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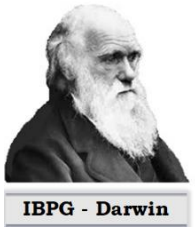

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The occurrence of known genera of fossils in the Mineral Raw Materials Mine in Mielenko Drawskie, West Pomeranian Province, Poland

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ABSTRACT

This paper presents the results of many years of search for fossils that were discovered at the Mineral Raw Materials Mine in Mielenko Drawskie West Pomeranian Province, Poland. The most common fossils found in this mine are Ordovician trilobites of the genera *Asaphus* Brongniart, 1822, and *Megistaspis* Jaanusson, 1956, and Ordovician nautiloids of the genera *Endoceras* Hall, 1847, and *Orthoceras* Bruguière, 1789. Other fossils, such as: graptolites, bactritids, belemnites, ammonites, corals and various types of gastropods and bivalve molluscs, can also be found. The oldest fossils discovered are the Cambrian trilobites of the genus *Agnostus* Brongniart, 1822. This mine has fossils ranging from the Cambrian to the Quaternary. These fossils were transported in erratic boulders across the ice sheet from Scandinavia. Currently, the mine extracts gravel and sand, as well as stones and erratic boulders on an industrial scale, which are then crushed and used as building material in the form of aggregate.

***Keywords*:** Paleozoic, Mesozoic, trolobites, *Agnostus, Asaphus, Megistaspis, Chasmops, Illaneus, Dalmanites, Calymene, Odontopleura, Ampyx, Arctinurus, Ceraurinus, Achatella, Decoroproetus, Endoceras, Orthoceras Protochonetes, Monograptus, Bactrites, Favosites, Halysites, Quenstedtoceras, Perisphinctes*

INTRODUCTION

There are many gravel and aggregate mines in Central Pomerania. The Mineral Raw Materials Mine in Mielenko Drawskie (Maps 1-4) (Photos 1-9) is the most diverse and rich mine in fossils. This mine has fossils ranging from the Cambrian to the Quaternary. It is related to the location of this mine in the area of moraine hills left behind by the last Scandinavian glaciation, about 11,000 years ago (Map 5).

The most common fossils found in the Mineral Raw Materials Mine in Mielenko Drawskie are trilobites of the genus *Asaphus* Brongniart, 1822 (Photos 10-13). They are quite common, mainly being found in the form of a tail shield (pygidium). Sometimes an entire specimen of this trilobite can be found, but these are rare cases (Photos 14 & 15).

The second most common trilobite found in this mine are trilobites of the genus *Megistaspis* Jaanusson, 1956. They are the largest trilobites being found quite commonly in the form of a tail shield (pygidium) and, but less frequently, in the form of a head shield (cephalon). A complete specimen of this trilobite has yet to be discovered (Photos 16-29).

Trilobites of the *Chasmops* McCoy, 1849, a distinctive but rare, can also be found. They are found in the form of a caudal and head shield (Photos 30 & 31).

Trilobites of the genus genus *Achatella* Delo, 1935, distinctive but rare, can also be found. They are found in the form of a caudal and head shield (Photos 32-36).

Trilobites of the genus *Illaneus* Dalman, 1827 are found occasionally but in greater numbers. That is, while breaking down glacial sedimentary stones, the entire grave of these trilobites can often be found. However, a complete specimen of this Illaneus trilobite has yet to be discovered (Photos 37-42). Table 1 shows the reported occurrence of the trilobite genera found in the Mineral Raw Materials Mine in Mielenko Drawskie, West Pomeranian Province, Poland.

Table 1. The reported occurrence of the trilobite genera found in the Mineral Raw Materials Mine in Mielenko Drawskie, West Pomeranian Province, Poland [1-41].

