

Mechanical and chemical preparation techniques, applied on Frasnian cephalopods from Lompret (Chimay area - Belgium)

By: Anthonie Hellemond^{1,2,3}, Kevin Houben¹, Natalie Tolisz¹, Kevin Nolis^{1,2}

Introduction

In the active quarry of **Lompret**, near Chimay (province of Hainaut – Belgium), large accumulations of **Frasnian cephalopods** were found and collected between 2015 and 2020. The quarry comprises strata that can be linked to the ‘**Kellwasser Event**’, an important extinction event near the Frasnian-Famennian boundary (372,2 Ma)*. Several fossil-rich lithological entities require different approaches in terms of preparation. In this poster we focus on the **preparation techniques applied** on cephalopods, as this group can help us to reconstruct deep marine environmental changes during the ecological crisis.

Mechanical Preparation

It is important that each specimen should be treated along a procedure that fits the distinct layer in which it was found. Experience learns us to physically separate fossils from different layers before commencing the preparation. Prior to any form of preparation, we make sure that every specimen is cut to a manageable size by a disk grinder and cleaned as thoroughly as possible.



Chemical Preparation

Sadly due to diagenetic effects and weathered surfaces, we are unable to separate most of the cephalopods entirely from their matrix. For the small pyrite coated specimens we chose to polish their shells with a stainless steel brush and apply a polyvinyl acetate like Mowilith® or Paraloid b72® to protect it from pyrite decay. The solution in this case has a 1:10 ratio.



Rewoquat®

For some specimens we want to remove the mudstone but preserve the limestone shells. Therefore we cover the surface with a thick coating of Rewoquat® 3690 PG**. This cationic hydrophilic softener is ideal to dissolve mudstones. We apply it in a solution with isopropanol (IPA) and let it sit for 72-96 hrs. Afterwards we repeat the procedure if needed. When the mudstone is dissolved we rinse with IPA and later with water.

Taphonomy



Every cephalopod has a front and backside that differs in preservation. Taphonomical conditions are often so that we deal with one weathered side and another more intact side. Mechanical preparation of the hard limestone requires a traditional air scribe or pneumatic pen. This pen is driven by a 25 L (whisper/silent) compressor generating between 7-8 bar of pressure. For the cephalopods of the Lompret quarry, we use a max. of 36000 beats/min to chip away the hard limestone.

Final Remarks & Conclusion

- Always try to combine mechanical and chemical prepping
- An individual approach for each specimen is required in order to obtain the best results.
- In general, 90 % of all cephalopods are lucky enough to survive preparation in 3 dimensions without breaking.
- The 10 % broken specimens are glued together and used to study the internal anatomy by cutting them in halves and polishing them (see pictures below).



Contact

Palaeontologica Belgica vzw.
A Paleontological Research initiative



*Founding members of Palaeontologica Belgica vzw

** Scientific advisor and boardmember of the Musée du Marbre Rance MAgMa

^ Vice President of the Belgian Council for Earth Sciences (RAW-CST) vzw-asbl.

Additional Info & Reference

- Cohen, K.M., Finney, S.C., Gibbard, P.L. & Fan, J.-X. (2013; updated 2020)
The ICS International Chronostratigraphic Chart. Episodes 36: p. 199-204.

** Make sure to re-use Rewoquat® after applying it on the specimens.
Dispose of any leftovers in a chemical waste container.