

# Why do we collect?

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“Do I get to keep it?”

This is one of the most frequent questions I’m asked at our public fossil digs. The answer is short, but not always easy to explain. “It gets kept, but not by you.”

It is, to me, a perfectly rational question. Most humans tend to have an inherent desire to collect things for a variety of reasons. This desire can be very mild in those who choose to live a minimalist lifestyle, or it can be overwhelming in those who suffer from hoarding. People choose to collect all sorts of items. From stamps, to porcelain dolls, to vinyl records, people tend to collect what interests them.

This is also true in the museum world and in paleontology. However, there is a slightly different spin to these collections. The collections that reside in public museums and archives belong to all of us, they are a national treasure. Collections grow and grow in size over decades and, in some cases, centuries. Contributions to that collection can come from museum personnel (curators, preparators, collection managers, volunteers, etc.) as well as from museum visitors making donations. It is not uncommon for museums to have artifacts and specimens numbering in the hundreds of thousands or even millions over several different types of collections (archeology, paleontology, etc.). The North Dakota State Fossil Collection has more than 100,000 specimens in its collection (fig. 1), but when it was established approximately 20 years ago, the collection consisted of only a handful of specimens. Now, with the help of some large donations and an active collecting program this number has skyrocketed (Person, 2010).

So why do we continue to collect with numbers of specimens already in the hundreds of thousands or even in the millions? Well for one reason, fossils are a non-renewable resource. We cannot create new fossils any more than we can create more gold, coal, or organic oil. More importantly we continue to collect because fossils are our only window into the history of life on Earth. Without fossils we would have no idea that some animals, dinosaurs for example, even roamed the planet at all.

## Understanding the past

How many species have ever lived? Obviously, the more we know about the animals and plants that lived in the past, the better we will understand the past, and the closer we will get to the answer to that question. There have been many studies on the adequacy and completeness of the fossil record (Teichert, 1956; Benton et al., 2000). These studies talk about skeletal structure along with a number of other specific factors that increase or decrease the chances of fossilization, so it is better to look at the broader, more



**Figure 1.** A small portion of the North Dakota State Fossil Collection. This collection is stored in the North Dakota Heritage Center in Bismarck and is an important resource for understanding prehistoric life in North Dakota.

encompassing view. It is estimated that less than 1% of all species that have ever existed are preserved as fossils at all (Prothero, 2006). This means that 99% of all species of animals that have ever lived were never fossilized, meaning we cannot know of their existence. This makes the collecting of fossils an important tool in understanding the history of life on Earth.

The chances of fossilization and subsequent recovery are very slim. First, the animal must be quickly buried after death to avoid destruction by scavengers, bacteria, and weathering processes (wind, rain, etc.). Secondly, the animal must survive all of the geologic processes that can destroy rocks and fossils (metamorphic and igneous processes like warping, breaking, or melting). Finally, the fossil must be exposed at the surface of Earth and be found within a very short time frame. Erosion is the biggest threat to fossils; wind, rain, snow, ice and other weathering processes can destroy delicate bones. A fossil exposed at the surface for too long will break apart into countless unidentifiable pieces, rendering it useless to help tell the narrative of life. How long it takes for any one fossil to break apart into useless pieces depends on the type



**Figure 2.** The tail of “Dakota,” the mummified dinosaur. Note the scale size near the tip of the tail and how well the scales are preserved. This is a very rare and important specimen found in North Dakota.

of rock the fossil is preserved in, as well as the environment it is exposed to. The fossils in harder or more consolidated rocks tend to resist weathering and erosion longer than the fossils in softer, more friable rocks. Finally, someone must find that fossil (and recognize it as such) before the weathering processes that

exposed it are able to destroy it. Because of all these factors, fossils are rare and it is truly amazing that we have so many and that we know as much as we do about ancient life. It is even more amazing that paleontologists have found the things we have. Fossils of animals seemingly in the middle of giving birth, the famous fighting dinosaurs of Mongolia, “Dakota,” the mummified dinosaur (fig. 2), fossil birds, and even fossil frogs (fig. 3) to name only a few, have all been preserved in the fossil record. Because of these tremendous finds and the promise of even more spectacular ones, it is very important that we continue to search for and excavate fossils every year, on the hopes that we will find another new animal that will add to our current knowledge about the history of life.



**Figure 3.** A rare Pleistocene frog from North Dakota. UND 13015.

### Research

Other reasons to collect are more museum related, but still important. They deal with what fossils are used for once they are collected. Most often, fossils are used for scientific research. Currently, there is very exciting research happening in the world of vertebrate paleontology. Paleontologists use the latest technology to squeeze the most information they can out of very little material. Using new technology to look at specimens collected years ago has also been a trend in paleontology. Young paleontologists, fluent in the latest computer programs and imaging technology, are looking at fossils in ways that couldn't have even been dreamed of just 20 years ago. Deciphering color from rarely preserved skin, creating 3D models of dinosaurs to infer movement and speed calculations, CAT scanning field jackets to determine the exact layout of fossils before preparation, and other such cutting edge research is currently ongoing.



**Figure 4.** A view of compacted fossil storage at the Field Museum of Natural History in Chicago. As part of the expansion project, the North Dakota state fossil collection will soon have similar compacted cabinets.

### Education

One of my favorite aspects of paleontology is designing and creating exhibits to help educate the public about the importance of fossils and fossil resources. The North Dakota Geological Survey (NDGS) has been very proactive in setting up fossil exhibits across the state to allow residents to enjoy and learn about the fossil plants and animals that once lived in their area (Hoganson, 2005). Interpreting the story that fossils can show us is both exciting and challenging. Fossils are also often used in education programs geared towards specific groups of people to challenge viewpoints or to focus on specific topics. For example, a skull or a large dinosaur leg bone might be shown to a group of 2<sup>nd</sup> graders learning about dinosaurs in their school classroom. For those especially adventurous folks, the NDGS offers public fossil digs every summer where members of the public are invited to join survey paleontologists on a real fossil dig to discover and learn what paleontology is all about (Hoganson, 2009; Hoganson et al., 2011). This program has proven to be very popular over the years and has led to some unique and new discoveries (Stidham et al., 2012).

### For the future

Finally, collecting fossils is important because they are a national treasure. Those fossils held in the collections of public museums belong to all of us and should be cared for in perpetuity. As previously stated, fossils, especially vertebrate fossils are a non-renewable resource and the fossils collected yesterday and today are fossils saved from eroding away. It is important that these collections continue to grow and remain for future generations to study and observe.

### Summary

Despite what the movies tell us, museum collections are not large warehouses with boxes and boxes of unopened crates waiting to be processed (for example, the final scene in *Raiders of the Lost Ark*). Museum collections are often rooms of wall-to-wall cabinets housing thousands or millions of specimens that are constantly

being viewed, researched, or taken out into classrooms (fig. 4). They are places of cutting edge research, exciting education programs, and a safe place for fossils to remain in perpetuity for our grandchildren's grandchildren to appreciate and interpret.

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