

COLD CASE

Re-opening of the Bernissart Iguanodon Crime Scene

DURATION
 15/12/2014 - 15/03/2019

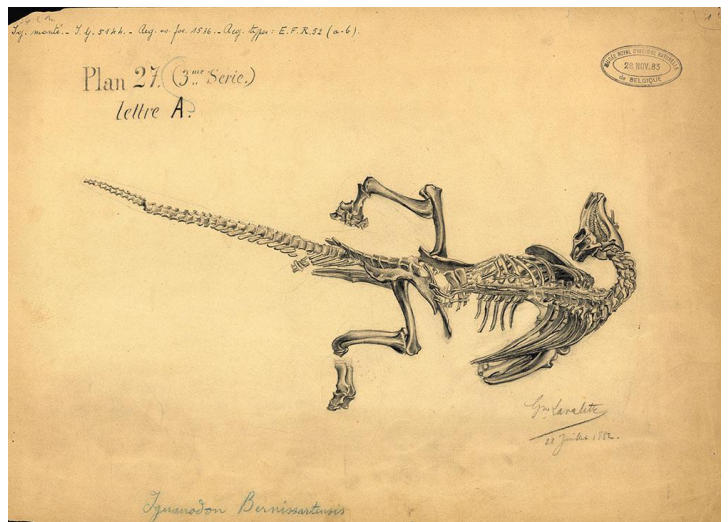
BUDGET
 877.448 €

PROJECT DESCRIPTION

Found by coal miners in 1878, the Early Cretaceous Iguanodon Sinkhole – or natural pit - at Bernissart (Belgium) is a unique fossil deposit owing to the quantity and preservation quality of *Iguanodon* (Dinosauria: Ornithischia) skeletons along with other taxa. Although this fossil locality has already been the subject of numerous scientific papers and monographies since its discovery 136 years ago, the processes leading to the local accumulation of so many complete skeletons remain completely unexplained. The aim of the present project is to refine an integrated model for the Bernissart Iguanodon locality that will be used as a framework for evaluating different taphonomic scenarios.

Several information sources will be re-examined at the occasion of this project: the Bernissart Iguanodons themselves, associated fossils, original maps and drawings made at the occasion of the excavations, and core data from the Ber 3 borehole that was drilled within the Iguanodon Sinkhole in 2002. Advanced non-invasive technologies will be used in order to preserve the integrity of these precious collection: computed 3D mapping of excavation area, core logger at large scale and microXRF at higher resolution for key intervals on the core drilled through the Bernissart Wealden deposits, analyses of multiple tracers (isotopes, trace elements, molecular biomarkers, etc.) from the core sediments, palaeohistological (“fossilopsies”), molecular palaeontology, and biogeochemical studies of the *Iguanodon* bones.

A series of taphonomic elements ('indices') will be collected in order to reconstruct the circumstances of the iguanodon demise. The analysis of the “crime scene” will clarify the distribution of the skeletons within the sinkhole. Forensic analyses of the Bernissart Iguanodons will help in reconstructing the structure of their population, will reveal eventual traces of predation and scavenging, and will bring new information about their diet, and paleoecology. Collateral victims, particularly fresh-water fishes, will also be studied for reconstructing the evolution of the ecological conditions reigning in the Bernissart lake/swamp. “Witness” testimonies will be cross-checked in order to clarify the relationships between the Bernissart Iguanodons and their environment: isotopic work ($\delta^{13}\text{C}$, $\delta^{15}\text{N}$) on organic matter and palaeobotanical changes across the bone layers; core logger at large scale & microXRF at higher resolution for key intervals ...



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In the light of these taphonomic elements, taphonomic models that potentially explain such a local concentration of skeletons in a limited area, will be evaluated: (1) "*natural death*" scenario, resulting from normal biological activity under normal circumstances, but requiring efficient and exceptional processes of concentration and conservation; (2) "*accidental*" scenario resulting from the quick burying of an *Iguanodon* population resulting from catastrophic sedimentary events; (3) "*mass or serial murder*" scenario, caused either by herding or abnormal behaviour under perilous situation. In this case, the collected taphonomic elements will be used to reconstruct the causes of death (or recovering the "murder weapons": exhaustion/starvation, miring, drowning, poisoning/suffocation, mass predation...) and then to propose a profile of the mass or serial killer (predators, wildfires, floods, droughts, H₂S from deep brines, cyanobacteria,...).

CONTACT INFORMATION

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LINKS

<https://www.naturalsciences.be/en/news/item/2820>