Conserve Nature to conserve ourselves.

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Abstract:

The present essay aims to present a historical analysis of the role, history and meaning of biological collections as conservation tools. Collections are not mere accumulations of objects, or organisms, but centers for the gathering of knowledge about our place in nature, and nature itself. The history of collections is rather complicated, as different forms of collecting or purposes for the collections were specific to each region of the world, but here I try to do a generalization based on personal experiences and views, with the aid of examples drawn primarily from Mexico.

Key words:

Conservation; Collections; Evolution; Human-Nature Relations; Extractivism.

Museums of Natural History, zoos and aquariums all around the world are deemed as centers of conservation of the existent and extinct diversity of life of our planet. All those centers help us to remember details of our past and present history as a biological entity and place us in the unity of life, however sometimes they also make us more distant from nature, as the cabinets - or other containing spaces or devices - form a natural barrier for the curious human hands or the inquisitive minds. The cabinets and other ‘containers’ could also be read as means of domination of man over nature. These are some of the reasons why we should have a deeper look into the role they play in the society and how they shape our conceptions.

Digging deep into the origins – organization of museum collections.

In the case of museums, it is always impressive to pay a visit and find the colossal remnants of the enormous ancient inhabitants of our planet, those

massive lizards that reigned the world for millions of years with an amazing display of morphologies and specializations that until know have not been fully understood, and here I just make reference of the dinosaurs because of the great appeal that they have to the younger public. Nevertheless, in collections' enclosures, one can also observe the reminiscences of other eras, maybe less appealing to the general public, and even less may be to infants. The museum halls enclose memories of a past in which diversity emerged in thousands of forms that resemble modern forms such as snails, crustaceans, or worms that have not even been yet properly classified or that have been a matter of taxonomical conflict for years; those sometime bizarre morphological patterns from time to time stimulate the imaginations of young and old, with their extraordinary shapes that are hard to imagine even by talented artists, driven by a mighty force without any (easily observable) guide or aim which is Evolution.

Although quite informative and appealing, those exhibitions can only inform us about hypothetical assumptions, in which the paleontologist tries to recreate life as it existed before our species occurred on Earth. Susceptible to the same critiques as the discipline of History, Paleontology is a historical sub-discipline of biology that must rely on the evidence found in the layers of sediment accumulated through millions of generations of living beings. Sadly, paleontologist will never be able to know how the studied organisms really behaved and looked like, no matter how precise their models and tools become, in the same way as for History, the very small and undocumented details will (probably) be hidden forever. But this is not enough reason to understate the reaching of Paleontology, as it would not be either to History. The paleontological collections have allowed us to understand

that “life finds its way” – this being maybe one of the most significant quotes for Biology, which did not come from a renowned scientist but from a blockbuster movie, Jurassic Park. The sediments and fossils lie confined in translucent cabinets open to the eyes of hundreds or thousands of visitors that come to the museums every year, and if those pieces of history could express their opinion, what would it be? I would like to think that they lie in those cabinets delighted by the affluence of admirers, after having spent at least a couple of years buried into the depths of Earth. A little bit of light does not hurt anyone, and even if it does, the personnel will take the precautions to minimize it. But coming back to the Hollywood movie quote, “life finds its way”, Paleontological collections are usually ordered in a chronological way. The first section commonly is a place in which the guests are presented with the theories of the origin of the universe, “The big bang theory”. Later, we might be presented with a display of the origins of the solar system and especially of our planet, and how the chemical conditions of a reducing atmosphere plus the physical forces allowed the formation of a primaeval “soup”. As possibly multiple ‘ponds’ containing different recipes of that soup existed, as it has been suggested by researchers in the field of the origin of life such as Antonio Lazcano or Alexander Oparin, nonetheless, only one of the ‘replicators’ survived, here I used the term “replicators” in the same way as Richard Dawkins but I am not refereeing to any kind of life yet. This first replicators evolved chemically and gave way to a new kind of chemistry which on further steps enabled the emergence of life. The only evidence that we have of such processes remains in the deepest layers of the earth or, in more fortunate cases, in exposed mineral deposits located in different parts of the world; but in the cabinets they lie as mere “stones” having

