A PRICKLY SUBJECT

Porcupines are found all over the world, including on the North-American continent. Unfortunately for them, your average porcupine is not the swiftest of beast, both physically and intellectually. Consequently, many of them are to be found dead by the roadside. (On the other hand, if you take the genius among porcupine, those that will *never* become road kill, they may very well be smarter than some former American presidents…)

Looks cuddly, but don't try to pet it…

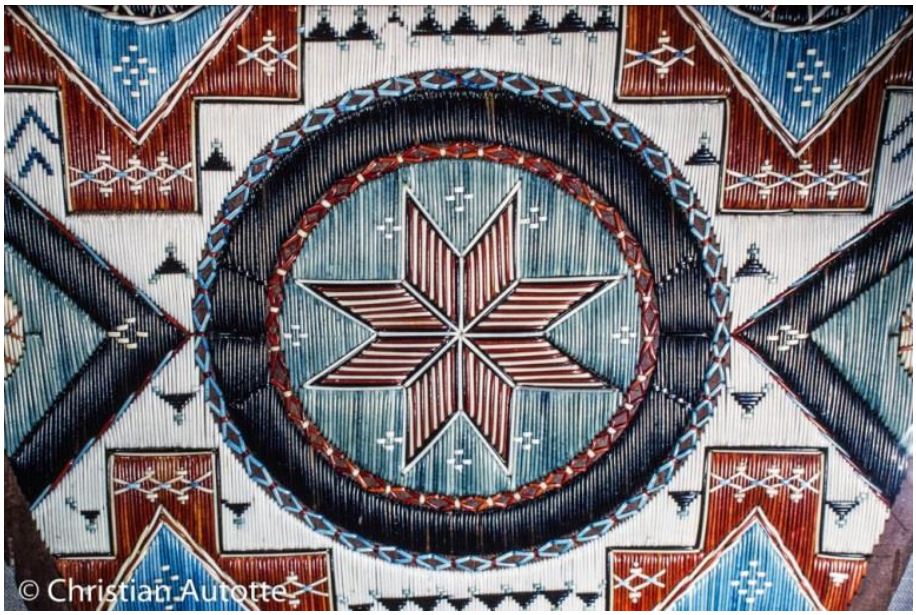
Happy porcupine in a local zoo… far from any road and rushing traffic…

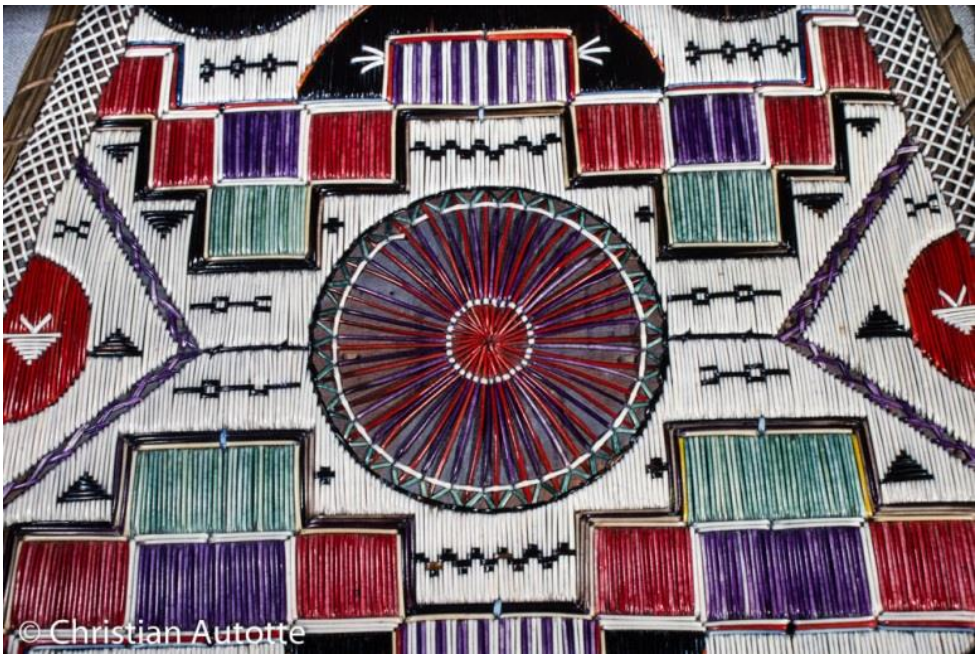
For personal reasons that will become clear in a moment I had been looking for one of those road kill for some time. Usually, I saw them on the wrong side of a busy highway or had a very large truck hugging my rear end leading me to decide against suddenly hitting the brakes; I guess that makes me smarter than your average porcupine… Eventually, I did find one hapless victim by the side of a country road where stopping did not endanger my own life. Fortunately, it was also a recent victim, so it didn't smell bad. Using the pliers of my Swiss Army knife I quickly got to work and pulled out dozens, if not hundreds, of its quills. The North American porcupine can have as many as 30000 quills. They cannot willfully throw them at a predator but the quills are loosely attached and can be pulled out easily the moment their barb pierce the skin or when one pulls at them with a pair of pliers…

