

Another of the reef-forming glass sponges off the B.C. coast, the *farrea occa* can grow to a height of 15 metres. While the two other reef-forming sponges can vary significantly in shape, this sponge has a consistent shape.

New life squeezed out of 'extinct' sponge reefs

B.C. waters only place in world ancient sea formations can grow

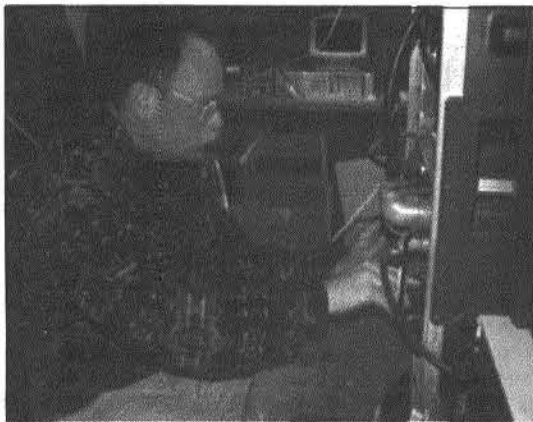
By Marcel Tetrault
Echo Staff

They were the very first multi-cellular animals on earth, they live longer than any other creature in the world and at one time about 220 million years ago they formed a 7,000-kilometre long reef—a reef that is three times the size of the largest structure on earth today, the Great Barrier Reef off the coast of Australia.

They are glass sponges, and while the sponges themselves can still be found in some parts of the world's oceans, it was believed that the last reef of glass sponges died out about 30 million years ago. Today's reefs, it was thought, are all formed from coral.

"That was the knowledge and it's still written that way in the textbooks of students," said Dr. Manfred Krautter, a paleobiologist who is one of the world's top experts on glass sponge reefs.

But in fact it has now been discovered that glass sponge reefs exist right off the coast of Vancouver Island and the closest one is just off the coast a few kilometres south of the Valley.



Dr. Manfred Krautter controls an underwater vehicle being used to explore the glass sponge reefs off of B.C.'s coast.

"It was like somebody had discovered a dinosaur roaming in his backyard," said Krautter on a recent visit to Courtenay where he was trying to raise awareness about the scientific discovery.

Krautter had been studying ancient glass sponge reefs but fossilized reefs were all he had to examine since no living reefs were believed to exist.

"While studying their ecology and biology, I stumbled over the publication (of the discovery of the reefs)," said Krautter.

"I nearly fell off my chair."

Glass sponge reefs

The biggest glass sponge reef today, near the Queen Charlottes in the Hecate Strait, is about 450 square kilometers in size, reaches up to 21 metres in height and lives in the ocean at depths between 150 and 250 metres.

The glass sponge reef that exists south of the Comox Valley is much smaller than those further north and in much shallower water, only 15 to 35 metres deep.

While glass sponges have been around for more than 600 million years—more than any other multi-cellular animal—they didn't form reefs until about 220 million years ago.

"They had to kind of evolve the ability to form reefs," said Krautter.

And today, they only grow off the coast of B.C. Moreover, according to Krautter, they cannot grow anywhere else on earth, the only place where the particular conditions required for the reefs to form exist right here off of our coastline.

"They started to grow (off the coast of B.C.) about 9,000 years ago," said Krautter. "That means they are three times as old as the Egyptian pyra-

mids.

"The living conditions, for this species here, must be just about perfect."

For the reefs to form there has to be a nearby mountain range with rocks that contain silica—a fundamental component of glass—and silica is abundant in B.C.'s coastal mountain ranges. The glass sponge reefs off the coast of B.C. are believed to consume 57,000 tonnes of silica per year. That's enough silica to fill a rail car 1,000 times.

But they also need to grow in an area with fjords—long, narrow and deep sea inlets—because they can only grow in areas with low sedimentation rates. Fjords stop fast moving rivers flowing out of the mountains from depositing large amounts of silt on the ocean floor. And those, too, are a feature of the B.C. coast.

They need troughs in the ocean floor as well as an area with the down welling of water, which allows the nutrients required by the glass sponge reefs to be funneled to the bottom of the ocean where the sponges grow.

Both of those exist off the coast of B.C. too.

The temperature of the water also has to be right, and it has to be cold, which is why the reefs can't form in tropical areas. The water must always be below 15 degrees celsius, and it is always between 4.5 and 6.5 degrees off the B.C. coast.

Finally, the sponges need a hard surface on which to grow. They can't take hold in sandy or muddy areas, and the withdrawal of the glaciers off the coast of B.C. scoured the seabed, leaving precisely the type of hard surface required by the sponges. And that is why they began to form about 9,000 years ago, right after the last glaciation.

"The situation here in British Columbia is just unique, completely unique," said Krautter.

Human impacts

B.C.'s glass sponge reefs are the only ones in the world and possibly the only ones that will ever form in the world. They also provide important habitat for marine organisms—scientists once found 17,000 creatures living in one glass sponge.

Despite that, Krautter says the reefs are in danger from modern fishing practices.

"The danger is clearly the trawling," said Krautter.

Bottom trawling—pulling fishing nets along the ocean floor—has so far, according to the Canadian Parks and Wilderness Society (CPAWS), destroyed about 50 per cent of the glass sponge reefs that exist off of B.C.'s coast.

"What do you think about killing the dinosaur just for the meat," asked Krautter. "If you trawl it, it will be just a graveyard of sponges."

There are currently closures banning the practice around the large sponge reefs in the Hecate Strait, but the reefs in the Georgia Strait are not protected. The Hecate Strait closures must also be renewed every year, which is why CPAWS is pushing for the areas containing the reefs to become marine protected areas, ensuring permanent protection for the unique reefs.

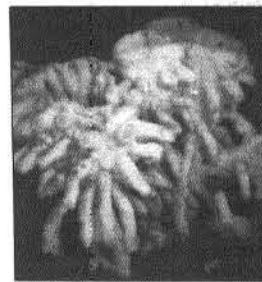
"We don't really have another chance to protect them," said Krautter. "These are nowhere else on earth."

There also is no buffer around the reefs and CPAWS would like to see a five to eight kilometre buffer zone, as recommended by scientists from the Department of Fisheries and Oceans Canada.

The Canadian government has argued that it is too difficult to police bans on bottom trawling, but Krautter does not agree.

"In times of global positioning systems it is very easy," he said. A global positioning systems is a type of electronic navigation equipment that is supposed to be present on all trawlers and is linked to a network of satellites that can track and record the movement of vessels.

More information about glass sponge reefs can be found at the website for the Sponge Reef Project at <http://www.porifera.org/a/ciopen.html>. Further information about the CPAWS campaign to protect the reefs can be found at <http://www.cpawsbc.org/marine/sites>.



A typical feature of the heterochone calyx, one of the three glass sponges that form reefs off of B.C.'s coast, are the long, finger-like protrusions pictured here. This sponge can grow to a height of 1.5 metres.



One of the three species of glass sponges that form reefs off the coast of British Columbia. This yellow sponge, called *aphrocallistes vastus* or the 'cloud sponge,' is believed to have been around for 100 million years, is usually funnel shaped and can grow over two metres high.