maybe as most important attributes a couple of colorful seams. Many museum guests may go through these halls without saying something else than “pretty stone”, without realizing their historical magnitude. Next to the mineral halls, the first evidence of life is found, again just “pretty stones”, however, this time the stones are not just covered by a couple of seams, now they have forms that resemble objects or animals that we know such as cones, spirals, leaves, vessels, pots, cookies or even lasagna. All of them are thought to be invertebrates or algae, the diversity of shapes we can observe would be the dream of any graphic designer or artist in the search for new ideas.

After the rooms with spiral and conical rocks, and the ones that resemble modern snacks and Italian delicacies, come the children’s favorites - the dinosaurs. Yet, the presence of dinosaurs in the collection might depend on different factors such as the budget of the museum, its location or history, and of course the qualities of the curators. For example, former colonial countries tend to have bigger paleontological collections. In a number of cases the museums only contain a couple of bones that look more like dry logs, but in more fortunate cases, museums host full skeletons of the majestic beasts (e.g. the Naturkunde Museum in Berlin). Carl Sagan pondered about the astonishment that children have about dinosaurs and animals of the ice age, as it is not uncommon to find children carrying around plastic *Tyrannosaurus rex* or *Brontosaurus excelsus* - my favorite one was *Triceratops horridus* – or plush dinosaur toys, which are made for the children to cuddle and offer them comfort. This I find quite ironic, because if by chance our species had to cohabitate the same space and time, most probably we would have been one of their meals and instead of offering us comfort they would be the

source of our nightmares. Sagan mentioned that such amazement of children was related mainly to size, as many children will select as their favorite animals elephants, whales, hippopotamuses or gorillas, rather than mice, insects or tiny birds.

Some people, specially the ones that have not had the privilege, opportunity or will to visit a museum collection, might find them as a waste of the hard-earned taxpayer's money, and maybe even consider them as a warehouse of old dust, stones and bones.

I have a personal story related to museum collections: My primary school was very near to my house, and on the first weeks my uncle used to pick me up from school so I could learn the way without getting lost. One Friday, he decided to take me to the nearby Geological museum. Entering the museum the full skeleton of a wooly mammoth in all its magnificence received me, surrounded by the "boring" stones. The exhibition of the origin of the universe is the first room on the right and the sequence follows the one I described above. Then there is the hall with the fossilized invertebrates, followed by the dinosaurs and the ice age fauna. Fortunately there are many full skeletons, not coming from the biggest species, but surely big enough to captivate the interest of a child. I was amazed by this first visit, and that might have been one of the events that made me fall in love with museums. I even consider that it might be one of the reasons why later I decided to study biology; although, ironically, I did not enjoy the Paleobiology lectures during my bachelor studies as much as I enjoyed this topic as a child. The entry fee to the museum was just 5 Mexican pesos, about 20 cents of Euro, and when I learned to go home by myself I used to visit it at least every Friday. The people at the

reception desk got to know me so well that at some point they told me that I could get the entry for free.

The value of the museum ‘warehouses’ goes further than their content, which by itself is already invaluable, the information that we can obtain from the inner layers of the Earth can help us to understand the evolution of life in the same way learning History or Anthropology helps us to understand the evolution of our societies, it can help us to predict what can happen to us and what we can do to avoid disasters. What if in a very near future any space agency discovers a planet in which life has found its way, understanding our past will aid us to understand our present, but also to understand other possible presents, and upcoming futures.

