

# THE THRUST

DECEMBER 10, 2007

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## THE SECOND INSTALLMENT OF THE MALASPINA GEOLOGY DEPARTMENT NEWSLETTER – TERM IS ALMOST DONE AND XMAS IS COMING. BY TIM STOKES

Well it is about time. The second installment of the 'Thrust' is out! Yes, the general consensus is that the newsletter is useful, and the name is acceptable. Steve has indicated that he had quite a lot of feedback on the newsletter and all of it was good. I have had less feedback, but got some from the powers above that we should include Malaspina's new logo on the front of the newsletter in case it gets out of Nanaimo.

The Fall Term is almost over with exams winding up in a week or so, then a well earned break for Christmas. Some of the activities that have occurred in the Geology Department over the last term have included:

1) The Great Walk around Cowichan Lake to raise \$\$ for a thin section machine. An amazing feat for a brave few, with various stories of hallucinations, unwell passengers in cars and new friends made.

2) Three student talks. Rachel with her GEOL 380 work experience report in a gold exploration camp up in Central BC; Bob with his GEOL 380 work experience report from

placer gold mining in the Yukon. (I hear real gold was being panned in this sessions); and Melissa with an amazing session on the geology of the Moon.

3) A field trip was put on by Sandra for the GEOL 200 class to Myra Falls mine with an underground mine tour, that also included a interesting late overnight at Strathcona Lodge

4) A field trip along the Sea to Sky Highway with Steve's GEOL 111 class, and reportedly one or two rain showers

5) A massive afternoon lab clean-up session, with a remarkable amount of work done in 3 hours, resulting in a lab that actually has table space.

Of course we have another busy term ahead of us. Ken Porteous is going to be staying on as technician for the Spring Term, as Owen Peer is hard at work finishing his Master's.

If you are looking for a geology course there are plenty of options GEOL 112, GEOL 200, GEOL 201,

GEOL 301 and GEOL 304 (see poster at back of newsletter).

We also have to start to plan for GEOL 206 - Field Geology and Geological Mapping that is run on Quadra Island and Texada Island. This requires a minimum of ten students for it to be a go. So if you want to do it, and know others who might, let us know soon – like now!

There is also rumor of a GEOL 390 – Special Field Studies trip to Northern BC. This is in the works and posters should be up soon.

**Have a great Xmas and New Year!**

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**REFLECTIONS ON FIELD SCHOOL—SEE PAGE 5**

## FOSSIL HUNTING ON VANCOUVER ISLAND BY KEN PORTEOUS

Few people on Vancouver Island realize how blessed we are with easily accessible fossil localities.

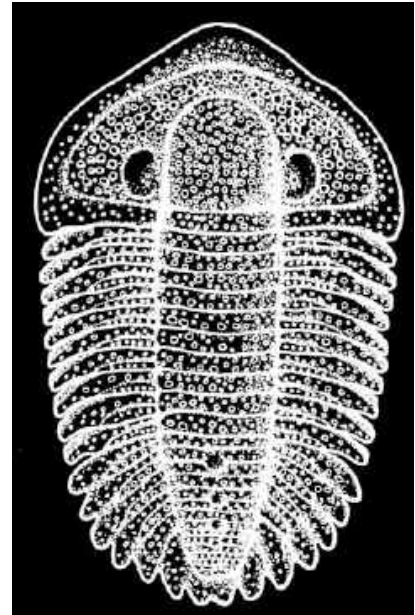
Within two kilometres of the campus, a person can collect 20 thousand year old Pleistocene fossils, and 85 million year old Cretaceous fossils. At Horne Lake, one can collect 295 million year old Paleozoic fossils. These are only three of the dozens of fossil localities available to us. This situation makes the island one of the most attractive places in B.C. to collect and study fossils.

In addition, Qualicum hosts one of the Island's best kept secrets, the Vancouver Island Paleontological Museum and in Courtney; a great fossil display can be seen at the Courtney and District Museum.

Because of the vast number of fossil localities, new discoveries occur regularly. In the past 12 years there have been two elasmosaurs, two mosasaurs, and a very large turtle found in the Courtney area, as well as one Elasmosaur found on Englishman River near Parksville. On Hornby Island, a theropod dinosaur tooth, a pterosaur wing bone, several bird bones and a couple dozen types of shark

