Fossils of southwest British Columbia

Curator: Richard Hebda

Other Participants: Marji Johns, Collection Manager

Other research participants at RBCM:
Dr. B. Archibald, Research Associate, RBCM and Simon Fraser Univ.
T. Bullard, Research Associate, RBCM
Dr. T. Cockburn, Research Associate, RBCM
R. Graham, Volunteer, RBCM
Dr. J. Haggart, Research Associate, Geological Survey of Canada
T. Henrich, volunteer RBCM
G. Kaiser, Research Associate RBCM
S. Mclachlan, RBCM volunteer, University of Victoria
S. McPhail, RBCM volunteer

Collaborators:
V. Arbour & Dr. P. Currie, University of Alberta
Dr. G. Dyke, University of Southampton, School of Biology and Environmental Science
Dr. L. R. Saul, Los Angeles County Museum of Natural History
Dr. R.L. Squires, California State University, Northridge

Rationale and Benefit:

Interest in British Columbia fossils has increased dramatically in the past ten years in part due to the RBCM’s Dragon Bones exhibit but also because of popular publications on the geology and paleontology of the province. No publication considers the important value of BC fossil plants or the role ancient plants have played in the origin and development of our ecosystems. The study of Saanich Peninsula plants has provided key material for RBCM exhibits and for the broader publication of Ancient plants of BC which for the first time will describe BC plants for the general public and explain their importance in the context of modern issues such as climate change.

The JH Nanaimo group fossil collection is the largest institutional collection from Vancouver and adjacent islands known and is a gold mine for years of scientific study. The RBCM holds a comprehensive collection of fossils form southwest Vancouver Island including type specimens of vertebrates. New material is being discovered on a regular basis and is known to occur in the field. Studies of specimens from the collection and of new field acquisitions will markedly improve our understanding of the region’s vertebrate and invertebrate fauna and flora. The project establishes and maintains a strong connection between the RBCM and amateur paleontological groups. The RBCM holds substantial marine Pleistocene materials. Identification and description of the ice age invertebrates will add enormously to our understanding this time of rapidly changing climates.
Project Description:

With the acquisition of a 20,000 specimen late Cretaceous fossil collection mostly of invertebrates, in late 2008, the RBCM is fast becoming a centre for paleobiological research. This project combines the previous project of studies on Late Cretaceous plants and a book on BC ancient plants with the study of other fossils especially invertebrates. It involves research associates T. Bullard, T. Cockburn and J. Haggart (Geological Survey of Canada) as well as volunteers R. Graham, J. Haegert, F. Moretti) and visiting researchers such as G. Dyke, B. Beatty (New York) and B. Archibald (Simon Fraser Univ.). The project involves the systematic examination and description of fossil localities and groups of organisms including invertebrates, vertebrates and plants from the distant past of the Province, such as a new fossil plant localities discovered in 2004, 2010, and numerous invertebrate sites along the Chemainus River, and locations on the southwest shore of Vancouver Island representing collectively by thousands of specimens in the collection. These sites and their fossils are important because they are a world-class representation of ancient life in the region and could contribute to resolving a controversial issue of the latitude and climate of Vancouver Island (Wrangellia) compared to the rest of North America, as well as the description of creatures previously unknown to science. Systematic studies of the fossils of the region have been few and there are now new techniques and advances in knowledge. All specimens have been accessioned or are in the process of being accessioned into the collections. In the past project year 2000 specimens were accessioned.

More than 100 specimens from Vancouver Island formed the backbone of the Behind the Scenes exhibit until fall 2011. A parallel and integrated project is the writing of a manuscript on the Ancient plants of B.C. a manuscript version of which was produced by the late Ken O’Neill and R. Hebda).

The research elements of the project consists of:
1. making a representative collection of scientific and exhibit-grade specimens from selected sites.
2. identifying and describing the constituent species of the fauna and flora especially invertebrates
3. describing the geologic, stratigraphic and depositional setting
4. selecting and installing specimens for exhibit as requested
5. describing the new fauna and flora in scientific papers
6. writing a book on the Ancient Plants of BC (Hebda)

Schedule Short-Term:
April June 2012:
Cockburn and possibly others will visit sites on southwest coast of Vancouver Is. and make collection as appropriate
Identification and cataloguing of JH fossil collection specimens in all four quarters of the year
Verify collection locations of Haegert material through selected field visits: Research associates, volunteers and M. Johns in quarters 1,2., visit newly discovered fossil flora site on Saanich Peninsula and make representative collection (R. Hebda), Accessioning of JH collection all four quarters
July- Sept: as above
Provide key specimens from collection to outside researchers.
October-Dec 2012:
Draft list of the fossil flora of North Saanich.
Research associates prepare papers on JH collection as per general work plan (see below).
Jan-March 2013: Submit first of papers on Haegert collection as per general work plan
First rough draft of fossil flora of Saanich Peninsula

