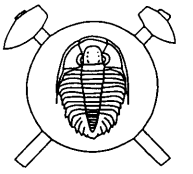
Perissopyge, a new trilobite from the Lower Cambrian of Greenland and North America



Perissopyge, nový trilobit ze spodního kambria Grónska a Severní Ameriky (Czech summary)

(7 text-figs)

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Perissopyge, a new Lower Cambrian trilobite genus of uncertain affinity, is described from the lower part of the Henson Gletscher Formation of central North Greenland and the basal beds of the Harkless Formation of western Nevada; it also is known to occur within the Sekwi Formation of the Mackenzie Mountains, north-west Canada. The type species is *Perissopyge phenax* sp. n. from North Greenland; *P. triangulata* sp. n. is described from Nevada.

Key words: Trilobite, *Perissopyge*, Lower Cambrian, Greenland, Nevada

Introduction

Perissopyge is an unusual trilobite first recognised some 40 years ago from the Lower Cambrian of California. The present description was stimulated by the more recent discovery of well preserved, although disarticulated, remains in the Lower Cambrian of Peary Land, central North Greenland. As the specific component of the name of the type species *P. phenax* implies, casual inspection reveals a pygidium that is deceptively reminiscent of much younger trilobites. The impression, however, is transient and *P. phenax* is firmly rooted in the Lower Cambrian where it occurs in association with olenellids.

