

What I Know About...Paleontology

by Peter Kranz

Many people imagine paleontology as a glamorous and romantic profession--a notion reinforced by educational TV productions. Those TV productions are exactly that: TV productions! It isn't that the scientists in the productions are not real ones, or that the fossils are fake; it's just that the producers are trying to create an image which will excite and entertain viewers, not portray ordinary events.

Paleontology is *science*. Like all science, it requires that the person practicing it look at the world in ways that an average person doesn't. Almost always this includes an overwhelming amount of mind-numbing time spent looking at details and endless days of collecting data. These sorts of behaviors do not make for exciting TV.

All scientists are also individuals. As a consequence, each scientist's method of working will be different in some degree from another's. In this article, I will describe and present my perspective. It should be remembered, however, that I am part of a profession that shares many common methods of working.

Kinds of Paleontologists

To the average person, the word "paleontologist" means *dinosaur bone hunter*. In fact, that is what I do. We are, however, a very rare breed. It surprises most people to know that a typical paleontologist actually spends his/her day staring into a microscope. Obviously, you don't need a microscope to see a dinosaur, but most paleontologists have nothing to do with dinosaurs.

The overwhelming majority of people paid to be paleontologists are asked to study microscopic plants and animals. There is a very good reason for this. Dinosaurs are large and very rare. On the other hand, a thimble full of dirt can contain thousands upon thousands of *microfossils*. If you have a small sample, you can learn a lot from the microfossils, but may not even find a fragment of dinosaur bone. Dinosaur bone hunters get lots of help from people with microscopes.

Another little understood fact is that paleontology produces little or no money. All people need money to live and usually the work they do helps in some way to produce the money with which they are paid. Again, it is not the bone hunters, but the people with the microscopes, that do this. The fossil fuel industries--coal, oil and gas--use paleontologists to help them locate deposits of fossil energy. When the energy is sold, the money is used in part to pay the paleontologists. The Sinclair Dinosaur notwithstanding, dinosaur bones neither produce

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energy nor help in any way to find it.

Other paleontologists are hired by universities, museums and governments, but none of these activities produce substantial amounts of money and, in fact, they usually spend money instead. Consequently, there are only a limited number of these types of jobs. Some estimates state that only 50-100 people world-wide are paid to find dinosaur bones. This is not to say that they are the only people looking for dinosaur bones. Thousands upon thousands of people are out looking for dinosaur bones every day--they simply are not being paid to do it.

Another surprising fact for most people is that, unlike lawyers, doctors and dentists, there is no degree or diploma issued by a college or university in the United States that says *this recipient is a paleontologist*. All paleontologists, at least in the United States, are self-defined or occupation-defined. That is, a museum will say that a particular staff member is a paleontologist, or someone will make a business card or website which says "I am a paleontologist." This may seem strange, but in the United States paleontologists are defined by what they do, not by a document.

Who I Am

I do not work for an energy company, government agency, university or museum. I am president of the **Dinosaur Fund**, a non-profit organization I created. The goals of the Dinosaur Fund are to further education and research about the dinosaurs found in the National Capital region of the United States: Maryland, northern Virginia and Washington, D.C. I do not receive a salary, so I must find different ways to earn money by doing work related to the Dinosaur Fund's objectives. I don't do the same work every day. I have a list of work priorities which help me decide what to do on any particular day.

My priority list looks like this:

1. Dig out any exposed dinosaur skeletons.
2. Do any work which pays money (especially education programs for schools).
3. Search for new fossil sites.
4. Read about and otherwise research dinosaurs.
5. Write books and articles for science journals.

On most days, of course, there is no dinosaur skeleton to dig out. Finding a dinosaur skeleton, or even a part of one, is very rare. Paleontologists have no secret knowledge of where skeletons are buried, and we have no high-tech way of finding them. They are found with lots of hard work, long hours and luck. Most skeletons are not found by paleontologists; they are found by ordinary people who stumble across them by chance. What a paleontologist *does* know is where not to look. For example, there are certain types of rock that cannot contain dinosaur skeletons because of their age or type.

Dinosaurs lived between 235 million and 65 million years ago. Rocks which are older or younger than these dates cannot contain dinosaur skeletons. Dinosaurs lived on land, so rocks from deep oceans, from volcanos or from deep in the Earth's interior will not have dinosaur skeletons either. Dinosaur skeletons can only be found in rock deposited in shallow freshwater or saltwater waterbodies, though occasionally they can be found on land under ashfalls, landslides or sand dunes.

