Field Journal Documentation Procedures Part One: *The Site Description*: Examples of What Data to Collect at a Fossil Dig Site

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ABSTRACT

A detailed "site description" is one of the most important things a paleontologist must record at a fossil dig-site. This description includes provenance, general and specific locality data, and outcrop data. This data should be the first written documentation in your journal and should be completed prior to starting any potentially important excavation. Tips and advice on how to write a detailed site description for a field journal are included with examples given.

INTRODUCTION

One of the most, if not *the* most, vital sources of documentation for any fossil dig-site is the "site description". Site descriptions include detailed locality data, discovery data, photographic records (both digital and film), land ownership records, basic geologic and stratigraphic data and other pieces of valuable information. It is often the first thing recorded for any site. The site description's main goal is to permanently place the collected specimen in three dimensional space and time, providing a picture of where, when and how the specimen was collected. Too often workers discount the importance of collecting such data believing that the specimen is the only valuable resource (or commodity) at a dig site. What many fail to realize is that the contextual data and provenance can be even more important to scientists than the fossil itself. This data can be used to help scientists understand many things about an extinct organism's taxonomy, taphonomy, ecology, bio-stratigraphy, history, geographic and chronologic range, and much, much more. Providing a proper site description also ensures repeatability of analysis for future paleontologists. One hundred years from now, when we are all dead and fossilizing ourselves, workers in that future may wish to return to our old fossil quarries to investigate them further. New technologies in the future may enable those workers to continue our excavations which, at present, may seem impossible. New ideas, hypotheses or concepts may arise in the future, leading to new questions, that at present, we can not possibly ask. By making a permanent record of the site's specific description we can help them to answer those future questions. Providing a detailed site description is not only a wise legal, scientific and professional necessity, but also our moral and ethical obligation to the science of paleontology.

THE SITE DESCRIPTION:

The following sections outline the different types of data that should be included in a site description for any fossil dig site. This information should be kept in a waterproof journal that is written on-site, in the field. Much of this data can then be reformatted or word processed at a later date and can be included in any *Journal of Paleontological Sciences* publications or registrations for specimens removed from that site. Outlines for the collection of geologic and taphonomic data will be in a second paper. Outlines for the collection of specimen data will follow in a third paper.

PROVENANCE AND HISTORY

Provenance describes who found the dig-site, when and where it was found and other important information. It is essentially the first written historical record of the discovery. Since, paleontology is partly a historical science (as well as a physical and a biological one), the circumstances surrounding the discovery are often just as important as the specimen itself.

We would all love to know the intimate details of Marsh's and Cope's important finds in the late 1800's! What were their first thoughts? How did they find there fossils? Why were they looking in that area? These are all important elements in establishing a historical framework for the site. The main entries of the journal (which will be covered in a future paper) will have a daily description of all day-to-day activities on the site including who was doing what and when they did it. But, the "site description", since it is one of the first things written in your journal should also include <u>at least</u> a short summary of provenance.

Recording the provenance and history of a fossil dig-site is important for many reasons. First of all, it gives credit to the discoverer, which whether you are an academic or an independent, is always an ethical thing to do. Too often the discoverer is left out of journals (and future scientific articles) leaving the reader (sometimes many years later) to assume that the writer of the journal (or the article) was the one who actually found the dig-site (a certain person's "egg mountain" immediately comes to mind). This is often not the case. After all, the first person on a dig-site may be the best person to talk to about the original condition of the site or the quality, condition and positioning of the fossils that had weathered out. Second, a provenance description enables future workers to trace the fossil from the ground, to the lab and to it's final resting place. This has obvious benefits particularly for independent paleontologists and fossil dealers where specimens often change hands several times before winding up in a permanent repository or collection. Each person who has handled a fossil specimen knows a piece of its history and those histories may have future significance. By including this in your site description you establish a template for others in the future to follow. Third, a record of who was involved in the excavation may assist in the preparation, restoration and analysis of the fossils recovered from the site. This is particularly true with vertebrate remains that are worked on over the course of several field seasons with large crews. For example, if the journal writer, during the course of documenting the site, accidentally forgets to include a particular detail of the collection, recording the names of all the workers during a season will assist future researchers in attempting to recover that detail. Those future researchers will be able to track down and interview the field crew and see if any of them can recall the lost information. This can help preparators to locate missing packages, may assist researchers in determining if the elements all came from a single individual specimen (or from several specimens) and many other potentially import aspects of the excavation. The journal writer may not know or remember years later certain aspects of a dig, but others who were onsite just might. Some groups actually prefer that more than one person is in charge of documenting a site for that reason. Many times, two sets of documentation are better than one.