Once out of the cabinets – colonialism,

Often next to the paleontological displays we find the exhibitions of modern biodiversity. Arranged in different ways and depending on the budget and aim of the museum, sometimes the exhibits are classified by their taxonomical characteristics such as “Birds, Reptiles, Mammals, Mollusks, Plants, etc.” or by their ecological characteristics “Rain forest, Savanah, Polar regions, etc.” or by the Historical sequence, meaning, which specimen arrived first and who donated it or collected it. These displays are full of taxidermies, stuffed animals, most of them hunted by the mere purpose of entertainment, as Charles Darwin himself mentioned in the “Voyage of the Beagle”. During the colonial era, the European aristocracy had as a common practice long walks through the natural areas of the “New lands” to look for the newly acquired treasures, usually in the company of hired mercenaries or slaves, each one carrying a gun or at least a massive knife

(artifacts which Darwin also thought to be responsible of high murder rates in the colonies). These tools served for killing off animals, sometimes even as a game; for example the natives of the Brazil were able to throw knives with a precision and strength able to kill a deer, and as Darwin's story recounts, it was common for a colonial aristocrat to order the killing of a dozen deer every day. The meat required to fulfill the daily nutritional requirements was eaten and the remainings were thrown away in the hope for the scavengers to come and clean. Later, the skins, fur or antlers became part of the attire of the new rulers of the New World. But they could also become part of the prestigious collection of a well-renowned Naturalist or even part of a Museum. As an example, the Smithsonian Natural History Museum accounts for nearly 10 million specimens of all taxa, many of them being products of the expansion of the United States through the Americas and the other continents.

Thus, considering this history of hunting and the fact that the specimens result after killing live creatures, it is quite paradoxical to think of Natural History museums as centers of conservation, and more when we look at the records. As mentioned above, the Smithsonian Natural History Museum possess around 10 million specimens, and the Museum of Natural History in New York has around 35 million, while in Europe the Museum of Natural history of London shelters inside its walls more than 70 million specimens, the count could continue but the numbers are both astonishing and shattering, even more considering that almost every country in the world has at least one Natural History museum. To that, we would have to add the private collectors, independent and mostly amateur scientist who

dedicate a considerable amount of their time and fortune to gather different kinds of animals, plants, fossils or any other object that catches their attention.

On one side, the efforts done for these collections are just impressive, it is well known that during the expansion of former colonial powers, multiple expeditions from each nation sailed the seas in the search of knowledge, not always as a romantic quest but as a way of domination. These expeditions were looking for new natural resources such as gold, diamonds, woods and spices; the treasures were collected and then shipped to the metropolis centre. A local base assured the continuum of the supply chain, at the moderate cost of just sending the crew and paying a few soldiers or mercenaries, although sometimes other costs such as piracy, sinking or shipwrecks had to be covered, but for a developing superpower that was a price worth paying to assure a bigger slice of the cake. Nevertheless, the costs carried by nature were never considered. During that period of History, the vision of nature was considerably biased. Although to understand this, we have to look even further back, to Aristotle.

Aristotle is by many acknowledged as the “father” of Biology, in the same way as he might be considered the “father” of many other disciplines. During his life he showed interest in understanding the origin of life. He proposed the origins happened spontaneously from non-living matter, as ‘spontaneous generation’, and called his theory *abiogenesis*; but he also approached the morphology and physiology of animals, plants and fungi, in fact he proposed that all living beings had a “soul”, which was giving the “essence” to each life form. He even tapped into in the field of what centuries later would be called developmental biology, proposing the theories of *preformism* (a formerly-popular theory that organisms