Those quills are a great defensive weapon; African porcupines have been known to repel whole prides of lions. Yet some beasts don't seem to get the point: I had a great uncle with a forgetful dog who would try to bite porcupines every time he would meet one. To pull out the quills my uncle would first cut the quill and then pull it out with a pair of pliers. The quills are more or less hollow, so first cutting the quill release the inside air pressure which allows the microscopic barbs to flex instead of holding on to the flesh. For the living porcupine, those hollow quills also make them buoyant; porcupine are not necessary fond of water, but they can easily cross lakes and streams if need be. That buoyancy of the barb has even been put to use by fishermen; some will make very sensitive floats to fish for small fry like crappies and small trout.

North American first nations, who were expert at using every parts of their quarry, not only ate porcupine (they're tasty and easy to catch), but they also used their quills to make amazing works of art and ceremonial clothes. The quills were gathered directly by the hunters or were traded with communities that had access to more of them. After being cleaned and softened, they were died with natural colorants made from flowers, roots, fruits and the likes. Known as "quillwork", the art often took on spiritual significance with many tribes. For instance, with the Mi'kmaq of eastern Canada quillwork was always done by women and was believed to give them spiritual powers. Mi'kmaq were so well known for their quillwork that some Europeans called them the "porcupine people".

Nowadays, those traditions are kept alive with small items made for visiting tourists.