The provenance includes a description of how the site was discovered, who discovered it, the date of discovery and the conditions under which the site was discovered, a list of all workers that helped to excavate the site and in best cases, contact information for each. A few bare bones (pun intended) examples and one detailed provenance (taken from actual field notes) are as follows:

1. The site was discovered by: Dr. Peabody Bonehead on June 20th 2005
2. The site was discovered sometime during the Fall of 1998 by the land-owner while on a hunting trip. It was later assessed by the curator of biology at High Plains University and thought to be a *Triceratops*. Later re-evaluation by Robert Goss of *The Fossil Company* in June of 2005 revealed that the specimen was indeed a *Tyrannosaurus rex.*
3. Site was discovered by representatives of *Trilobite Hunters LLC* based upon a tip from the land owner on September 20th 1997.
4. The Site was initially discovered by construction crews while widening interstate 80 (between mile marker 135 and 136) sometime during the summer of 1999. Max Do-Right, one of the construction crew, reported the incident to State Officials at the Wyoming DOT,

after failing to convince his supervisor to report the incident on his own. Initial site reconnaissance was conducted by the State Paleontologist of Wyoming, Dr. George Baker in May of 2001. Baker led several surface collecting trips to the location throughout the summers of 2001 through 2003 in an attempt to recover as much of the damaged specimen as possible. The damaged fragments are now curated with the University of Wyoming. The site was later turned over to a crew from the University of Wyoming, led by Dr. X. The following crew members and volunteers worked on the site during the summer of 2003…

5. "June 27th, 2002- MT and WS exploring [deleted] pastures in Central Montana approximately 20 miles northwest of the town of [deleted]. Most of the pastures are devoid of exposures. Some limited Bear Paw Shale discovered north of the [deleted] county line. The temperatures are extremely hot… 117 degrees according to the thermometer in the truck. Miserable conditions! Conducted mostly reconnaissance from the air-conditioned trucks, looking for potential Bear Paw Shale outcrops capable of bearing marine reptiles. Potential areas of future exploration include Sections: [deleted]. POTENTIAL SITE DISCOVERED- Thin section of what appears to be Hell Creek Formation sandstone and shale discovered perhaps ¼ mile north of the county line. Formation is exposed on a narrow, northwest-southeast sand-stoned-capped ridge, punctured by several small patches of badlands. Due to the heat we conducted a very brief field reconnaissance of the Hell Creek Outcrops. Fragmentary bone and petrified wood litters this area. MT went west and north, WS went east and north. Met in the middle along a narrow gully on the western side of the main small patch. MT asked if I had been down the length of the gully to the north. I replied I hadn't yet but was on my way. Just 10 meters north from where we met up, I could see the skeleton sticking out of the bank another 5 meters down from where I was standing. The strata dips steeply to the north. Site may represent a small tyrannosaur… Some minor excavation took place including the discovery of an unusual bone fragment that may be skull. Nearby remains of weathered theropod teeth. Weathered material trails down the hill. "BCT", designated as sites name (stands for [deleted] Theropod"). Site is located…"

LOCALITY DATA

Key to the collection of any potentially important specimen is the collection of thorough, accurate locality data. Recording this information helps researchers to re-discover old sites and re-interpret analysis made on previously collected specimens (see Ken Carpenters paper, 2007, in this issue for a good example). Often this information is highly sensitive, particularly if the site is active and ongoing. Care must be taken to ensure detail for legitimate researchers while not publicly revealing too much to the wrong individuals. For the *AAPS Certified Specimen Registry*, general information is public knowledge, but specific locality is often confidential. This way, the information is guaranteed to exist (i.e. not lost to science), but access is restricted for many years and then shared only with legitimate scientists. Locality data should include the following components:

a. City/town (or distance to nearest city or town), County, State and Country. – Every fossil locality should have the nearest city or town as a reference point for researchers as well as the exact county, state and country the specimen was collected in. Should the specimen be located far from civilization the distance and direction from the closest named and mapped town or geographic feature should be included. Examples include:

1. Approximately 20 miles south-southwest of the town of San Marcos, Hays County Texas, USA. Two miles due west of "Interstate 35".