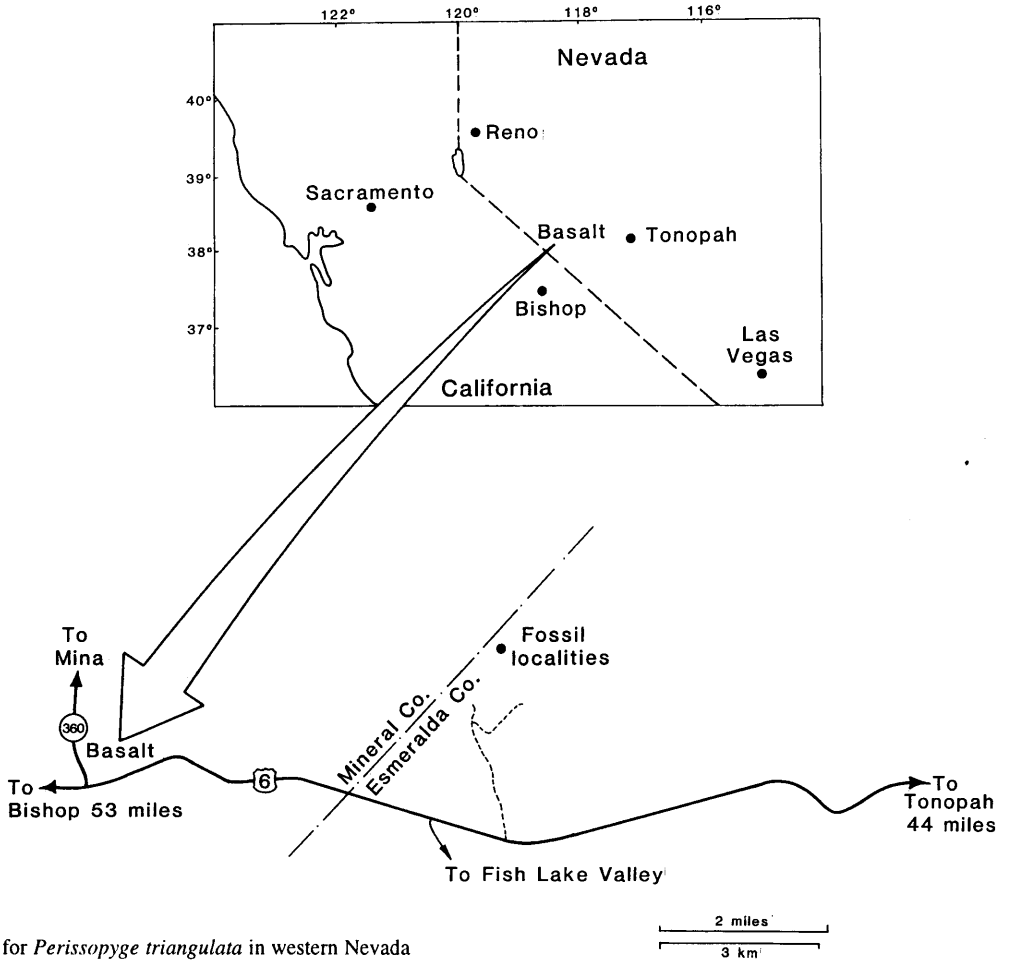

Fig. 1. Collection localities for *Perissopyge triangulata* in western Nevada

History of research

In 1956 Donald C. Ross collected an unusual Lower Cambrian trilobite fauna from the upper part of what was then called the Miller Mountain Formation in western Nevada, U.S.A. (written communication to Nelson, 1957; Fig. 1). Nelson subsequently collected the fauna, recognising that the formation contained most of the elements of the Lower Cambrian succession in the White/Inyo range of eastern California. The fauna occurs in a restricted interval, together with species of *Ogygopsis* and *Olenellus*. At the instigation of Nelson, Wilson (1961) undertook a study of the palaeontology and stratigraphy of the Miller Mountain area. At this stage, the interval containing the Protolenid-like fauna was incorrectly interpreted as equivalent to the uppermost Mule Spring Limestone and the Lower "Cadiz" (Monola) Formation (Nelson 1963).

Several visits to the Miller Mountain locality in following years by Moore (1976) and Nelson, and detailed mapping by Stewart (1979), have firmly established that the succession is equivalent to that of the White/Inyo range (Nelson 1976, 1978). The trilobites here referred to *Perissopyge triangulata* gen. et sp. n. are now known to be specifically from the basal beds of the Harkless Formation (Fig. 2).

Perissopyge phenax gen. et sp. n., the type species of *Perissopyge,* was first collected in Løndal, southern Peary Land, central North Greenland (Fig. 3) by Peel and Peter Frykman in 1978 from strata which subsequently came to be known as the Henson Gletscher Formation of the Brønlund Fjord Group (Peel and Sønderholm 1991; Ineson and Peel 1996; Figs 3, 4). The section has been revisited on several occasions in connection with The North Greenland Project (1978-80), a massive mapping and regional geological programme launched by the Geological Survey of Greenland (now incorporated into the Geological Survey of Denmark and Greenland). Løndal remains the only locality in Greenland yielding *Perissopyge* but the species has also been identified in collections from the Sekwi Formation of north-west Canada made by W. H. Fritz (Geological Survey of Canada). In Greenland, *P. phenax* is associated with *Olenellus* and *Kootenia,* indicating a Late Early Cambrian age, *Olenellus* zone (Blaker and Peel, in press).

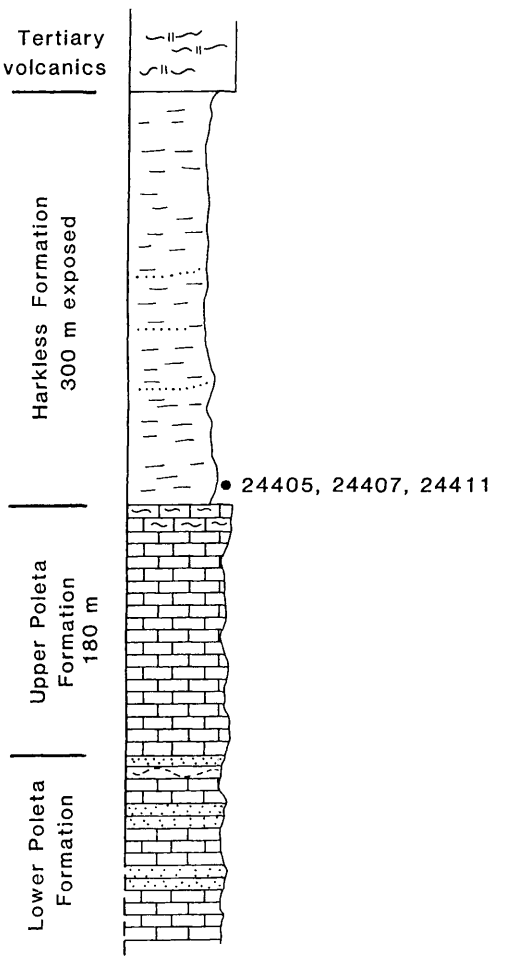

Fig. 2. Collection horizon for *Perissopyge triangulata* in the basal beds of the Lower Cambrian Harkless Formation. Sample numbers refer to Nelson collections deposited in Los Angeles County Museum. For location of section see Fig. 1

Systematic description

Family uncertain
Genus: *Perissopyge* gen. n.