To find the right kind of rock, paleontologists depend on a geologic map that uses different colors to highlight the types and ages of the rock layers found at or near the surface of the area. A paleontologist must then use the map to determine which places are possible dinosaur skeleton locations. The paleontologist may also ask other researchers for advice, consult books or scientific papers, or historical records and journals as part of this determination.

Because our most important work is to find new dinosaur skeletons, it is our top priority. But, because it is so rare to find one, it can often be unproductive and frustrating to spend all one's time and energy searching every day. One amateur bone hunter I know spent twelve years searching unsuccessfully; I was able to guide his work and, eventually, he did find dinosaur bones.

When I learn that a new skeleton has been located, it is important to get to the location as soon as possible because rain, wind and other forms of weather can destroy the skeleton and the site. An even bigger danger to the skeleton is vandalism. Only specially trained technicians know the proper way to remove a skeleton from the ground. Even well-intentioned scientists and amateurs can destroy a valuable specimen.

I never remove skeletons from the ground. I always call in a trained crew from a museum or a university. Even they are very careful. These days, a specimen will be covered with a plastic cast called a *jacket* and brought back to a museum or university laboratory for cleaning and conservation by experts. The most complete skeleton I ever found was jacketed and removed in two and one-half hours; however, it took eleven years to clean and conserve it in the lab!

In order to continue my dinosaur bone hunting, I need to earn money. Many of my days are spent doing educational programs, usually for schools but also for scout groups, families and nature centers. I do many programs in schools and community centers, but I also do many where the participants come to a field worksite.

When the participants come to a fieldwork site, they help find and/or excavate fossils. Many people think fossils are rare. Actually, they aren't. Rare fossils are rare, of course, but most fossils are very abundant and literally litter the ground where they occur. The big problem is that too few people know where to look and what to look for when searching for fossils. When a

participant comes to a field site, it adds an extra pair of eyes to help the search. Most participants are surprised and delighted at the number and kinds of fossils available to find and take home.

In addition to the help that participants provide at the site, there is the added bonus that they are being trained to hunt for fossils. With luck, many participants will continue to hunt fossils on their own and to find new fossil sites.

When I present a program in a school or other building, I usually won't find anything new. However, I can offer a lot of information about fossils and dinosaurs, and can share some fossil models and actual fossils. The audience, which is often young children, can ask questions and touch real dinosaur bones.

There is a special program I do called a **Dinosaur Dig**. I invented it when a teacher said that her principal would never let her students go to an actual dinosaur dig site. What I do is bring clay from a real dig site to a school. The students wash the clay through screens and collect the fossils. This works well because [1] the clay comes from a location where dinosaur fossils have already been found and [2] we use clay that has already been "disturbed" and so we aren't hindering the research going on at the real dig site.

A great deal of my time, and that of our volunteers, is spent searching for new fossil locations. Because all fossil sites must initially be found by someone actually visiting a location and finding a fossil, this work is extremely important. As I mentioned above, when one sets out to look for a new site, the first thing to do is to consult a geologic map to determine if the location may hold dinosaur fossils. Next, one must go to the site and look for exposed rock or sediment layers; finally, one must actually find a dinosaur fossil.

When I'm not in the field or doing an educational program, I'm probably in a library or on the Internet looking for information. The Internet is of course a wonderful way to gather lots of information quickly, and there are thousands of excellent dinosaur websites.

Like any historical research, there is no substitute for visiting libraries, archives and private collections when seeking one-of-a-kind records. Sometimes, we *hope* a record exists, while other times when know it *used to* exist. But, if we don't find it, it won't help us. This makes me an historical detective of sorts. In short, I do genealogical research in reverse. In order to find the living relatives of a deceased paleontologist, or to find people that may have old journals or letters, I search through small libraries, as well as great big ones, looking for rare documents. Why? Because all dinosaur skeletons have been found by a **person**. And, since there are no living dinosaurs, all we know about them is due to the work of the people that have found their skeletons.

Once I have done my hunting and research for the day, I may have some new information or I may have found a new fossil. At this point, I need to share my findings with other paleontologists and with the world. The way I do this is by writing technical articles for scientific journals, by writing books, and by posting my findings on the Dinosaur Fund website.

So--this is how this "dinosaur hunter" spends his days.

About the author:

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