ABSTRACT VOLUME

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Cover and logo designed by Caleb Brown.

Conference Logo: The logo for the 2012 Canadian Paleontology Conference is inspired by the fossils of the Burgess Shale. *Anomalocaris canadensis*, the top predator of its time and arguably the most iconic animal of the Cambrian Explosion, is backed by the dramatic Toronto skyline. The lobopod *Hallucigenia sparsa* remains one of the most enigmatic Burgess Shale fossils. The Royal Ontario Museum houses the largest collection of Burgess Shale fossils in the world, with ongoing expeditions since 1975.

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One of the main goals of the 2012 ROM Burgess Shale expedition was to better understand lateral facies variations within the Waputik Member, its relationship to the "thick" Stephen Formation and differences in trace and body fossil assemblages in an area between Odaray Mountain and Stanley Glacier. During the reconnaissance phase of this work, we discovered an extraordinary new Burgess Shale-type fossil assemblage west of Stanley Glacier in Kootenay National Park, 40 km to the southeast of Fossil Ridge. The new locality lies within the uppermost part of the "thick" Stephen Formation. Its proximity (<1 km) to exposures of the "thin" Stephen Formation to the east, implies the presence of a major topographic break between the two distinct expressions of the Stephen Formation. Preliminary fossil collections from talus material and limited *in-situ* excavations indicate that the diversity, density and quality of preservation resemble the famous 'phyllopod bed' (Walcott Quarry) on Fossil Ridge. Arthropods are dominant and include *Isoxys*, *Marrella*, *Naraoia*, *Sidneyia*, *Tuzoia* and some rare forms like *Branchiocaris*, *Habelia* and *Mollisonia* as well as a number of probable new taxa. The fossil assemblage also includes *Oesia* and *Metaspriggina*-like forms, polychaetes, hyoliths, and other unidentified forms as well as trace fossils. While a dozen localities with Burgess Shale-type fossils are known in the Canadian Rockies, this new "phyllopod bed-like" assemblage promises to be one of the most important field discoveries of the last 30 years and will no doubt greatly contribute to our understanding of the Burgess Shale biota and Cambrian diversity.

"I BET WE'LL FIND THAT BEAR": A CASE OF PERSEVERANCE AND SERENDIPITY IN THE CHAMPLAIN SEA

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The concept of serendipity is well known to scientists, and especially to paleontologists. As paleontologists, we generally know where to look for fossils, but don't always know if our search will be successful and, more importantly, what it will bring to light. From this perspective, one could say that many fossil discoveries are not so much the result of chance as they are the result of provoking chance. The discovery, in 2004, of a brown bear (*Ursus arctos*) metatarsal at the Saint-Nicolas site, near Québec City, provides a good example of serendipity and perseverance in paleontological fieldwork.

The Saint-Nicolas site is a large sandpit located in the Saint-Nicolas ward of the city of Lévis. It exposes a regressive Champlain Sea sedimentary sequence spanning the Pleistocene-Holocene transition. As described by Occhietti et al. (2001), this sequence comprises three units, from bottom to top: massive clay overlain by coarsely stratified silts and sands; richly fossiliferous, fine to medium cross-bedded sands; and stratified silts and sands. Our field efforts since 1995 have allowed us, with the help of numerous

colleagues (mostly avocational paleontologists), to gather more than 3 000 macroinvertebrate and 300 vertebrate specimens. These fossils are derived from the tidal channel sands (as interpreted by Occhietti et al., 2001) of the middle unit, and were either collected *in situ* or, more commonly, in colluvium deposited along the working faces of the pit. The latest survey of the fossil assemblage listed 38 species or types of invertebrates and 13 species of vertebrates (Cournoyer et al., 2006).

More than a decade ago, while discussing the fauna with the senior authors, C.R. Harington mentioned the possibility of finding polar bear remains at the Saint-Nicolas site. His hunch was based on the presence of a small species of seal (presumably the ringed seal, the polar bear's main prey item) as well as the Atlantic walrus and, by extension, on the presumed existence, at least seasonally, of fast ice or sea ice in the area at the time of deposition of the cross-bedded sands. Harington further expressed how, as a polar bear enthusiast, he would be delighted to be able to study and describe such fossils, to which Cournoyer replied, in essence, "I bet we'll find that bear." This was a half-serious remark, as each visit to the site since 1997–1998 had lead us to observe, with mixed feelings, rapid shifts in the position of working faces, with corresponding depletion of the cross-bedded sands and loss of countless specimens.

In the spring of 2004, an unidentified bone was found by Cournoyer at the surface of colluvium left over in a newly abandoned part of the sandpit. Three years later, following a suggestion by Kevin Seymour (Royal Ontario Museum) that the bone appeared to belong to a terrestrial mammal, perhaps a bear, and with help from Steve Cumbaa (Canadian Museum of Nature), the senior authors were able to identify the specimen as a definite ursid. More recently (2010–2011), the specimen was carefully examined by Harington, who identified it as a third metatarsal probably belonging to a brown bear, and radiocarbon dated to confirm its age (9880 ± 35 BP). DNA was also successfully extracted from the fossil and PCR-amplified by Fulton and Shapiro at Penn State's Ancient DNA Lab; genetic analysis of the fossil DNA sequence made it possible to identify it unequivocally as brown bear, *Ursus arctos*. This specimen, which is the first record of brown bear from Champlain Sea deposits, adds to other data indicating that this species once ranged as far as eastern Canada.

Although the fossil found by Cournoyer did not prove to be Harington's predicted polar bear, it illustrates the value of perseverance and shows that serendipity may hold unexpected surprises, even when dealing with adverse field conditions. It also highlights the importance of collaboration between people with different backgrounds and areas of expertise.

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