**Biology is not a degree *continued***

Gómara was a priest and one who never travelled to the New World; his information was reports from sailors, hearsay, rumor… Yet he compiled a largely accurate description of the fish. This is sufficiently accurate and precise that I can even infer the species he is writing about: the bull shark.[[1]](#endnote-1) He was trained in neither natural history nor science; indeed, these had yet to develop as disciplines. Still he distilled, eloquently and in two pages, much of the content that you would find today on Wikipedia about sharks. And he was not alone in his natural history observations or inferences. Cabeza de Vaca described the opossum while spending eight years as a slave of the Indigenous peoples of the southeastern US; Jacques Cartier, a master mariner but uneducated man, left us very accurate and complete descriptions of birds, mammals, and whales of the St. Lawrence River.

I have long maintained that science, and more specifically, biology, is not a qualification but rather a way of thinking. A degree does not make one a biologist: it is a deep curiosity and willingness to study that makes one so. This study could be through reading or time spent in the field, and ideally includes both. It is a manner of observing and investigating the world. It is the worldview that we create for ourselves from effort, study, practice, and experience. Sure, we can have professional colleges that work to define who get to call themselves “biologist” and who does not; but that should not delimit who gets to contribute.

The greatest scientists and biologists I have witnessed are children. They are keen to stop every few steps on a path or run off the trail or into the water because the force of their curiosity impels them. They cannot help themselves. And then they ask the fated “why” questions. They are not hidebound by orthodoxy and lack the ego to feel they must be right. They simply want to know how and why things are the way they are. This is science distilled.

We can cultivate and maintain a scientific inquiry mindset without the formal trappings of science into adulthood and, as I am learning, into later life. The principal tools we need pack always in our kit are patience, curiosity, and wonder. Our first tool, patience, is that trained attribute that causes us to walk slowly, to stop frequently, to realize we will see and learn more if we enjoy the journey rather than focussing on the destination. Curiosity is the motive force to get us out of the house, even in inclement weather, and place us in the field to witness and experience the world. That then enmeshes with patience to allow us to sit quietly for an hour watching over a seacoast, or follow the deer’s trail from its bed to the nearby stream. The third instrument, wonder, is both the wonderment of curiosity, but also the awe and beauty of the world. Seeing fox pups or otter teenagers in play, the watcher cannot help but be moved. Here we shift from the scientific and analytic to the artistic and emotional. We bring wonder to our observations.

Of course, we must also carry with us the heavier and bulkier tool of scepticism. Gómara does this well when he refers to “*I have heard honest men swear*...”; he is reporting what he understands but he is not claiming it as a truth. So must we. Our backpack must contain a bag of salt for the proverbial grains with which to take reported information. Our most powerful lantern to shine a light of understanding on uncertain claims is the question “How do you know?”.

Natural science is built on a foundation of centuries of observation and inference by untrained observers. We all, each of us, irrespective of background and training, can continue to add to the accumulating knowledge. Formal education is far, far less important than the tools suggested here. A sixteenth century priest of Madrid, together with the writings of most naturalists prior to the twentieth century, may serve as a guide of how much the ‘non-professional’ can offer.

NRTG hopes for each of you a joyous and peaceful Christmas season, and wishes you time to be outside with your companions - patience, curiosity, and wonder.

*Endnotes:*

1. Gómara was writing of the Caribbean so it had to be a shark in that region which shortlists candidate species. It had to be a man-killer with a gluttonous appetite (tiger shark?). But the giveaway was the predation of cows and horses in freshwater – it is likely the bull shark. This species is famous for intruding long distances into freshwater rivers (up to a thousand kilometres up the Mississippi to Illinois) and undergoes long annual migration from the Caribbean to Massachusetts, as Gómara says, travelling great distances. And their size at maturity? Seven to twelve feet. The priest rocks this! Their number of young is typically less than a dozen per female however (live births), so here he was a bit out.

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