develop from miniature versions of themselves) and *epigenesis,* the counter theory to preformism. But one of his most remarkable contributions was the *Scala naturae*, a classification in the form of a ladder of life: at the lower level - organisms without autonomous, or at least not noticeable, movement such as plants, algae and mushrooms; followed by organisms such as worms, insects, mollusks, reaching more complex forms like dogs, cows and dolphins, and of course the pinnacle of this ladder of life were the humans were only surpassed by the Olympian gods. It is also common knowledge that due to many diverse circumstances, Europe fell in an era of obscurantism and that the advancement of science was not the strongest point. During this period, rediscovered Aristotle's work and added some details to the *Scala naturae* and transformed it into a new version called *The big chain of being*. Tomas Aquinas substituted the Olympians with Angels and God at the top of the chain. According to him, every level was perfectly designed and was following a divine plan, but of course there were some demons plotting to destroy God´s heavenly plan. This scheme of thinking was preserved for a long time, and maybe the next big step was done by Carolus Linnaeus, considered the "father" of taxonomy. He created the binomial nomenclature; that overformal way in which biologists say *Canis lupus* or *Panthera leo,* instead of wolf or lion. Although it might seem complicated, it is particularly useful to communicate between scientist and establish when the same species is the topic of the discussion, especially because common names vary abruptly even in the same language if it comes from different regions. The development of this nomenclature helped to equalize the scientific discussion but did not envision the actual reach it actually had. Part of the idea of this nomenclature is to identify

similarities between the species, traits that nowadays help to hypothesize if there are any existents evolutionary relationships, yet Linnaeus defined these differences as mere deviations from the divine plan.

Even the naturalists looking into the deeper layers of the earth failed to see the unquestionable evidence of the transmutation of species and denied the existence of clear and gradual changes in the species. As example we have a school of thought known as *fixism*. One of its most eminent representatives was Georges Cuvier, a French naturalist that payed special attention to the secrets of the geological strata. Ironically, again, considered as one of the founders of paleontology; and here I dare to say ironically because paleontology is one of the disciplines that allowed the progress of the evolutionary thinking while the fixist ideology raised the thought of immutable species placed on the earth by a godly force. Another line of thought brought by the *fixists* was *catastrophism*, a paradigm suggesting multiple sudden events of terrible changes occurred on the Earth, possibly dictated by God, producing changes in the geological strata. This school of thought supported their ideas through biblical narratives that indicated how the fury of God eliminated and created civilizations. Not far from Cuvier, geographically, another naturalist provided a big step for the field. Jean-Baptiste Lamarck was the first to propose a scientific theory of evolutionary change of species, proposing that species change through their lifespans and the changes are then inherited to their offspring; he suggested for the first time in the western world that species were not perfect divine creations. This breakthrough was not very liked by the thinkers of that time; this is particularly sad, considering that he

coined the word “Biology” and to date he is considered as the founder of the emerging field of epigenetics.

After this tour of the history of biology, we come back at the conception of the world during the era of colonialism. The review of the main thinkers in the field of naturalism, allows us to see a similar mentality of urban citizens concerning the natural world, to be resumed as follows: God created nature for the enjoyment and benefit of the greatest of creation, the mankind. People at that time in history though that the resources were infinite and in case that levels declined, a couple of prayers would make God bring the supplies back again. Also, the idea of ‘spontaneous generation’ used to be present, making people think that the appearance of new organisms was just the fulfillment of a divine plan. It is interesting to notice that at the time there were books of recipes of how to “generate” mice or flies, just by organizing a wooden box with some bread and old fabrics, and a divine breath would create some rodents. These ideas coming from centuries ago led to the brutal extractivism observed during the colonial expansion and is, unfortunately, still present. The hunters visiting the new worlds used to hunt thousands of animals; there are plenty of examples. During the expansion of the American territories to the west, documents can be found on how wildlife was affected. It is well known that the colonizers and the indigenous groups of North America did not have a very good relationship, and unfortunately those failed relationships led to genocide. The European powers used to boast about their distance from nature and the domination over it, aiming to reach ‘civilization’. Meanwhile, the contrary was the case for most of the native population groups of the Americas, who use to be proud of their close relationship with “the big mother”,

nature. As references for it, we have ‘Pachamama’, nature in the Incan world, a lovely and giving mother responsible for all the goods coming from the earth and granted to her daughters and sons. The Aztecs and their pantheon of blood thirsty gods such as Tlaloc, Tonatiuh or Xipe Totec, that required the sacrifice of young warriors to make rain, make the sun rise or germinate seeds respectively; but they also had loving mothers such as Citlalicue, Coyolxauhqui or Meztli, celestial goddesses of the nocturnal firmament that indicated their daughters and sons when were the best times to seed and harvest. On the north of the continent, the tribes from what is today Canada, used to carve logs to create totemic figures, different meanings could be attribute to them, showing clearly a representation of their proximity to the natural world.