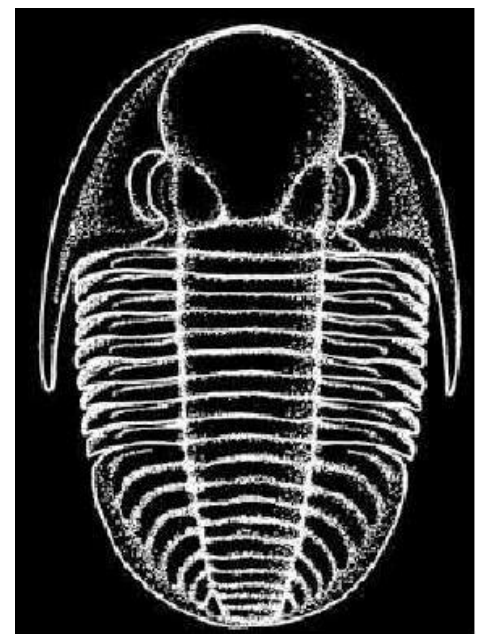
teeth have been found. All of these finds are of Cretaceous age. Remarkably, on one small (~10 hectare) island in Cowichan Lake, 6 new species fossil crabs were found. These too, were of Cretaceous age. On Mt. Spencer, just south of the Alberni Inlet, 56 new taxa of Paleozoic fossils were found in the exposed rocks of the Mt. Mark Formation. These included the first (for Vancouver Island) described blastoids and two species of trilobite. Lastly, at Horne Lake and again in the Mt. Mark Formation, a further 11 new taxa of Paleozoic fossils, including one more species of trilobite, were found. These two sites have been dated to the upper Pennsylvanian Period (295 million years old) and are the oldest and largest example of a fossil macro fauna ever found on the island.

So get out your hammers and chisels and start collecting!



Two of our three species of trilobite. Top: *Brachymetopus* cf. *pseudometopina*

Bottom: *Paladin* s



**THE SNOW HOLE MYSTERY AT MOUNT WASHINGTON BY STEVE EARLE AND IVANNA FAUCHER**

Ever since they opened the ski hill in 1979 the operators at Mt. Washington have noticed that snow never accumulates at a number of locations. These “snow holes” range up to about 2 metres across, and are restricted to a 100 by 25 m area on “Schum’s Delight” next to the Sunrise Chair. There is no evidence of groundwater or surface water flow in the area of the holes, although one of the ski-hill staffers reported that warm air blows out of the holes during the winter.



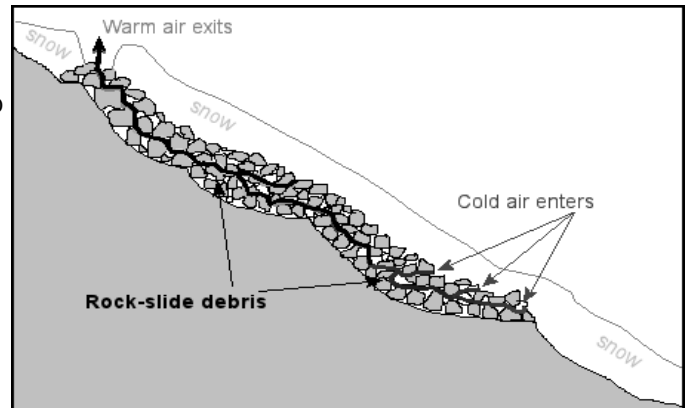
Last winter Mt. Washington asked the Geology Department if we could help them to understand this phenomenon.

During the winter Ivanna spent a couple of days making observations, taking GPS readings, and marking the hole locations. Ivanna and Steve returned to the area during the summer to examine the rocks and the terrain, take more photographs and make temperature measurements in the area using digital thermometers.

What we found was a surprise to everyone. Firstly the area of the holes is underlain by a deposit of metre-sized blocks of granite that appear to have accumulated during a major slope failure some time in the past. Most of the snow-holes are situated directly above visible openings in the rock-slide deposit, and some of these openings are large enough to climb into. We found that the air temperature deep inside the rock holes ranged only from 7 to 9° C over a 24 hour period, while the outside air temperature ranged from 8 to 30° C. We also discov-

ered that, during the warmth of the day, air was being sucked into all of the holes—not blowing out.

Our hypothesis is that the rock-slide deposit is actually a type of cave system (known as a talus cave). The caves have a fairly consistent temperature year-round (close to 7° C). During the winter, when the outside air temperature rarely rises above zero, the relatively warm air circulates up through the rock-slide deposit and comes out through the holes, melting the snow as it falls. On summer days, on the other hand, the relatively cold air within the rock pile moves downward and sucks warm outside air into the holes.



Entrance to a rock-pile opening – note person for scale (see arrow)



Photo taken at a depth of about 2 m within one of the rock-pile openings

We are grateful to Tim Stokes for valuable discussions and the use of the temperature probes, to Peter Gibson from Mt. Washington for funding assistance and to Stewart Butler and Maryon Paulsen-Strugstad for assistance in the field.

## THE TROUBLE WITH BIODIESEL- PART 1 BY BRIAN ROBERTS



At the Cowichan Bio-Diesel Co-op (CB-DC) I get a lot of questions from people who are curious about the benefits of running their cars on bio-fuels such as bio-diesel made from vegetable oil. In the last year I have also come across some interesting arguments that bio-fuels are not a viable alternative for fossil fuel and are, therefore, not “the” solution. Four of the main criticisms against bio-fuels are that they: 1) will not reduce the effects of global climate change because CO<sub>2</sub> is still released; 2) are a mis-allocation of agricultural land and food crops; 3) can not free us from fossil fuel dependency because there is not enough arable land in the world to feed our current fuel consumption, and; 4) have a poor energy balance, meaning they do not conserve energy because it takes as much or more energy to produce bio-fuels as you get from them.