Schedule Long-Term:
2013-14 Ancient plants of BC to be revised and published, submit and publish fossil flora of Saanich Peninsula
2010-14 Papers on JH fossil collection and Sooke Formation published. JH fossil collection fully accessioned

Project Completion Date: 2016

Collection Work And Acquisitions:
Approximate number of specimens to be collected: 200
Accessioning of Haegert collection: approx. 4000

Community Outreach During Research Trips:
In 2011 specimens resulting from this project formed the core of the Behind the Scenes temporary exhibit at the RBCM. Specimens were and are used in the Fossil Fair held by the Victoria Paleo Society every year.
Media collections tours and possible site visits to Accompany 2012 dinosaur exhibit

BUDGET:
No funds requested

Publications: recent work involving RBCM team or RBCM specimens:

Refereed:


**Field Guides, Newsletters, abstracts, posters**


The following is a working list of planned research activities that have been identified by the Research Team through preliminary review of the JH Fossil Collection, housed at the Royal BC Museum. Listed contributions include a general title, a possible research journal for submission, and potential lead author. Most, if not all, of the papers will be multi-authored contributions. Principal workers of the RBCM Research Team are: J.W. Haggart, M. Johns, R. Graham, T. Bullard, J. Haegert, R. Hebda.

Other researchers will be approached for involvement, based on needed expertise. It is also anticipated that J. Haggart will obtain funding to support M.Sc. students for some projects. Several of the identified contributions are already underway, in one form or another. Additional contributions will likely be developed, as analysis and review of the collections continues. It is anticipated that many of the contributions identified as scientific journal papers will be completed by the end of the 2016; monographs and theses will likely take beyond the 5-year period.

**Scientific Journal Papers**

1. The genus *Biplica* in the Upper Cretaceous Nanaimo Group of British Columbia (R. Graham; *Veliger*)
2. Perissityidae of the Upper Cretaceous Nanaimo Group: occurrences and biostratigraphic range zones (R. Graham; *The Veliger*)
3. Coastal lowland Eocene strata, southeast Vancouver Island, British Columbia; transition to Upland successions of the Interior (J. Haggart; *Canadian Journal of Earth Sciences*)
4. Repatriation of fossil specimens lost for a century: an example of the importance of record keeping for paleontological collections (J. Haggart; *Museum Curatorship*)
5. Molluscan biostratigraphic succession of Denman and Hornby islands, British Columbia and
6. *Marsupites* in the Nanaimo Group Cretaceous of Vancouver Island, British Columbia: implications for the of the *Sphenoceras Schmidtzi* Zone of western North America (J. Haggart; *Cretaceous Research*)

7. Placenticeratid ammonites of the Upper Cretaceous Nanaimo Group of Vancouver Island, British Columbia (J. Haggart; *Journal of Paleontology*)

8. Late Cretaceous (Campanian) shark teeth from the Pacific coast of Canada (T. Cook; *Canadian Journal of Earth Sciences*)

9. New Nanaimo Group (Upper Cretaceous, Santonian-Campanian) baculitids (Ammonoidea) from Vancouver Island, British Columbia (J. Haggart; *Journal of Paleontology*)

10. Unusual new heteromorph ammonites from the Upper Cretaceous Nanaimo Group, British Columbia (J. Haggart; *Cretaceous Research*)

11. Patellacea and Fissurellacea (Gastropoda) in the Upper Cretaceous Nanaimo Group (M. Johns; *Journal of Paleontology*)

12. Occurrence and distribution of Gaudryceratinae of the Upper Cretaceous Nanaimo Group (M. Johns; *Journal of Paleontology*)

13. The mosasaur fauna of the Nanaimo Group, British Columbia (T. Bullard; *Journal of Vertebrate Paleontology*)

14. **Monographs**

1. Fossils and localities of the JH Fossil Cretaceous Fossil Collection: database and summary report (M. Johns; RBCM internal publication?)

2. Stratigraphic setting of Upper Cretaceous fossil collections, Nanaimo Group of Vancouver Island (J. Haggart; RBCM publication?)

3. An atlas of the Late Cretaceous molluscan fauna of Vancouver Island (J. Haggart; RBCM publication?)

4. Santonian-Campanian (Late Cretaceous) nautiloids from the Nanaimo Group, Vancouver Island, British Columbia (T. Bullard)

5. Pachydiscid ammonites of the Nanaimo Group (Upper Cretaceous; Santonian-Campanian), Vancouver Island, British Columbia (J. Haggart)

6. Late Cretaceous inoceramids (Bivalvia; Pteriacea) of the Nanaimo Group of Pacific coast Canada (J. Haggart)