ISOS-14 Field Guide
The Ordovician of Estonia

Edited by Olle Hints and Ursula Toom

14th International Symposium on the Ordovician System, Estonia, July 19-21, 2023
Pre-conference Field Excursion: The Ordovician of Estonia, July 15-18, 2023

ISOS-14 Field Guide: The Ordovician of Estonia

Edited by Olle Hints and Ursula Toom

14th International Symposium on the Ordovician System, Estonia, July 2023

Pre-conference Field Excursion: The Ordovician of Estonia; July 15-18, 2023

The conference and field excursion are supported by:
IGCP Project "'Rocks and the Rise of Ordovician Life"
University of Tartu
Tallinn University of Technology
Geological Survey of Estonia
Estonian Museum of Natural History

Recommended reference to this publication:

Ainsaar, L. 2023. Stop 11: Aru-Lõuna (Kunda-Aru) quarry. In: Hints, O. and Toom, U. (eds). *ISOS-14 Field Guide: The Ordovician of Estonia*. TalTech Department of Geology, Tallinn, p. 65–68.

Electronic copy available at: https://geoloogia.info/reference/47491

Printed by Alfapress OÜ

ISBN 978-9916-80-008-9 (printed)
ISBN 978-9916-80-009-6 (pdf)

Tallinn, 2023

Stop 15: Nõmmeveski waterfall and canyon

Oive Tinn

Location: Latitude 59.50937°N, longitude 25.79010°E; Harju County, North Estonia.
Stratigraphy: Tremadocian to Darriwilian, from the Pakerort to Aseri regional stages.
Status: The outcrop is under nature protection – no hammering.
More information: https://geoloogia.info/en/locality/12189

The Nõmmeveski waterfall and canyon are located in the Lahemaa National Park, a scenic area in North Estonia about 50 km east of Tallinn, rich in forests, flora and fauna. At Nõmmeveski, the Valgejõgi River has eroded a canyon typical for many rivers in northern Estonia. The canyon was cut at the place where the water was spilled over the edge of the Baltic Klint (Fig. 15.1). The canyon and the 1.2 meter-high waterfall on its bottom mark the location of the klint at Nõmmeveski and its surroundings. The steep-sloped canyon-like valley is 15–20 meters deep, 60–70 meters wide and 450–470 meters long. It is assumed that initially, the waterfall was situated at the beginning of the canyon, and its height could have reached 10–15 meters (Miidel 2003). In the walls of the canyon, Lower and Middle Ordovician and partly upper Cambrian rocks are cropping out.

Historically, in 1927, in order to make use of the rapid water, a small hydroelectric power station that provided electricity to the Joaveski sawmill factory was built in Nõmmeveski Canyon, in the place of an even older watermill. In 1964, the buildings perished in a fire, and only the ruins mark the former power station today.

Stratigraphically, the Nõmmeveski section is similar to other North Estonian sections. According to Miidel (2003), the Nõmmeveski canyon walls expose the following strata (from top to bottom):

4.9 m – Kunda Stage, Loobu Formation: grey hard thick-bedded limestone with rare glauconite grains and thin-bedded clayey limestone;

0.4 m – Kunda Stage, Sillaoru Formation: brownish-grey limestone with brown Fe-ooids;

2.5 m – Volkhov Stage, Toila Formation: light grey glauconitic limestone, the middle part is clayey, the lower part dolomitised and hard;

0.2 m – Billingen Stage: dolomitised glauconitic limestone;

0.7 m – Hunneberg Stage, Leetse Formation: green quartz-glauconitic sandstone and clayey glauconitic sand;

2.8 m – Pakerort Stage, Türisalu Formation: dark brown kerogenous black shale, middle part consists of grey or yellowish siltstone with shale interbeds;

6.3+ m – Pakerort Stage, Kallavere Formation: yellowish and grey medium to fine-grained quartzose sandstone, in the uppermost part cross-bedded with shells and skeletal debris of brachiopods, in the lower part siltstone with interbeds of dark shale.

Fig. 15.1. Upper part of the succession in Nõmmeveski Canyon, showing the limestones of the Volkhov and Kunda regional stages, Dapingian to Darriwilian. Photo: Olle Hints, 2018.

