

Escalante 2003

John Fam & Dan Bowen

As you know, traveling to remote fossil sites on the west coast of Vancouver Island is risky business. The surf swells, the tides and the winds can change in minutes and you can be in trouble. In the past we used a 22' Zodiac, but this time we went with Keith Bennett in his 22' aluminum boat, with a 12' skiff; the same boat and pilot we used for our 2002 field trip in the Charlottes. Our small group consisted of field trip leader Dan Bowen, paleontological consultant, John Fam, Mike Inglin and Skippy Miller.

We set out early from Courtenay and, by late afternoon, arrived at Burdwood Bay where we quickly set up camp. The trip out through Nootka Sound was a little rough, but as we headed for Escalante the seas calmed. The tide was perfect as we stepped on to the perfectly layered Eocene rocks that the Spanish so eloquently named "Escalante". We were referencing Jeletzky's and Cameron's material for site information and wanted to visit some known sites and some new ones.

The best exposures of early Tertiary rocks on the west coast of Canada are exposed around the Nootka Sound region of Vancouver Island. Numerous exposures of the Hesquiat and Escalante formation contain well-preserved foraminifers, molluscs, and decapod crustaceans. George Jeletzky and B.E.B. Cameron of the Geological Survey of Canada studied and published a series of papers on these formations but they disagreed on each other's interpretations of the age and depositional environment of these rocks. Based on foraminifers, Cameron argued that the deposition of the Hesquiat formation occurred in bathyal water depths as a submarine fan complex of Late Eocene to Early Oligocene age (Cameron 1980). Jeletzky, who used molluscs to correlate and interpret the nature of these beds, argued for a shallower, neritic channel and interchannel shelf deposit of Early Oligocene age (Jeletzky 1975). This disagreement resulted in a series of contentious papers by both authors. The tension

reflected not just disagreement between the two scientists but between two schools of research; molluscan and benthic foraminiferan specialists were making conflicting interpretations of data. Cenozoic molluscs from strata in the Pacific Northwest are highly provincial, making them difficult to correlate with other regions (Prothero & Armentrout 2001). Molluscs are abundant mainly in shallow to intermediate depths but generally lacking in deeper deposits. On the other hand, benthic foraminifera were found to be time transgressive as they reflect paleobathymetry or sensitivity to water depth (Prothero 2001). The limitations between the "two schools" resulted in the molluscan Oligocene being shorter than the foraminiferal Oligocene (Refugian) (Prothero 2001). Jeletzky and Cameron correlated their data with work from their American colleagues. Furthermore, the occurrence of shallow water mollusks with deep water foraminifera, in many of the sequences, compounded the problem. Such disagreements resulted in contentious tones when the researchers were referring to each other's work (Jeletzky 1973). Ultimately, the use of planktonic foraminifera allowed correlation with European type sections and illustrated the problem of using benthic foraminifera for biostratigraphy, and allowed paleontologists to resolve the controversies regarding the Cenozoic of the Pacific Coast.

Recently, work using magnetic stratigraphy combined with biostratigraphy has allowed more accurate correlation of Pacific rocks with the global time scale (Prothero & Armentrout 2001). In fact, magnetic stratigraphy provides a resolution to less than 100,000 years (Prothero 2001). The Refugian stage, which was disputed by Cameron and Jeletzky, is now considered to span the Eocene – Oligocene boundary (Prothero & Armentrout 2001). Magnetic stratigraphy of the tertiary rocks from the west coast of Vancouver Island could possibly resolve the age of the rocks there. Nevertheless, one result of the controversy was a wealth of scientific papers from Jeletzky and

Cameron that have greatly improved our understanding of such complex geological formations.

The purpose of our expedition to this region was to collect from the “crab concretion” beds in the vicinity of Escalante Point. Eventually, it is our intention to publish a paper describing the unique decapod fauna. Jeletzky described a few of the most common genera, but more recent collecting through VIPS expeditions in 1999 and 2001 have revealed a greater diversity of decapods than previously thought. Exposed in the intertidal zone and wave cut benches are some wonderful outcrops of the Late Eocene to Early Oligocene Hesquiatic formation. Previous trips to this vicinity have focused primarily on a single locality rich in crab bearing concretions. We hoped to proceed further south to explore other potential localities.



John Fam digging in the debris zone.