Type species: *Perissopyge phenax* gen. et sp. n. from the Henson Gletscher Formation of Løndal, southern Peary Land, central North Greenland.

Derivation of name: From the Greek *perissos,* 'strange', and *pyge* 'tail'.

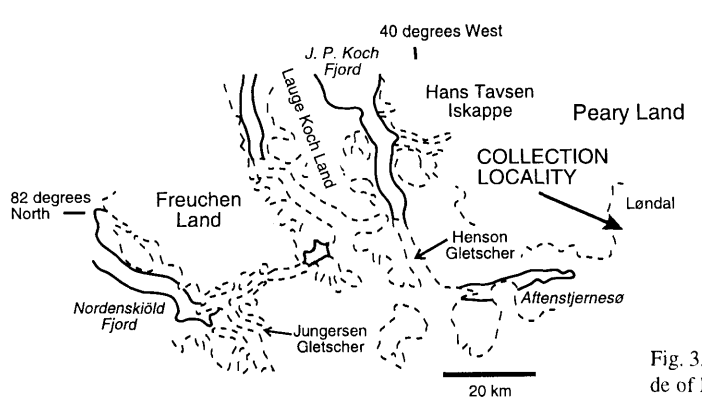

Fig. 3. Collection locality for *Perissopyge phenax* on the western side of Løndal, southern Peary Land, central North Greenland

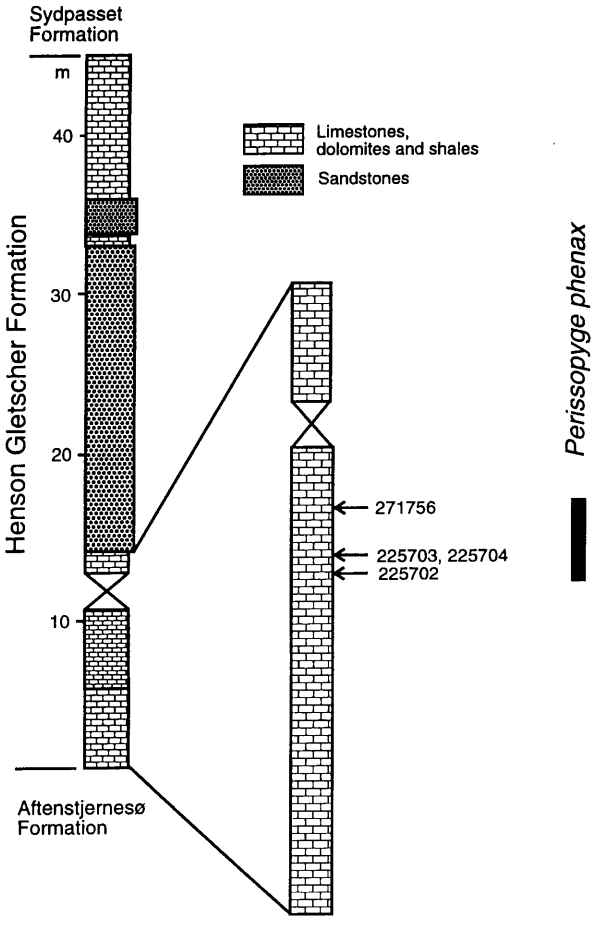

Fig. 4. Distribution of *Perissopyge phenax* in the Lower Cambrian Henson Gletscher Formation. Sample numbers indicate GGU collections. For location of section see Fig. 3

Diagnosis: Glabella with concave sides. Preglabellar field present. Palpebral areas very wide (tr.); long, gently curved ocular ridges and short (exsag.) palpebral lobes. Hypostome fused to rostral plate; anterior lobe of middle body with median swelling. Thorax of seven segments. Large, triangulate pygidium with long (sag.) axis of up to 14 rings. Pleural regions crossed by up to 10 pairs of interpleural furrows. Very narrow border. Granular sculpture on all exoskeletal parts except hypostome.

Discussion: The cranidium of *Perissopyge* is similar to that of *Aldonaia* Lermontova, 1940, with the latter differing in glabellar furrows that are very poorly-impressed or absent, an anterior glabellar lobe that is expanded (tr.) and a shorter (sag.) preglabellar field. The type species, *Aldonaia ornata* Lermontova, 1940 from the Lower Cambrian of Siberia, is known from cranidia alone, but it was noted by Öpik (1975, p. 16) that *A. ornata* is close to *A. tersa* Suvorova *in* Chernysheva, 1960; the two are possibly conspecific. If *A. tersa* is accepted as being representative of the genus then a number of important differences with *Perissopyge* are observed. Most notable is the contrast in pygidial morphology, for that of *A. tersa* is reminiscent of Lower Cambrian ptychoparioids, being small, semielliptical and with an axis of only two or three rings. The free cheek of *A. tersa* is also different, being described by Öpik (1975, p. 16) as "...semicircular, with an advanced, deflected and transmarginal genal spine." The free cheek of *Perissopyge* does not have the genal spine in an advanced position and it is confluent with the lateral border. The overall shape of the free cheek is subquadrate.