The strata exposed in the Nõmmeveski Canyon are rich in fossils (Fig. 15.2). The canyon walls have yielded brachiopods from genera *Clitambonites*, *Antigonambonites*, *Porambonites*, *Iru*, *Raunites*, *Paurorthis*, *Ranorthis*, *Productorthis*, *Nicolella*, *Orthambonites*, *Lycophoria;* echinoderm *Echinoencrinites*; *cephalopod Discoceras*; bryozoan *Dianulites*. Microfossil samples taken from

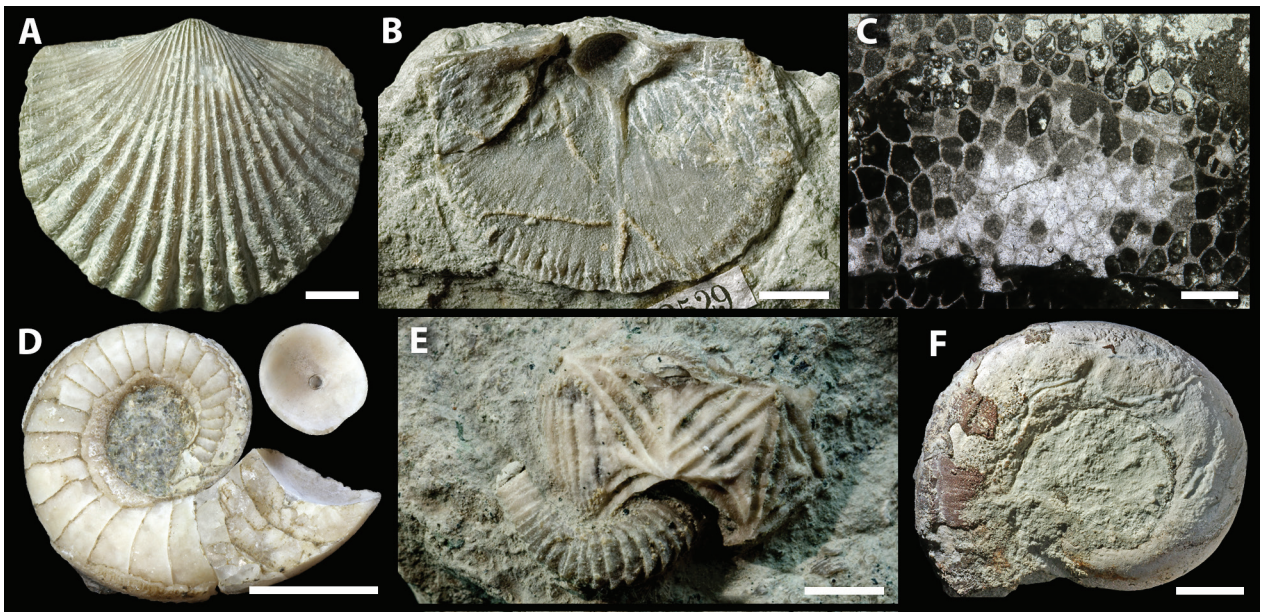

Fig. 15.2. Selected fossils collected from the Nõmmeveski Canyon. The abbreviations and numbers refer to specimen numbers in the Estonian geocollections database (https://geocollections.info). Scale bars: A, B, D, E – 5 mm; C – 1 mm; F – 1 cm. **A** – *Orthambonites majuscula* GIT 125-83, Kunda Stage; **B** – *Gonambonites parallelus* GIT 129-25, Kunda Stage; **C** – *Dianulites petropolitanus* GIT 537-2160, Kunda Stage; **D** – *Discoceras* sp. GIT 426-291, Volkhov Stage; **E** – *Echinoencrinites* sp. GIT 640-49, Kunda Stage; **F** – *Pararaphistoma vaginati* GIT 404-226, Kunda Stage.

the walls of the canyon for processing ostracods also yielded diverse and well-preserved fauna from Billingen, Volkhov and Kunda stages – among these are paleocopid ostracods *Tvaerenella*, *Rigidella*, *Ogmoopsis*, *Brezelina*, *Protallinella*, *Glossomorphites* and eridostracans *Conchoprimitia* and *Incisua* (Tinn et al. 2006).

References

Miidel, A. 2003. Stop 8. Nõmmeveski canyon. In: A. Raukas and H. Kukk (eds), International symposium on human impact and geological heritage. Excursion guide and abstracts (pp. 26–27). Tallinna Tehnikaülikool.

Tinn, O., Meidla, T. and Ainsaar, L. 2006. Arenig (Middle Ordovician) ostracods from Baltoscandia: Fauna, assemblages and biofacies. Palaeogeography, Palaeoclimatology, Palaeoecology, 241, 492–514.