Dan Bowen photo

On the first day, we were lucky to get sunny weather and moderately calm waves. So after setting up camp, we set out to visit our main collecting area around Escalante Point. This intertidal outcrop exposes a horizon yielding reworked concretions containing decapod crustaceans, molluscs, and fairly abundant carbonaceous debris. There are also adjoining horizons containing naturally deposited concretions containing crabs. By far the most common fossil was the decapod, *Megokkos alaskanensis* (Rathbun) (see the photo on the cover). These crabs are found in reworked

concretions that are all randomly oriented to the bedding plane. We also managed to find a couple of examples of the rare rananid crab, *Carinaranina naseiensis* (Rathbun). Also of significance was the discovery of a complete fossilized pinecone, *Pinus escalantensis* by Dan Bowen. This is the third occurrence of this pinecone from this locality and the fourth known specimen of this species! We collected until dusk where the on coming tide chased us off the beach.

Species of *Megokkos* are known only from the North Pacific Rim. *Megokkos macrospinus* is the earliest known member of the genus, dating from rocks of middle to late Eocene in age (Schweitzer & Feldmann 2000). *Megokkos alaskanensis* has been collected from rocks of Late Eocene to Early Oligocene of Alaska, British Columbia, and Washington. At these localities, certain horizons containing abundant concretions have yielded a well-preserved decapod fauna. The crab fauna is dominated by the crab genus *Megokkos*, formerly known as *Portunites*. *Megokkos* in latin translates to “large eye” referring to the broad and deeply excavated orbits of this genus (Schweitzer and Feldmann, p. 641). These crabs certainly had large orbital sockets. Other, rarer elements of the crustacean fauna include several genera of Rananid crabs. *Carinaranina naseiensis* (leatherbacks), and *Ranina* sp. have been documented from the Hesquiatic formation, and other forms of Raninidae such as *Laeviranina*, and *Raninoides* have likely been found but require further study to confirm their occurrence.

On the second day, we explored a new locality about 1 km south of Escalante point. This locality known as 71-5 (Cameron 1980) contains several fossil-bearing horizons. When we made our beach landing, we came upon an immense outcrop consisting of primarily alternating layers of thinly bedded sandstone/siltstone. Splitting up, we began to search for the layers that contained reworked concretions. Several fruitless hours went by as we walked the seemingly never ending outcrop with little trace of any fossils. Finally, we re-examined the geological map and decided to check out an area just west of our beach landing. This turned out to be correct move as we discovered a huge outcrop of reworked concretions. Unlike the first locality, these concretions were deposited in a

conglomeratic matrix. It reminded us of a fossilized debris flow, containing everything from large boulders of volcanic origin to pebbles, loose molluscs, and crab concretions deposited in random orientations to the bedding plane. This phenomenon has also been reported from several localities in Washington State. In Western Washington, transported or reworked crab assemblages have been found within conglomerates of the Eocene Aldwell Formation, Eocene Humptulips Formation, Late Eocene Hoko River Formation and Oligocene Pysht Formation. (Nyborg 2003).



John Fam in the normal-layered zone.
Mike Inglin photo.

References:

Cameron, B.E.B. 1980. Biostratigraphy and depositional environment of the Escalante and Hesquiatic Formations (Early Tertiary) of the Nootka Sound area, Vancouver Island, British Columbia. Geological Survey of Canada, Paper 78-9, 28 pp.

Jeletzky, J.A. 1973. Age and depositional environments of Tertiary rocks of Nootka Island, British Columbia (92-E): Mollusks versus foraminifers. *Can. Journal of Earth Science*. 10 (3): 331-365.

We were very successful in finding many good specimens of *Megokkos* and two examples of *Ranina* sp. Tim “Skippy” Miller cracked open a large oval shaped concretion to yield the most impressive *Megokkos* that we have ever seen. It was certainly a lucky break as most specimens require a lot of prep work. But “Skippy’s” crab was almost perfect. We also found a rare solitary coral and several gastropods loose in the reworked sediments. After lunch, we stood on the outcrop and marveled at how these fossils and rocks were buried and then transported. There was still so much more of this outcrop to explore. As the tide came in, so did the rains, driving us back to our campsite. After a spectacular day of collecting, more questions than answers seem to arise. We were hoping to make one more trip back to this site, but the weather was not favorable.

We packed up our camp and headed for Cougar Creek with our specimens and gear. This left us wondering when we could make another trip back. See BCPA newsletters No. 22 and 29 for other articles on the west coast.

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