Although unknown for the type species *Perissopyge phenax* sp. n., the thorax of *Perissopyge* is known from a second species, herein described as *P. triangulata,* from the Harkless Formation at Miller Mountain, western Nevada, U.S.A.. The thorax of this species is formed of seven segments, none of which is macropleural. Although the number of segments is uncertain for *A. tersa,* the thorax differs from the Miller Mountain material of *Perissopyge* in that it is characterised by a macropleural segment with exceptionally long pleural spines.

It has been suggested that *Perissopyge* may belong to the Aldoniidae Hupé, 1953 (A. W. A. Rushton, written communication to Blaker, 1987). Henningsmoen (*in* Moore 1959, p. 212) considered this taxon to be a subfamily, questionably placing it in the Protolenidae Richter et Richter, 1948. Subsequently, the family was revived and rediagnosed by Repina (1966), who also revised the included genera. In her opinion, in addition to *Aldonaia,* the family included *Tuvanella* Pokrovskaya, 1959, *Eleganolimba* Pokrovskaya, 1959, *Volonellus* Ivshin, 1953, *Planaspis* Repina, 1960 and *Rinconia* Hupé, 1953. *Aldonaia* is apparently the only representative of the family for which exoskeletal elements other than the cranidium have been illustrated.

Although the cranidial morphology of *Aldonaia* and *Perissopyge* are similar, there are considerable differences in the form of the thorax and pygidium. It is concluded, therefore, that *Perissopyge* is not closely related to *Aldonaia* and *Perissopyge* is not included within the Aldonaiidae. Indeed, *Perissopyge* does not appear to belong to any known family.

Even the higher level classification of *Perissopyge* presents difficulties. The presence of a preglabellar field like that of *Perissopyge* is typical of ptychoparioids; in primitive ptychoparioids the hypostome is generally separated from the rostrum by a definite gap, so that the hypostome was free. *Perissopyge* has developed a preglabellar field whilst maintaining the hypostome in contact with the rostrum. The genus is therefore excluded from that group on the basis of a fused hypostome and rostral plate. This strategy of hypostomal development is typical of corynexochids, and it is open to debate as to whether *Perissopyge* is an advanced ptychoparioid or an unusual corynexochid.

Perissopyge phenax sp. n.

Fig. 5, 6

Holotype: Pygidium; MGUH 23584 from GGU collection 271756, Henson Gletscher Formation, west side of Løndal, southern Peary Land, central North Greenland (Figs 3, 4).

Figured paratype: Cranidium; MGUH 23585-23586 from GGU 271756, MGUH 23587-23589 from GGU collection 225703. Free cheek; MGUH 23590 from GGU collection 271756. Hypostome; MGUH 23591 from GGU collection 225703. Pygidium; MGUH 23592-93 from GGU collection 271756, MGUH 23594 from GGU collection 225703. Same locality and formation as the holotype.

Derivation of name: From *phenax,* the Greek for a 'cheat' or 'imposter', referring to its similarity to taxa of a considerably younger age.

Other material: GGU collections 225702-225704, 271756 (abundant). Same locality and formation as the holotype.

Description: Cranidium subquadrate in outline, very gently convex (tr. and sag.). Glabella sides taper very gently forwards to S3, frontal lobe expands gently forwards, anteriorly slightly curved. Preglabellar fi-