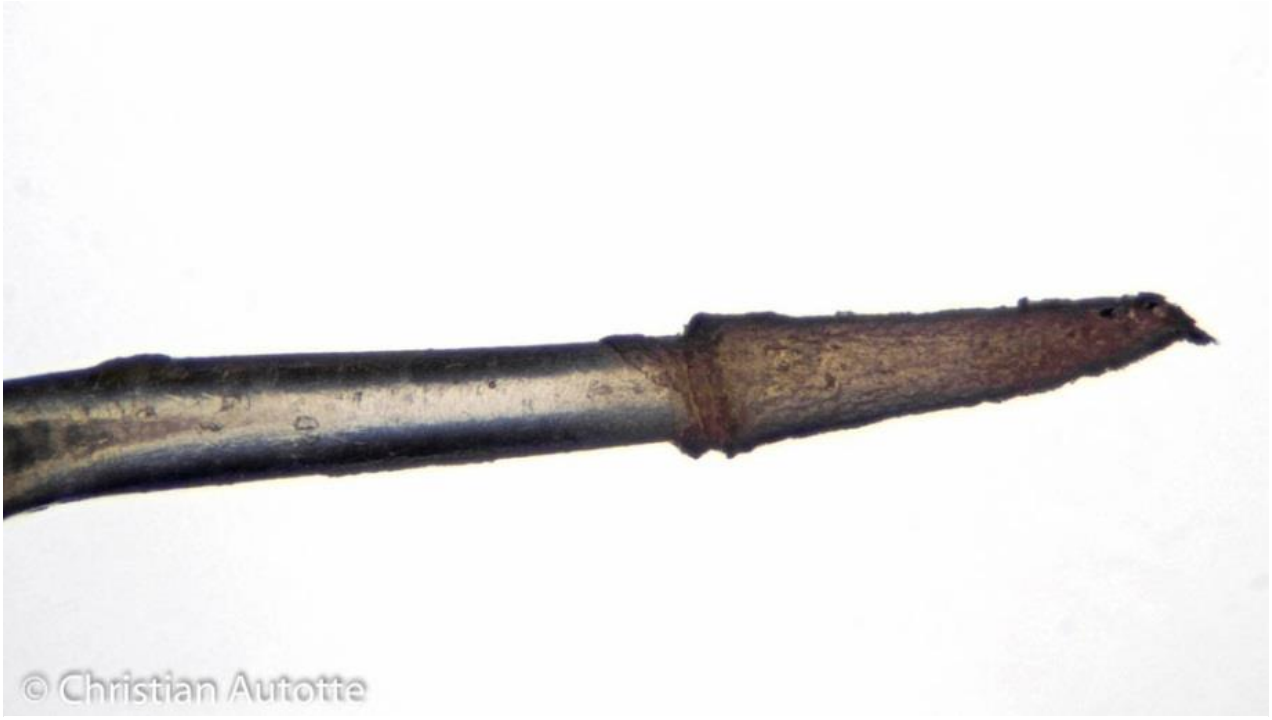


You can read more about it on the following link:

https://www.thecanadianencyclopedia.ca/en/article/quillwork

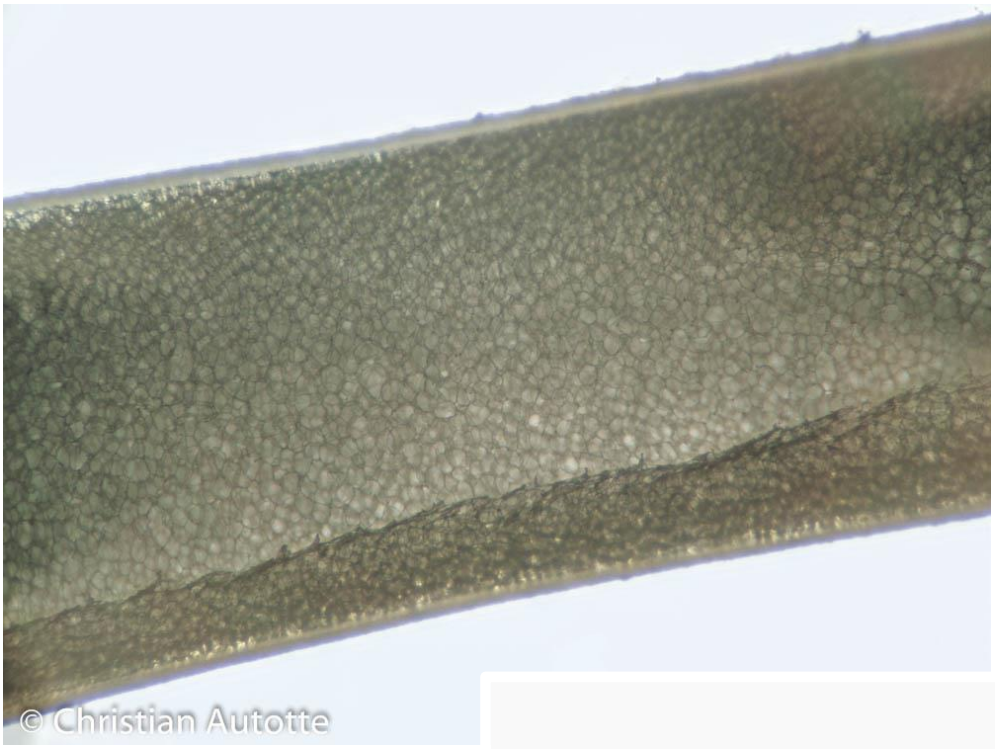
Back home with my quills, the first thing I did was disinfect them in alcohol. Then I started to examine them under the microscope. The first obvious target of my interest was the tip and its barbs. At first, I was a bit disappointed. I was expecting to see obvious projections; instead I saw a pointed tip that appeared fairly smooth. But using a combination of white field and episcopic lighting I was eventually able to see what looks like backward pointing sharp scales. Being very smooth and flat against the quill, they can easily puncture the skin, but try to pull the quill out and those scales just grab hold and prevent it from coming out easily. At the other end of the quill is the root of the hair that is attached to the porcupine. Pointed and narrow, it's the weak part and pulls out easily.