These are some troubling charges against a renewable fuel that promises so much and smells so good from a tailpipe. In this and the next three issues of The Thrust I'll look into each of these four arguments and show how

critics who write off bio-diesel for these reasons are missing the bigger picture and throwing the baby out with the bathwater.

First, there is no denying that burning any hydrocarbons - including a methyl ester like bio-diesel - will release CO<sub>2</sub>, but let's make sure we're not comparing apples with dinosaurs. The CO<sub>2</sub> released from bio-diesel is not the same as that released from fossil fuel. Pumping oil from sedimentary reservoirs brings hydrocarbons to the surface that have been locked in “carbon sinks” for millions of years. Therefore, burning fossil fuels such as regular diesel, or what I like to call “dino-diesel” (because its past its prime and moving to extinction), releases additional CO<sub>2</sub> into the atmosphere. It's this additional CO<sub>2</sub> that is messing up the carbon balance, enhancing the greenhouse effect, and resulting in anthropogenic (human-caused) global climate change. Conversely, a 100% bio-diesel blend (B100) is almost completely carbon-neutral; nearly 90% of the carbon for the fuel comes from vegetable oil, a carbon source already found within the biosphere. And if the alcohol used to make bio-diesel is not de-

rived from fossil fuels, as most methanol is, then it has the potential of being 100% carbon-neutral. (This also applies to ethanol - the “other” bio-fuel). That means if you replant the same area of canola crops that you harvest to produce fuel each year, the CO<sub>2</sub> you release into the atmosphere will be sequestered, or recaptured, in the next crop cycle and the net effect on the earth's carbon balance is minor in comparison to dino-fuels.

Next issue of The Thrust look for part 2 of this four part “mini-series” on: The Trouble with Bio-Diesel! If you would like to learn more about bio-diesel and how to become involved with the alternative energy revolution feel free to visit the Cowichan Bio-Diesel Co-op website at [www.smellbetter.org](http://www.smellbetter.org) and contact me at [robertsb@mala.bc.ca](mailto:robertsb@mala.bc.ca) or [info@smellbetter.org](mailto:info@smellbetter.org).

# TRUE CONFESSIONS OF A FIELD SCHOOL INSTRUCTOR, BY SANDRA JOHNSTONE

## GEOL 206: Geology Field School: Quadra, Texada and Savary Is- lands

I have to say it, folks: “I love field school!!”

I loved field school as a student; I loved it as a TA; and now I love it as an instructor.

I know. It sounds sentimental. But after a full day of scaling treacherous cliff faces or fumbling with a compass in the biting wind, or pulling out your hair over the meaning of the mysterious “flow cast structures”, there is nothing better than sitting down to share a meal with 15 other people who know your pain. There is no way to deny that a 10-day trip with a large group of people has its stickier moments. These are not the memories that stay with me, though. The things that I remember are the



within our department.

The first annual Malaspina Geology Field School (Spring 2007) had its share of sticky moments – especially for me personally. Field schools are always logistically complicated, and it was the first course that I had assembled from scratch.

Congratulations to all of the 2007

As the darkest days of the year approach, it is hard to believe that it's time to start thinking about Field School 2008 ... it will soon be upon us. And I can hardly wait!

elated moments when one first realizes that they have mapped a geological feature offset across a fault; or that they have recognized the top of a basaltic flow; or that they have mapped a large fold.

Another thing I love about field schools is the connections that develop within a department. It provides a rare opportunity for faculty and students to mingle and get to know each other outside of the classroom. I think this contributes to the community-feel



# Spring 2008 Geology Courses



*Prerequisite: GEOL 111, any other Geology course, or permission of instructor.*

Classes: Tuesday and Thursday 10am to 11.30 am. Labs Tuesday 12.30 pm to 2.30 pm (or 2.30 pm to 4.30 pm)



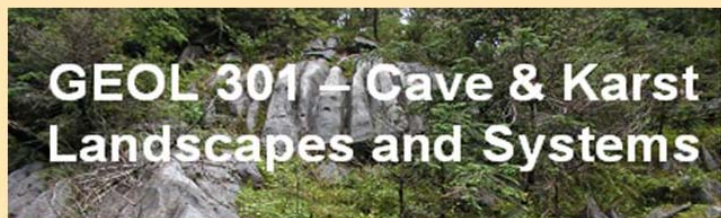
*Prerequisite: GEOL 112*

Classes: 10.00 -11.30 am Mon and 11.30 am - 1pm Fri. Labs/Field Trips: 12.30-3.30 pm Mon



*Prerequisite: Any 100-level course in Geology*

Classes: 10.00 -11.30 am Wed and Fri. Labs/Field Trips: 12.30-3.30 pm Wed



*Prerequisite: Any 100-level course in biology, chemistry, geology, forestry and geography*

Classes: All completed online. Optional Lab 1.00-3.00 pm Fri.



*Prerequisite: GEOL 201*

Classes: 8.30-10 am Tue and Thurs. Lab/Field Trips Thurs 1.30-4.30 pm

For details check the geology web site at <http://www.mala.ca/geology/index.asp> or e-mail Tim Stokes at [stokesty@mala.bc.ca](mailto:stokesty@mala.bc.ca)