But what happened in the area of the current territory of the United States? The tribes living in the west, apparently evolved there for thousands of years, as it seems to be a clear consensus that the first humans arrived in the Americas around 16000 years ago following the migrations of the ice age megafauna. The first settlers of North America presumably established around 12000 years ago, where, according to fossil evidence, they hunted large mammals to extinction, and unfortunately left us without the privilege of sharing the continent with mammoths, giant sloths, camels, horses, giant armadillos and many other animals. The remaining species adapted to the environment and to the human groups too. Without sabretooths, humans became apex predators, and hunted bison, deers, peccaries and turkeys; sometimes having to compete with wolves and pumas. The human groups integrated perfectly in the ecosystem, occupying a niche left by their Mesozoic antecessors. As all societies, they evolved and learned about the value

of life. Hunting became a rite, the preys were not simple pieces of meat but fellows in the wild world. As far as it has been documented, they followed hunting practices worthy of modern regulations, they had established seasons of hunting and preferred to take the old males rather than the young and females; every part of the animal had a use, the meat was the meal for the hunters and their families, if the consistence was not good enough for the humans, the dogs also had a the right to take some bites of it; skins and fur were used to make clothes and the horns to make attires for ceremonies; and finally the carcass and inedible parts were left on the plains to let the scavengers do their work.

The extermination of these human groups, besides being part of one the darkest hours in human history, had a very interesting ecological effect: populations of herbivores exploded. For that it is worth mentioning that human tribes were not the only ones susceptible to this first eradication, wolves, pumas, jaguar and any other kind of mayor carnivore were wiped out to give space to civilization. Documents of the time report herds of thousands or even millions of deers and bison roaming around the big American plains. This was a paradise for the pioneer settlers, lots of arable land and practically unlimited sources of meat. As photography was invented around that time, we have an iconic photograph in textbooks of ecology and conservation science for the chapter on massive extinctions: a pile of bison skulls with one man at the top and another at the bottom, the height might be about 6 meters, but the most impressive part is that the massacre was done only by these two men. It is possible that some of those bison were stuffed and sent as taxidermy to the collections of Europe or the US. By the beginning of the XX century almost no bison were present in the plains of the US,

and by the half of the same century the only bison survivors were living in the Sonoran Desert in the North of Mexico. This is just an example, but as I mentioned there are plenty of them, like the dodo, thylacine, passenger pigeon and more.

Therefore, it might be difficult to underpin the idea of collections as a tool for conservation, but as a matter of fact they are. Museums do not only help us to understand biology, but they teach us about how decisions of previous generations have affected our future. I consider them as a kind of shock therapy; through them we can understand that extinctions are real, but most importantly we can have a sad look at the species that not very long ago roamed the land and because of our actions, we will not be able to see again. They might serve as a stepping point to change the mentalities of the present and future generations, or maybe they will become monuments of our unstoppable greed. What would be the next species only to be found in Museums? Dogs, cats, cows or maybe us, humans?

A golden cage

After some of the aspects I mentioned, a visit to a Natural History museum might not sound as the choice for a cheering trip. But on the other hand, there are the Zoos, Aquariums and Botanical Gardens, spaces designed as tool for conservation of living beings. In those places, and particularly to the enjoyment of the youngest ones, it is possible to admire living beings, as they would be in their natural environments without having to leave the big city. But to understand the role of this centers we have to look back in history again.