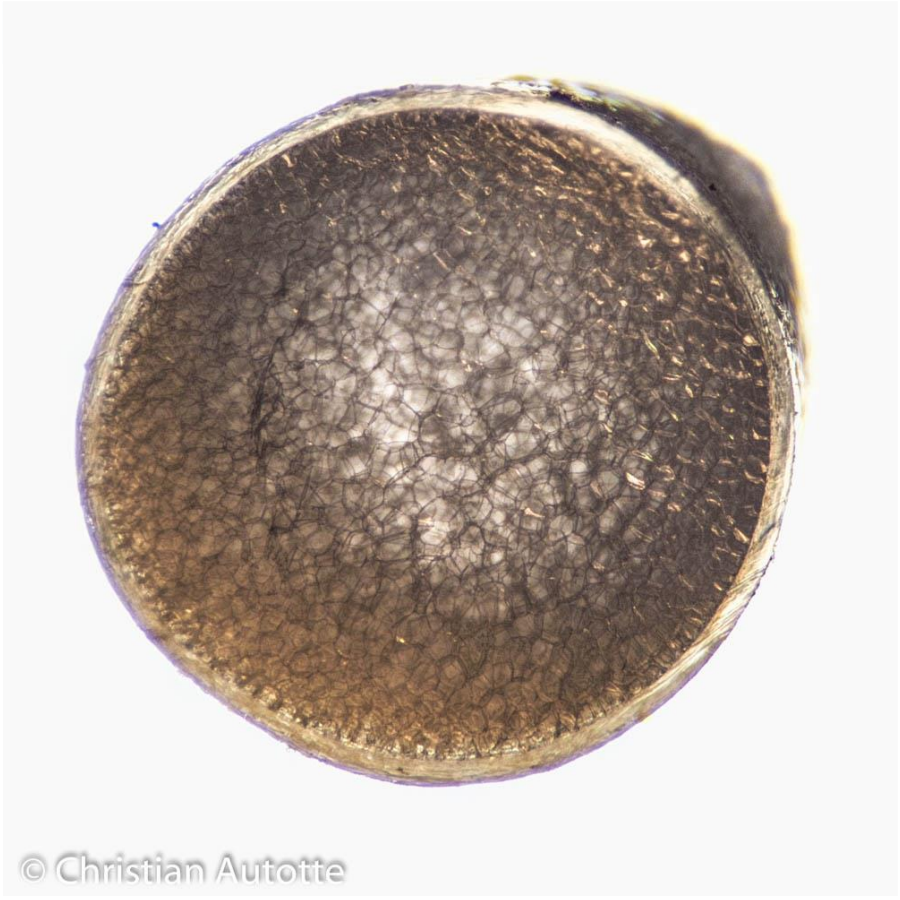
The pointed end, 40x



The weak root, 40x

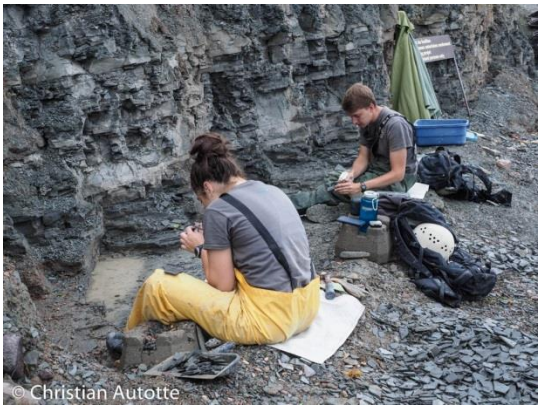
The quills are said to be hollow, but that's not quite true; the medulla, the central part of the hair, is actually made up of a spongy material. So I went on to investigate, first by cutting a quill lengthwise with a razor blade. You can see the spongy material, but its appearance could be misleading; we can't be sure that the whole space is occupied by these open cells. Using a pair of razor blades held together with a heavy duty spring paper clip (a technique described by the late Walter Dioni), I made a cross section to get another look at the medulla. This makes its character plainly obvious.





