



PALEONTOLOGY DIVISION TALK

in conjunction with the Alberta Palaeontological Society

Main presentation: Where the Wild Things Are: Palaeontology and Partnership in Grasslands National Park, Saskatchewan

Speaker: Dr. Emily Bamforth, Royal Saskatchewan Museum

Brief presentation: Tyndall Limestones in Your Neighborhood

Speaker: Tako Koning, Professional Geologist and APS member

November 20, 2020 | 7:30 pm MDT

Webinar, there will not be a meeting at Mount Royal University, Room B108 in November

1 CPD (Continuing Professional Development) credit will be awarded for this event

MAIN TALK ABSTRACT

Fossil Tourism is certainly not a new concept. As early as the 17th century, holidaying gentry would flock to the south coast of England to collect 'curios', such as 'snakestones' (ammonites), 'devil's toenails' (a type of bivalve) and 'verteberries' (fossils of fish and ichthyosaurs). Today, people are still drawn in their thousands to places like Dinosaur Provincial Park to see, and sometimes to collect, fossils of charismatic animals such as dinosaurs in their natural habitat. While fossil tourism provides unparalleled opportunities for scientific outreach, public education, and the raising of awareness for fossil resources, it also has a more problematic side. Increased visitation to paleontologically significant areas can lead to the unintentional damage of fossils, their illegally collection or intentional vandalism. Nowhere has the question of how to balance conservation with visitor experience been more evident than in Canada's provincial and national park systems.

Grasslands National Park (GNP) in southern Saskatchewan, along with its partners and stakeholders, has been striving to find that balance. GNP was established in 1981 to protect the native grassland ecosystem. The East Block of GNP in particular is an area long known for its fossil resources. Geologist George Mercer Dawson collected the first dinosaur fossil in Canada from what is now the East Block in 1879. Since then, the latest Cretaceous dinosaur-bearing rocks known as the Frenchman Formation have yielded fossils of *T. rex*, Triceratops, Edmontosaurus, several dromaeosaur species, Thescelosaurus, pachycephalosaurs, ornithomimids, and the giant caenagnathid 'terror chicken', Anzu. Microvertebrate fossils from GNP's Frenchman Fm include sixteen species of turtle, twenty-one species of fish, freshwater sharks, salamanders, frogs, lizards, crocodiles, champsosaurs, marsupial and eutherian mammals, and an endemic species of toothed bird called *Brodavis*. GNP also contains one of the best and most extensive exposures of the Cretaceous-Paleogene (K-Pg) Boundary, the geological signature of the dinosaur mass extinction, in North America. The boundary contains amber inclusions with rare insect fossils, the first of this age to be found in the country. Above the boundary, the earliest Paleocene Ravenscrag Formation contains exquisitely well-preserved fossil leaves, a signature of plant recovery and a treasure trove of paleoclimate information following the extinction. The East Block also features fossil-bearing early Miocene-aged rocks, very rare in Canada, known as the Wood Mountain Formation.

Despite the scientific significance of its fossil deposits however, the first two decades of GNP's existence saw very little paleontology research conducted, largely because of concerns that fossil collection would disrupt the delicate ecosystem. It was not until the 2000s that a renewed effort by the Royal Saskatchewan Museum (RSM) and McGill University to explore and document the palaeontological resources in GNP brought the Park's fossils back into focus. Attaining permits to collect the fossil material led to discussions with Parks Canada about the need to collect palaeontological resources in order to protect them, as well as how the ecological impact of collection could be minimized. These discussions led to the establishment of a GNP Paleontology Team, comprised of members from Parks Canada GNP, the Royal Saskatchewan Museum

(RSM), McGill and other outside institutions, to discuss issues related to paleontology in the Park. In 2014, a formal Memo of Understanding was established between the RSM and GNP, establishing guidelines about how palaeontological resources in the Park were to be dealt with.

Since 2010, visitation numbers in Grasslands National Park have skyrocketed, largely due to increased public awareness and to a new campsite and visitor centre being built in the East Block. The new focus on paleontology – a type of fossil tourism - in GNP has been significant and greatly beneficial. In partnership with the RSM, it has led to the development of a hugely successful public program known as ‘Fossil Fever’. Additionally, more fossils are being found by knowledgeable amateurs in the backcountry, who report their findings. However, with the dramatic increase in number of people visiting the backcountry, sensitive fossil sites previously protected by their remoteness are now being discovered and sometimes disturbed. In 2017, the vandalism and partial poaching of a high-profile fossil from the Park brought the issue to a head. The GNP Paleo Team is now working to mitigate these issues by providing more education, information and signage about fossil collection legislation, more site monitoring, and more public awareness about the importance of leaving fossils in their original geological context.

Grasslands National Park provides an excellent example of how professional and amateur paleontologists, government organizations and the general public can work together to help balance research, visitor experience and protection of valuable fossil resources on protected lands.



Figure 1: A vista known as ‘The Million Dollar Viewpoint’ in the East Block of Grasslands National Park, overlooking deposits of the latest Cretaceous dinosaur-bearing Frenchman Formation and the earliest Paleocene Ravenscrag Formation.



Figure 2: Participants in Grasslands National Park’s ‘Fossil Fever’ program, run in partnership with the Royal Saskatchewan Museum.