No	**Genus of trilobites**
1.	*Agnostus* Brongniart, 1822
2.	*Asaphus* Brongniart, 1822
3.	*Megistaspis* Jaanusson, 1956
4.	*Chasmops* McCoy, 1849
5.	*Illaneus* Dalman, 1827
6.	*Dalmanites* Barrande, 1852
7.	*Calymene* Brongniart, 1822
8.	*Odontopleura* Emmrich, 1839
9.	*Ampyx* Dalman, 1827
10.	*Arctinurus* Castelnau, 1843
11.	*Ceraurinus* Barton, 1913
12.	*Decoroproetus* Pribyl 1946
13.	*Achatella* Delo, 1935

Trilobites are common with nautiloids. These are represented by the genera *Endoceras* Hall, 1847 (Photos 43-71], and *Orthoceras* Bruguière, 1789 (Photos 72 & 73). The longest nautiloid of the genus *Endoceras* that was discovered in the Mineral Resource Mine in Mielenko Drawskie was 67 cm long, while the nautiloid of the genus *Orthoceras* had a maximum length of 55 cm [42-56].

These nautiloids are very distinctive and usually well preserved. There is no difficulty in identifying these nautiloids (*Endoceras* – with a dorsal siphon, *Orthoceras* – with a central siphon). The nautiloid of the genus *Endoceras* is often found together with trilobites of the genera *Asaphus* and *Megistaspis*, while the nautiloid of the genus *Orthoceras* is often found with trilobites of the genera *Asaphhus* and *Illaneus*.

Brachiopods of the genus *Protochonetes* Muir-Wood, 1962 are commonly found [57-61] (Photos 75-76).

The fossils of various graptolite species are among the basic index fossils, especially in Europe and North America.

Graptolite fossils that are found in the Mineral Raw Materials Mine in Mielenko Drawskie belong to the genus *Monograptus* Geinitz, 1852, being known on all continents except

Antarctica, although in Africa it is known only from its northern part, and in South America and Australia only from single locations [62-78].

Silurian graptolites of the genus *Monograptus* are often found in postglacial rocks in the form of a mass grave together with a nautiloid of the genus *Bactrites* Sandberger, 1843 [79, 80] (Photos 77-86).

The fossilised corals in this mine are found in the form of known genera: *Favosites* Lamarck, 1816, and *Halysites* von Waldheim, 1828 [81-83] (Photos 87-94).

Ammonites are found sporadically. Ammonites from the genera *Quenstedtoceras* Hyatt, 1877, and *Perisphinctes* Waagen, 1869 were found [84-87].

Crinoids and belemnites were also found, as well as a wide range of gastropods and bivalve molluscs from the Palaeozoic to the Quaternary.

During several decades of mining operations in the Mineral Raw Materials Mine in Mielenko Drawskie, mammoth fossils were also found. These were mainly mammoth tusks, but in a very poor condition (all photos taken by Tomasz Borowski).

CONCLUSIONS

The occurrence and abundance of fossils from the Cambrian to the Quaternary in the Mineral Raw Materials Mine in Mielenko Drawskie is the main direction of exploration and research in this field for a palaeontologist. It can be said with certainty that there are still many undiscovered species of fossils in this mine.

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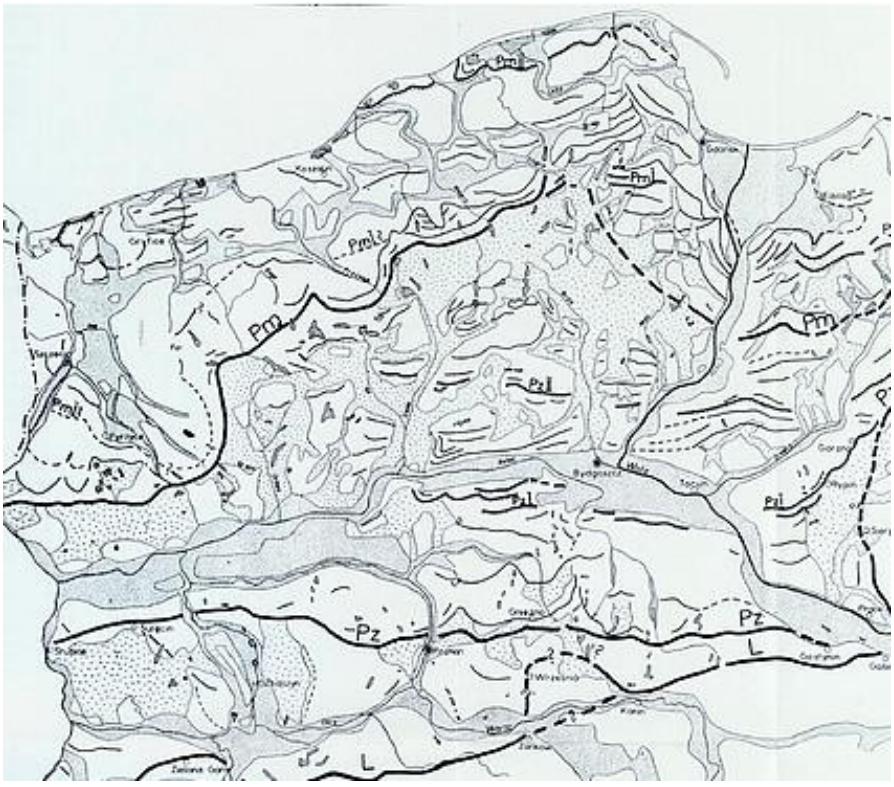
Map 1. Location of the Mineral Raw Materials Mine in Mielenko Drawskie, West Pomeranian Province, Poland.