Keeping organisms alive is a very costly task, for centuries these areas were property of royalty, or other powerful people. Even keeping plants alive is not

as easy as it might appear. Very well known are the Botanical Gardens and Zoos that once belonged to European monarchies, which nowadays are state property. Possessing something of this sort was a symbol of power, desired by everyone wanting to show a certain level of notoriety in high society, even a way of dominance, just like the tail of a peacock that could have been the inhabitant of those zoos or botanical gardens. To me it always comes to my mind the Zoo of Moctezuma Xocoyotzin, one of the last Tlatoanis (Aztec emperor); apparently inside the walls there were a myriad of species, something very logical considering the megadiversity of Mexico. Animals coming from all regions of the Aztec empire were there, for the mere display and joy of the Tlatoani. But something very surprising for that epoch was the implementation of “reproduction and conservation” programs. The emperor had a very particular passion for birds and felines, which were supervised by members of the court. After the conquest of Mexico -Tenochtitlan most of the records of all the subjects were burned, including the ones of the zoo, but thanks to the surviving texts and the notes made by the Spanish conquerors, we are able to retrieve some facts. For example, jaguars and birds such as quetzals were successfully reproduced in captivity, an achievement that took more than 400 years to be observed again. When talking about aquariums, the one at the London Zoo is considered the first one to open, but apparently someone forgot to mention that the Zoo of Moctezuma also accounted 20 ponds, each one allocating different samples of diversity from freshwater ecosystems, also an accomplishment not hard to believe considering that the Aztecs were a lacustrine civilization and their mastery of water management allowed them to build a city on a lake (Tenochtitlan on lake Texcoco). Building 20

ponds is nothing compared to the effort necessary to build one of the biggest capitals of the ancient world. Of course, the plants were not a minor issue, and the surrounding of the zoo had a botanical garden, fortunately the climate conditions of Mexico Tenochtitlan are favorable to grow almost any kind of plants and green houses were not needed to host a wide diversity of plant life, even the picky ones such as orchids and cacti found dedicated caretakers that ensured a proper habitat, at least in term of soil, shadow and humidity. Sadly, after the conquest most of it was lost, not only the books were burned but the specialists were killed or enslaved. The engineering of Tenochtitlan was something never seen by the Spaniards, and as they did with their rivers and lakes in the Iberic peninsula, they proceeded to dry the big lake lo build roads, churches and all the infrastructure for the new capital of New Spain. Many species found in the lake and dependent on the lake experimented a critical decrease in their populations, but the native also experimented a decrease, not only in population but in sense of belonging.

Mexican food is known for being especially diverse, just a starting point, there are 79 varieties of chili peppers and 68 of corn, without acknowledging all the other plant varieties used in the Mexican cuisine. But the Aztecs did no rely only on those, the wild plants and animals were also part of their diet, by the oral tradition we know about some recipes made with armadillo, flies, peccaries, crawfishes and more, and on the side of less mobile organisms, fungi and plants were eaten as long as they were not poisonous. By losing this diversity, the conquered lost a main part of their lives.

In the current Mexico City, exactly in the same place where Moctezuma’s zoo was, today one can visit the Chapultepec zoo, but in the remembrance of its

ancestor. One can also pay a visit to the aquarium and botanical garden. Today they are not symbols of power anymore, they are centers for the conservation of species, sometime well done and sometimes not. As successful examples are one of the first breeding programs for the Giant panda, Californian Condors or the American bison. But also, they have been a tool in the reintegration of the Mexican identity through wild life through breeding programs of endemic species such as the axolotl, Mexican wolf, Jaguar, volcano rabbit, ocellated turkey, multiple bats, and fishes; as for plants, orchids and cacti seem to be the favorites.

These ‘installations’- zoos, botanical gardens - might seem to some as jails, especially to animal activists or vegan community advocates, who argue for the closing of the facilities, arguing that there is no benefit with the incarceration of animals and the imposing of unnatural conditions. Instead, they say, the animals should be living in their natural environments without any restrictions. I agree to some point, definitely I would support the life of animals in their natural environments, but the reality is hard to face. The condition of their natural environment might not be suitable anymore, or the numbers of indivuduals are so reduced that freeing them would be just a slow death sentence to the species.