2. Outcrop is 20 miles northeast of the town of Green River, on east side of "Laurie Road", Grand County, Utah, USA.
3. Approximately 10 miles southeast of Otero Mesa, in Otero County, New Mexico, USA.
4. Exactly 1.6 kilometers due north of the town of Terry, Alberta Province, Canada on the east side of highway 216.
5. 117 kilometers west of Jingxian, 10 kilometers east of Eagle Mountain, Honshu Province, China.

b. Land title description, ranch name and/or name of land owner - Ownership of the land where fossils are contained is obviously a very important issue for anyone involved in this discipline. Having this explicitly stated gives confidence to those who are scrutinizing your data. Boundaries of the land or ranch where title to the specimen is held are always helpful and reassuring. The following are some examples of a land title description:

1. Blue Mesa Ranch, 17,000 acres +/-, John Murphy owner, Harley Teal manager.
2. Robert Swenson Estate, 12,400 acres +/-, Shirley Swenson caretaker of trust. Ranch Boundaries: *T12N R15E*- Sections 8, 9, 12, East ½ 7, northwest ¼ and south east ¼ ¼ of Sec.14; *T13N R15* E Sections 31, 32, 34.
3. Harding County Grazing Association +/- 640 acres, Managed by Rod Felps Harding County Grazing Association Vice President. Leased by George Ruff. Signed contract with Harding County Grazing Association via Rod Phelps.
4. BLM permit #MT-04367 issued by Debra Dobson June 20th, 2004, for site #199 surface excavation only.
5. Unknown land ownership (lots of red flags here, but honesty does help!)
6. Title information is restricted due to sensitivity of the ongoing dig. Met with *Journal Committee* approval vote 7-2 June 24th 2008.

c. GPS coordinates- A global positioning system is a must-have tool for anyone doing paleontological fieldwork. Resolution here can be within a matter of a few meters (or a few dozen kilometers if used incorrectly). There are several different models and manufacturers of GPS and each has its positive and negative aspects. There are also several different types of coordinate systems that GPS receivers can use. These include Latitude/Longitude coordinates such as: DMS (Degrees, Minutes, Seconds), DDM (Degrees and Decibel Minutes) or DDG (Decimal Degrees), UTM (Universal Transverse Mercator Projection), and many others (http://maptools.com/UsingLatLon/Formats.html). The latitude and longitude coordinate systems are by far the most popular and most widely used but many others will swear by the accuracy, simplicity and ease of UTM. The differences between the various coordinate systems, which ones are better to use in which situation, and how to interpret them, are beyond the scope of this paper. In most cases, the choice is often one of personal preference or of continuity with the additional maps that are being employed. For uniformity, relative accuracy and ease of use, it is recommended that all *Journal of Paleontological Sciences* manuscripts be *recorded* in DDM (Latitude and Longitude) coordinates. Whatever system you decide to use, make sure the system is clearly marked on your manuscript. Some examples of how to record GPS positions include:

1. GPS Coordinates: 44°59.986 N 103°10.725W (DDM) Elevation: 3111 feet
2. GPS Coordinates 33°25'20'' N 101°46'59'' (DMS) Elevation 2014 feet
3. GPS Coordinates 13.643591 E 4984327N NAD27 (UTM) Elevation 3105 feet

When recording the data make sure that the receiver is held upright, has an unobstructed view of the sky, and you are standing in either the center of the quarry/dig site or at a permanently fixed point within the quarry such as a "o" point quarry mapping stake. If your quarry is large, make sure

you record the exact position within the quarry where the reading was taken. Draw a quick sketch of the location in your journal if it helps to define things. One should also be sure to record the exact time of day the reading was taken, the make and model of the GPS receiver, as well as that model's known margin of error.