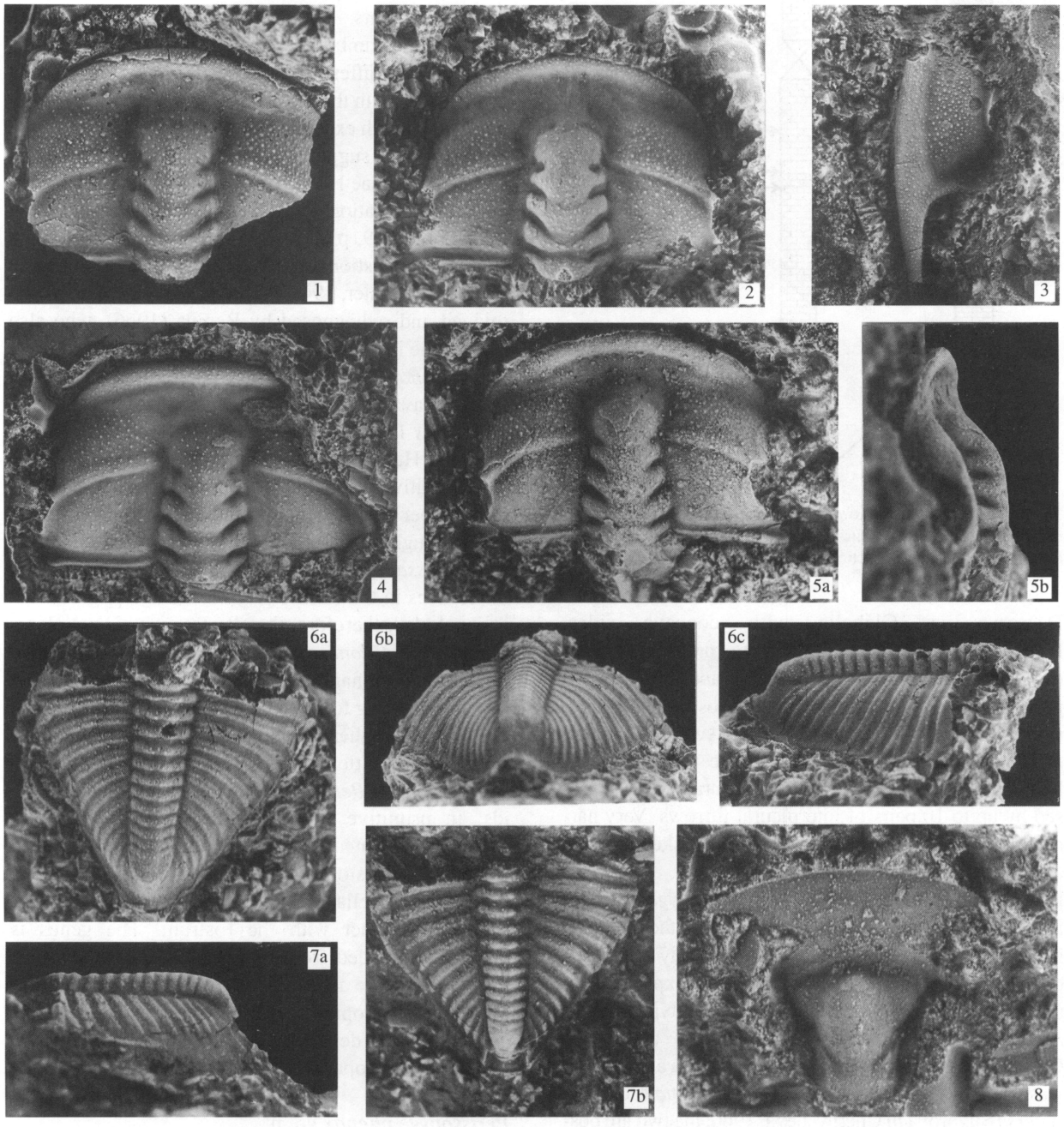

Fig. 5. *Perissopyge phenax* gen. et sp. nov. Henson Gletscher Formation, North Greenland
1 - paratype, damaged cranidium, partially exfoliated, dorsal view, MGUH 23585 from GGU collection 271756, x4; 2 - cranidium, paratype, internal mould, dorsal view, MGUH 23589 from GGU collection 225703, x4; 3 - free cheek, paratype, dorsal view, MGUH 23590 from GGU collection 271756, x3; 4 - cranidium, paratype, latex of external mould, dorsal view, MGUH 23587 from GGU collection 225703, x4; 5a, b - cranidium, paratype, partially exfoliated, dorsal and lateral views, MGUH 23586 from GGU collection 271756, x4; 6a-c - pygidium, paratype, internal mould, dorsal, posterior and lateral views, MGUH 23594 from GGU collection 225703, x3; 7a, b - pygidium, paratype, internal mould, lateral and dorsal views, MGUH 23592 from GGU collection 271756, x7; 8 - hypostome and rostral plate, paratype, ventral view, MGUH 23591 from GGU collection 225703, x7