Zoos, Aquariums and Botanical Gardens, are useful tools of conservation that could help educate people, and contribute to the retrieval of value of nature, and in the best-case scenario, to regain a sense of belonging and identity to the wilderness.

Making nature great again!

The ‘progress of civilization’ was usually related to the devastation of nature, one of the examples are the Mayans in the south of Mexico and Central America. Despite of the mysticism in which they have been covered, they could be considered as one of the least ecologically friendly civilizations. In comparison to other cultures of the Americas, the Mayans had multiple urban complexes of high development, and that was one of the mysteries, because apparently those urban areas seemed to be abandoned in a chronological sequence and that led to the emergence of conspiracy theories that even linked the disappearance of the Mayan culture by extraterrestrial visitors. The truth is more terrestrial and gives us a very important insight about our possible future.

The Mayans used to build cities in the middle of the rainforest, maybe as a strategy to use the ebullient vegetation as protection. But for that, hundreds of hectares had to be depleted to offer open space for the pyramids and palaces, and for the hundreds or thousands of people that also needed a roof. As an interesting fact, although today those ruins are grey, sometimes greenish due to the influence of some algae, the Mayan cities were vibrant blocks of color, the archeologic evidence suggest that the buildings were painted with plant-based colorants, but without any mean of fixation, the structures had to be painted periodically. It has been mentioned that some pyramids were painted in white, to obtain that color it was necessary to reduce to ashes different species of trees from the rain forest, leading to a periodical deforestation. Once the resources were depleted, the settlers just moved to a more abundant territory and started all over again. This process lasted during centuries and accompanied the raise and fall of the Central

American Civilization. Most archeologist coincide that “the vanishing” of the Mayans occurred due to sequence of droughts, highly probable caused by their reckless use of the jungle. However, the ruins are not the only reminiscence we have from them, today patterns of diversity could be inferred and attributed to the “management” they did, but most importantly, they left successors. Inside the big Central American complex of rain forest, descendant of the Mayans still survive, which now are the guardians of the jungle. Those groups maybe experiencing a transgenerational regret, are now in living in sustainable communities in the middle of the forest and in some cases, when the government of the country supports them, they are in charge of ecotourist and conservation programs. They have got a much deeper relation to nature than their ancestors had. For sure the ancient Mayans were able to gather incredibly complex astronomical information, but it seems that they lacked the knowledge necessary to understand earthly processes. The modern Mayans can track almost any animal or identify most of the plants and fungi, not to forget mentioning their deep knowledge about hurricanes, droughts and weather changes. Sadly, their civilization had to experiment a dramatic event to understand the value of nature.

I consider this a pattern, our species has gone through a rough process of learning. In the beginning we had to fight against nature to survive: African savannahs where humans were the prey became our hunting grounds, and expanding to the rest of the world in the search of more prey transformed human habits. Later, agriculture made our conflict with nature even stronger, and the depletion of entire areas for the sake of our crops became part of our rituals. The continuous strem of food supply opened the doors for the formation of big cities,

cities that required increased quantities of resources, just as a growing baby. During one of the highest points of development, the contemporary age, the hunger knew no satiety. All possible environments were the victims, from coral reefs to mountain peaks. But after many years of overexploitation, the Earth started giving us cues of an imminent catastrophe. If we want to survive, it is necessary to stop listening to our irrational desires of consumption. Nature has a lot to tell us, and we must pay attention to it.

We have to make a special effort to try to regain the lost connection with the environment that we had at some point in our history. Museums, zoos, gardens and aquariums should not be the only places we could find wildlife. Creating and restoring reserves would help to regain that value for nature and at the same time, to regain a connection to ourselves.

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