Map 2. Location of the Mineral Raw Materials Mine in Mielenko Drawskie, West Pomeranian Province, Poland

Map 3. Location of the Mineral Raw Materials Mine in Mielenko Drawskie, West Pomeranian Province, Poland

Map 4. Location of the Mineral Raw Materials Mine in Mielenko Drawskie, West Pomeranian Province, Poland



Map 5. The recession (withdrawal) of the last continental glacier from northwest Poland

Photo 1. The Mineral Raw Materials Mine in Mielenko Drawskie,
West Pomeranian Province, Poland

Photo 2. The Mineral Raw Materials Mine in Mielenko Drawskie,
West Pomeranian Province, Poland

Photo 3. The Mineral Raw Materials Mine in Mielenko Drawskie,
West Pomeranian Province, Poland

Photo 4. The Mineral Raw Materials Mine in Mielenko Drawskie,
West Pomeranian Province, Poland

Photo 5. The Mineral Raw Materials Mine in Mielenko Drawskie,
West Pomeranian Province, Poland

Photo 6. The Mineral Raw Materials Mine in Mielenko Drawskie,
West Pomeranian Province, Poland

Photo 7. The Mineral Raw Materials Mine in Mielenko Drawskie,
West Pomeranian Province, Poland

Photo 8. The Mineral Raw Materials Mine in Mielenko Drawskie,
West Pomeranian Province, Poland

Photo 9. The Mineral Raw Materials Mine in Mielenko Drawskie,
West Pomeranian Province, Poland

Photo 10. Pygidium – *Asaphus* Brongniart, 1822

Photo 11. Pygidium – *Asaphus* Brongniart, 1822

Photo 12. Pygidium – *Asaphus* Brongniart, 1822

Photo 13(A). Cephalon – *Asaphus* Brongniart, 1822

Photo 13(B). Cephalon – *Asaphus* Brongniart, 1822

Photo 14(A). Trilobite of *Asaphus expansus* (Wahlenberg, 1821)

Photo 14(B). Trilobite of *Asaphus expansus* (Wahlenberg, 1821)

Photo 15. Trilobite of *Asaphus expansus* (Wahlenberg, 1821)