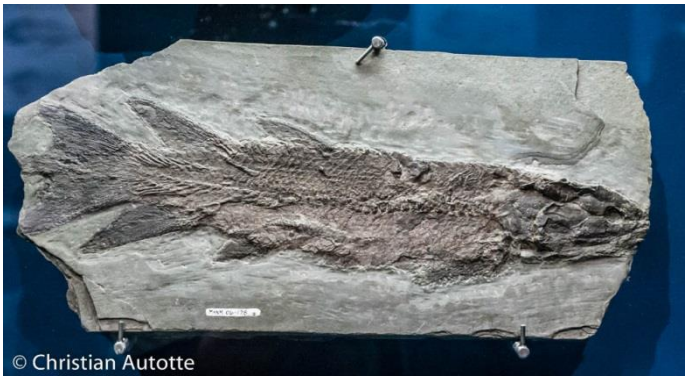
The medulla, both at 40x

But why gather hundreds of quills only to dissect a few of them for microscopic studies? Those who follow me may remember that another of my interests is paleontology. Years ago, I had visited an important paleontological site called Miguasha. Located on the south shore of the Gaspe Peninsula, it is world renowned for its fossils of fishes that represent an early evolution towards amphibians. During a guided tour, everyone was surprised and amused to learn about one of the tools used to clean very fine details of those fossils: porcupine quills… When you get to the very late stage of cleaning any tool that is harder than the fossil itself risk scratching or otherwise damage it. What is then needed is a tool that is harder than the matrix to be removed but softer than the fossil. Porcupine quills fit that requirement.

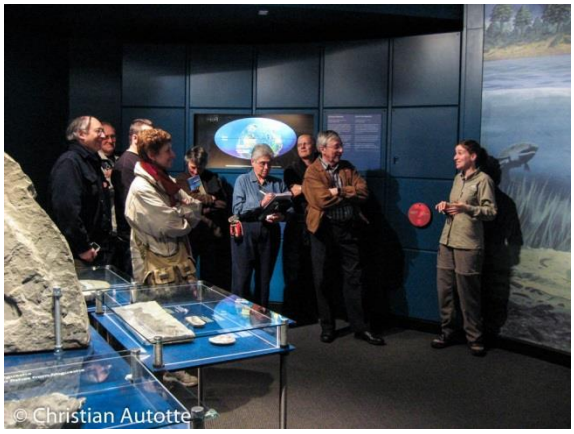


A pair of university students digging at the cliff of Miguasha.

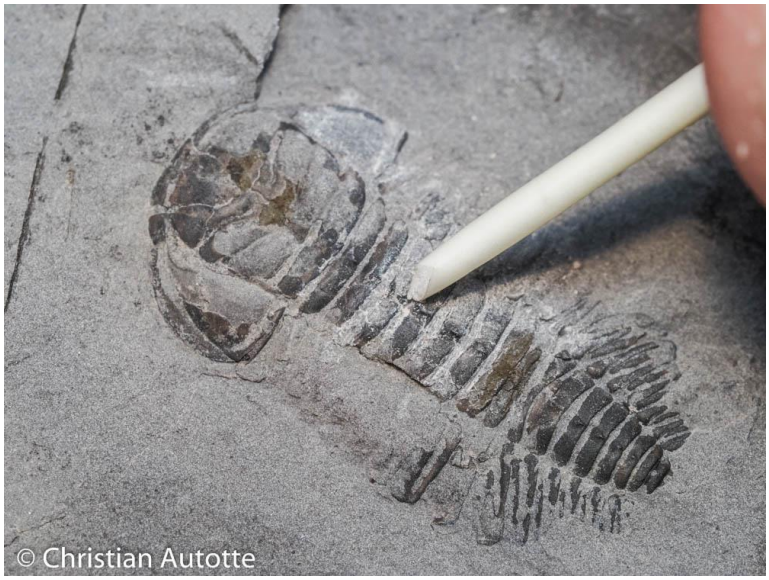
Cleaning my own fossils, I often work under the binocular with mounted needles. When going to the finest details I have been known to switch to round toothpicks sharpened to a very fine point. For years, I have wanted to give porcupine quills a try. I found them to be very soft and safe to the fossil, but still able to get to the smallest nook and crannies. However, they tend to wear off quickly and I ended up cutting the end regularly to keep them sharp. At first, I tried to mount the quill in a leadholder, as I do with toothpicks, but quills are too flexible to make that practical. Eventually I found holding a quill by hand to be more efficient.



Eusthenopteron fordii **also known as "the prince of Miguasha". I have a cast of that very fish in my own collection.**



A guided tour at the Miguasha museum



Comments to the author Christian Autotte welcomed, email:
cautotte.9001 AT videotron DOT ca
Published in the July 2021 issue of Micscape magazine.
www.micscape.org