References:

1. Parks Canada Mandate from Parks Canada 2013-14 Report on Plans and Priorities, Pg. 3
2. Parks Canada, Guiding Principles and Operational Policies, Part II, Section 3.2.8

BIOGRAPHY

Dr. Emily Bamforth is a vertebrate paleontologist with the Royal Saskatchewan Museum (RSM), working out of the RSM’s T. rex Discovery Centre in Eastend, SK. Dr. Bamforth’s research in Eastend focuses mainly on palaeoecology, involving the study of fossil plants and animals, as well as sedimentology and paleoclimatology, to understand ancient ecosystems. Dr. Bamforth received a BSc in evolutionary biology from the University of Alberta in 2005, with an undergraduate thesis on 38 million-year-old fossil snake hibernacula from Wyoming. She went on to do a MSc in Precambrian Invertebrate Paleontology at Queens University with Dr. Guy Narbonne, exploring Ediacaran taphonomy and paleoecology at Mistaken Point in Newfoundland. In 2008, she began her PhD at McGill University under the supervision of Dr. Hans Larsson, exploring pre-extinction biodiversity trends immediately prior to the K-Pg extinction in Saskatchewan. She received her doctorate in 2014, the same year she began working for the Royal Saskatchewan Museum. Dr. Bamforth has published numerous papers and conference abstracts of Ediacaran and Cretaceous paleontology. She is the

recipient of several academic, teaching and community engagement awards, including the Regina YWCA's 2019 Women of Distinction Award for Science.

BRIEF TALK ABSTRACT

The Tyndall limestone is the famous and iconic building stone from the Late Ordovician (450 million years old) Red River Formation which outcrops near the town of Tyndall, approximately 30 km northeast of Winnipeg, Manitoba. The Tyndall limestone, also known as Tyndall Stone, occurs within the lower half of the Red River's Selkirk Member that is 43 m thick. Tyndall Stone is used extensively throughout Canada as an ornamental building stone. It ranks among one of the most beautiful building stones in the world. The interiors of the Parliament Buildings in Ottawa are of Tyndall Stone as well as the Museum of Civilization in Gatineau, Quebec, the Provincial Legislature buildings in Winnipeg and Edmonton, the Rimrock Hotel in Banff, the Empress Hotel in Victoria, and the University of Alberta's Tory Building.

The Tyndall limestone was deposited in a shallow marine environment. It is fine grained and cream coloured with pervasive mottling of darker dolomitic limestone. The highly distinctive and beautiful mottled appearance is due to the extensive presence of trace fossils known as *Thalassinoides* which are fossilized tracks, trails and borrows left behind by burrowing organisms, such as worms and crustaceans, which burrowed through the limestone during or just after its deposition.

This presentation will show select locations in downtown Calgary, the Beltline, Sunnyside - Kensington and at the Southern Alberta Institute of Technology (SAIT) where Tyndall Stone is used to decorate the sides of buildings and for ornamental purposes. Downtown, on the north side of the classic art-deco style AGT (Alberta Government Telephone) Building at 119-6 Ave., SW, built over 90 years ago in 1929, one can observe occurrences of *Receptaculites* which is the highly distinctive fossilized algae sometimes referred to as "the sunflower coral". Abundant *Thalassinoides* can also be seen there. The *Thalassinoides* are more resistant to weathering than the limestone matrix. Accordingly, they are prominently etched on the surface of these blocks by almost a century of weakly acidic rainfall.

Ten meters high Ionic-style columns of Tyndall Stone grace the entrance of the heritage Bank of Montreal Building, built in 1932. Similar style columns of Tyndall Stone can be seen at the entrance to the Centre for the Performing Arts, built in 1930 and originally called the Calgary Public Building. Both buildings are on the Stephen Avenue Mall.

In front of the Safeway store in Kensington, ten blocks of Tyndall Stone are present. The top dimensions of each block are about 1.0 m by 1.0 m and the depth is 0.5 m. These blocks allow the observer to study the fossils in multi-dimensions (top, front, side and back). However, the best location in Calgary to view the Tyndall is at SAIT where in the southeast corner of SAIT four large buildings are entirely covered by slabs of Tyndall Stone, the slabs are mostly 1.4 m high by 0.7 m wide.

The Tyndall is highly fossiliferous in the locations to be reviewed in this presentation. These fossils represent life which flourished 450 million years ago in a tropical environment on an ancient sea floor. A variety of fossils have been observed including nautiloids, gastropods, stromatoporoids, brachiopods, sponges, rugose corals, and large (up to 25 cm diameter) circular *Receptaculites*.



Fig.1 SAFEWAY, Kensington: Maculurites gastropod. Canadian loony coin for scale.



Fig.2 SAFEWAY, Kensington. Sponge with a straight-shelled orthocone nautiloid in the lower right corner.



Fig.3 SAIT. Receptaculites, an Ordovician age algae. The darker mottled features are known as Thalassinoides which are worm tubes caused by organisms intensively burrowing in the soft sediment.



Fig.4 SAIT. Large orthocone nautiloid, length of 50 cm.

BIOGRAPHY

Tako Koning is Holland-born but Canada-raised with many years of experience working as geologist in the oil industry in Canada but also living and working in Indonesia (7 years), Nigeria (3 years) and Angola (18 years). He has a B.Sc. in Geology from the University of Alberta and a B.A. in Economics from the University of Calgary. He continues to be fascinated by geology and palaeontology. This is his second presentation to the Alberta Palaeontological Society. His first was last year with a talk on "Algal Stromatolites - From Precambrian to Present Day".

This event is presented jointly by the Alberta Palaeontological Society, the Department of Earth and Environmental Sciences at Mount Royal University, and the Palaeontology Division of the Canadian Society of Petroleum Geologists. For details or to present a talk in the future, please contact CSPG Palaeontology Division Chair Jon Noad at jonnoad@hotmail.com or APS Coordinator Harold Whittaker at 403-286-0349 or contact programs1@albertapaleo.org. Visit the APS website for confirmation of event times and upcoming speakers: <http://www.albertapaleo.org/>.