Photo 16. Pygidium – *Megistaspis* Jaanusson, 1956

Photo 17. Pygidium – *Megistaspis* Jaanusson, 1956

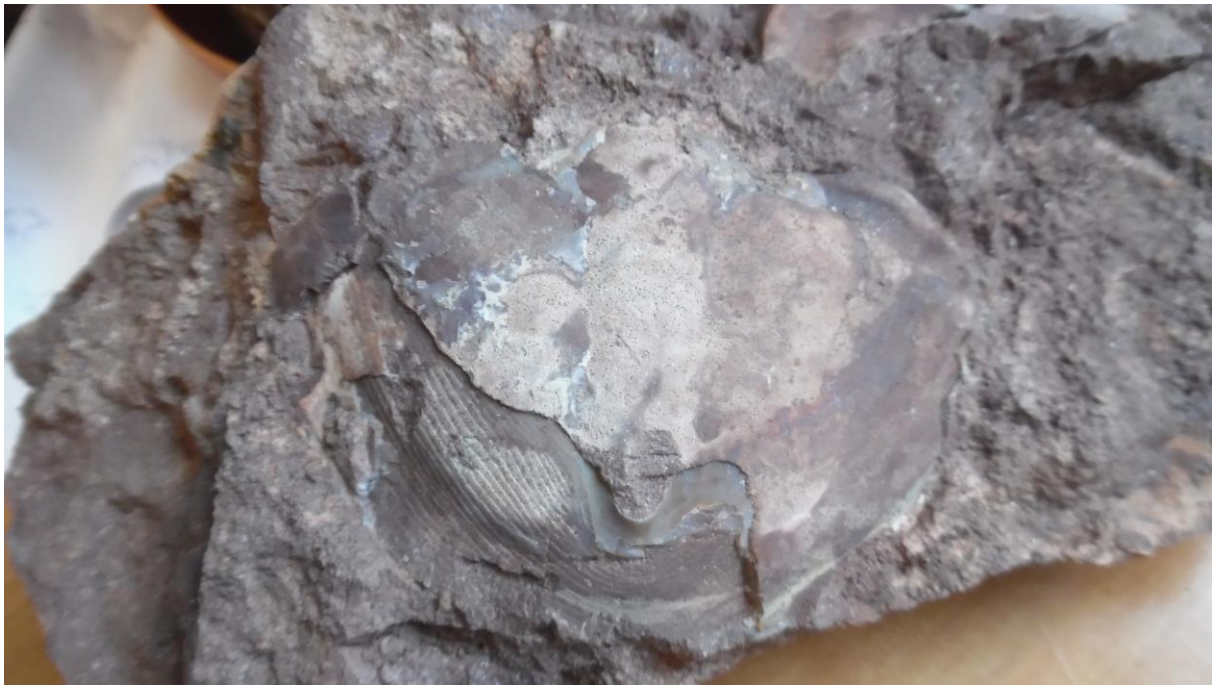


Photo 18. Pygidium – *Megistaspis* Jaanusson, 1956

Photo 19. Pygidium – *Megistaspis* Jaanusson, 1956

Photo 20(A). Pygidium – *Megistaspis* Jaanusson, 1956

Photo 20(B). Pygidium – *Megistaspis* Jaanusson, 1956

Photo 21. Pygidium – *Megistaspis* Jaanusson, 1956

Photo 22. Pygidium – *Megistaspis* Jaanusson, 1956

Photo 23. Pygidium – *Megistaspis* Jaanusson, 1956

Photo 24. Pygidium – *Megistaspis* Jaanusson, 1956

Photo 25. Pygidium – *Megistaspis* Jaanusson, 1956

Photo 26. Pygidium – *Megistaspis* Jaanusson, 1956

Photo 27. Cephalon – *Megistaspis* Jaanusson, 1956

Photo 28. Genal spine (Cephalon) – *Megistaspis* Jaanusson, 1956

Photo 29. Genal spine (Cephalon) – *Megistaspis* Jaanusson, 1956

Photo 30. Cephalon – *Chasmops* McCoy, 1849

Photo 31(A). Cephalon and thorax – *Chasmops* McCoy, 1849

Photo 31(B). Cephalon and thorax – *Chasmops* McCoy, 1849

Photo 32. Cephalon – *Achatella* Delo, 1935

Photo 33. Cephalon – *Achatella* Delo, 1935

Photo 34. Pygidium – *Achatella* Delo, 1935

Photo 35. Pygidium – *Achatella* Delo, 1935

Photo 36(A). Pygidium – *Achatella* Delo, 1935

Photo 36(B). Pygidium – *Achatella* Delo, 1935

Photo 37. Pygidium – *Illaneus* Dalman, 1827

Photo 38. Cephalon – *Illaneus* Dalman, 1827

Photo 39. Cephalon & pygidium – *Illaneus* Dalman, 1827

Photo 40. Cephalon – *Illaneus* Dalman, 1827

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Photo 43. *Endoceras* Hall, 1847

