll. G. Bexell. Figured by Ahlberg and Bergström 1978, Pl. 4, Fig. 7. SGU Type 17. X 2.9. H. *Ellipsocephalus* cf. *gripi* (Kautsky, 1945). Almost complete cranidium, slightly deformed and partially exfoliated. SGU Type 95. X 2.7.

ACKNOWLEDGEMENTS

For general encouragement and critical comments on the manuscript, my thanks are due to Dr. Jan Bergström, Lund. For the loan of the material I am indebted to the Museum Department of the Geological Survey of Sweden. Mr. Sven Stridsberg, Lund, skillfully prepared the photographs. Messrs. Brian Holland, Lund, and Claes Sultan, Klippan, made the linguistic corrections. Miss Elin Pulkinen, Stockholm, assisted in the drawing of Fig. 1.

REFERENCES

- AHLBERG, P., and BERGSTRÖM, J., 1978: Lower Cambrian ptychopariid trilobites from Scandinavia. – *Sver. Geol. Unders.* Ca 49. 41 pp. Stockholm.
- BERGSTRÖM, J., 1973: Organization, life, and systematics of trilobites. – *Fossils and Strata* 2. 69 pp. Oslo.
- Generalstabens karta över Sverige, norra delen 1:200 000. 4 Torneträsk. – Generalstabens Litografiska Anstalt, Stockholm 1888.
- KULLING, O., 1960: Introductory notes on the Caledonides of the Torneträsk area. In O. KULLING and P. GEIJER: The Caledonian mountain chain in the Torneträsk-Ofoten area, northern Scandinavia. The Kiruna iron ore field, Swedish Lapland. – *Int. Geol. Congr. XXI Sess. Norden. Guide book Sweden* g. 76 pp. Stockholm.
- MARTINSSON, A., 1974: The Cambrian of Norden, 185–283. In C. H. HOLLAND, (ed.): *Lower Palaeozoic Rocks of the World. Vol. 2, Cambrian of the British Isles, Norden, and Spitsbergen.* – 300 pp. John Wiley & Sons, London.
- MATTHEWS, S. C., 1973: Notes on open nomenclature and on synonymy lists. – *Palaeontology* 16, 713–719. London.
- MOBERG, J. C., 1908: Bidrag till kännedomen om de kambriska lagren vid Torneträsk. – *Sver. Geol. Unders.* C 212. 30 pp. Stockholm.
- MOORE, R. C., (editor) 1959: *Treatise on invertebrate paleontology. Part O, Arthropoda 1.* – 560 pp. Lawrence, Kansas.
- Topografisk Karta över Sverige 1:100 000. Fältkarta 30J Rensjön. – Generalstabens Litografiska Anstalt, Stockholm 1967.

PRISKLASS A

Distribueras genom
Liber Kartor
162 89 VÄLLINGBY

ISBN 91-7158-179-0