Photo 44(A). *Endoceras* Hall, 1847

Photo 44(B). *Endoceras* Hall, 1847

Photo 45(A). *Endoceras* Hall, 1847

Photo 45(B). *Endoceras* Hall, 1847

Photo 45(C). *Endoceras* Hall, 1847

Photo 46. *Endoceras* Hall, 1847

Photo 47. *Endoceras* Hall, 1847

Photo 48. *Endoceras* Hall, 1847

Photo 49. *Endoceras* Hall, 1847

Photo 50. *Endoceras* Hall, 1847

Photo 51. *Endoceras* Hall, 1847

Photo 52. *Endoceras* Hall, 1847

Photo 53. *Endoceras* Hall, 1847

Photo 54(A). *Endoceras* Hall, 1847

Photo 54(B). *Endoceras* Hall, 1847

Photo 55. *Endoceras* Hall, 1847

Photo 56(A). *Endoceras* Hall, 1847

Photo 56(B). *Endoceras* Hall, 1847

Photo 57. *Endoceras* Hall, 1847

Photo 58. *Endoceras* Hall, 1847

Photo 59(A). *Endoceras* Hall, 1847

Photo 59(B). *Endoceras* Hall, 1847

Photo 60. *Endoceras* Hall, 1847

Photo 61. *Endoceras* Hall, 1847

Photo 62(A). *Endoceras* Hall, 1847

Photo 62(B). *Endoceras* Hall, 1847

Photo 63. *Endoceras* Hall, 1847

Photo 64. *Endoceras* Hall, 1847

Photo 65. *Endoceras* Hall, 1847

Photo 66. *Endoceras* Hall, 1847

Photo 67. *Endoceras* Hall, 1847

Photo 68. *Endoceras* Hall, 1847

Photo 69(A). *Endoceras* Hall, 1847

Photo 69(B). *Endoceras* Hall, 1847

Photo 70(A). *Endoceras* Hall, 1847

Photo 70(B). *Endoceras* Hall, 1847

Photo 70(C). *Endoceras* Hall, 1847

Photo 70(D). *Endoceras* Hall, 1847

Photo 71. *Endoceras* Hall, 1847

Photo 72. *Orthoceras* Bruguière, 1789

Photo 73. *Orthoceras* Bruguière, 1789

Photo 74. *Protochonetes* Muir-Wood, 1962

Photo 75. *Protochonetes* Muir-Wood, 1962

Photo 76. *Protochonetes* Muir-Wood, 1962

Photo 77(A). *Monograptus* Geinitz, 1852 and *Bactrites* Sandberger, 1843

Photo 77(B). *Monograptus* Geinitz, 1852 and *Bactrites* Sandberger, 1843

Photo 78(A). *Monograptus* Geinitz, 1852 and *Bactrites* Sandberger, 1843

Photo 78(B). *Monograptus* Geinitz, 1852 and *Bactrites* Sandberger, 1843

Photo 79(A). *Monograptus* Geinitz, 1852 and *Bactrites* Sandberger, 1843

Photo 79(B). *Monograptus* Geinitz, 1852 and *Bactrites* Sandberger, 1843

Photo 80 (A). *Monograptus* Geinitz, 1852 and *Bactrites* Sandberger, 1843

Photo 80(B). *Monograptus* Geinitz, 1852 and *Bactrites* Sandberger, 1843

Photo 80(C). *Monograptus* Geinitz, 1852

Photo 81. *Monograptus* Geinitz, 1852

Photo 82. *Monograptus* Geinitz, 1852 and *Bactrites* Sandberger, 1843

Photo 83. *Monograptus* Geinitz, 1852

Photo 84. *Bactrites* Sandberger, 1843

Photo 85. *Monograptus* Geinitz, 1852 and *Bactrites* Sandberger, 1843

Photo 86. *Monograptus* Geinitz, 1852

Photo 87(A). *Favosites* Lamarck, 1816

Photo 87(B). *Favosites* Lamarck, 1816

Photo 88. *Favosites* Lamarck, 1816

Photo 89(A). *Favosites* Lamarck, 1816

Photo 89(B). *Favosites* Lamarck, 1816

Photo 90. *Favosites* Lamarck, 1816

Photo 91. *Favosites* Lamarck, 1816

Photo 92. *Favosites* Lamarck, 1816

Photo 93. *Favosites* Lamarck, 1816

Photo 94(A). *Halysites* von Waldheim, 1828

Photo 94(B). *Halysites* von Waldheim, 1828

Photo 94(C). *Halysites* von Waldheim, 1828

Photo 94(D). *Halysites* von Waldheim, 1828