d. Township and Range location- Another method for plotting a site on a map is the American Public Land Survey System (PLSS) or Township and Range Parcel System. This is not an accurate coordinate system like a GPS, but rather a way for the US government back in 1785, to divide lands west of the Appalachian Mountain Range, into easy-to-define land parcels (http://nationalatlas.gov/articles/boundaries/a_plss.html). This Cartesian system is used on most USGS topographic maps and since they have been used in the past, they should supplement any GPS data for fossil sites in the United States. Each Township and Range is 36 square miles (6 miles by 6 miles) and each section is one square mile or 640 acres. Each section can be further subdivided into smaller parcels of land (ie. ½ of a section, ¼ of a section or ¼ of ¼ and so on). When defining the location of a certain dig site it is important to place the smallest parcel distinction as possible. The terms NW, NE, SE, and SW refer to the northwest, northeast, southeast or southwest portions (quadrants) of a section. Partitions are described from the smallest parcel outward to the largest. Some examples of how to report this data include:

1. PLSS- NW ¼ of the NE ¼ of Section 3 T112N R45W.
2. Township and Range: E ½ of the SW ¼ of T105N and R68E
3. Township and Range: NE ¼ of the NE ¼ of the NW ¼ of state section 16 T99N R104E.

e. Physiogeographic Province or Geologic Province- A physiographic province is defined as a region of which all parts are similar in geologic structure and/or climate which has had a similar geomorphic history (Bates and Jackson, 1984); its relief features vary significantly from those adjacent regions. A geologic province is defined as a large region characterized by a similar geologic history and development (Bates and Jackson, 1984). These descriptions are optional, however they will assist workers in the future when analyzing the stratigraphic information you provide in a following section. Examples of recording physiographic provinces or geologic provinces include:

1. Physiographic Province: Located in the southern portion of the Big Horn Basin
2. Geologic Province: Located on the northern arm of the Sheep Mountain Anticline
3. Physiographic/Geologic Province: Located in the northwest corner of the Arbuckle Uplift
4. Physiographic/Geologic Province: Located at the northern extent of the Henry Mountains in the Colorado Plateau of Utah
5. Physiographic/Geologic Province: Located in the Mt. Pleasant Fluvial System of the Texas Gulf Coastal Plain.

f. Physical description – The preceding information will get workers to the approximate location, but if the site is over 20 years old, the effects of weathering and erosion may obscure the exact quarry location or dig site. This is especially important if you are using a GPS, DMS coordinate system, where each second corresponds to just over 100 feet of horizontal distance, leaving a great deal of room for error on small localities. The physical description is written like one might describe a treasure map. It describes bearing and distance from one or several fixed or semi-permanent landmarks so that future workers may again find the exact spot of recovery. The bearing and distance from three fixed or semi-permanent landmarks is recommended. For consistency's sake one should use metric units for distance, or a combination of metric with English equivalents in parentheses. Try not to mix and match your measuring units as this might confuse future readers of

the description. Also consider drawing a sketch of the approximate location. This may not necessarily be geographically accurate, but may aide in the future re-discovery of the site. Here are some examples of what a physical site description should look like:

1. Site is located approximately 25 meters (75 feet) south east of highway 25, five meters (25 feet) south of a lone, five-meter high pine tree and 10 meters (30 feet) upstream of a large northwest bend in the Purgatory River. The quarry was excavated into a cut-bank on the northern side of the river.
2. The site is located about 400 feet from the land-owner's easternmost boundary fence-line, in a small patch of badlands of low relief.
3. The site is located in a narrow ditch on the west side of Benchmark Road approximately 200 meters from an old dilapidated barn and 10 meters from an exceptionally large, gnarled tree stump.
4. The site is located between the following semi-permanent landmarks: 1) 200 meters on a bearing of N43E to an oil and gas well; 2) 120 meters on a bearing of N53E to the land-owner's current farmhouse and 3) 15 meters on a bearing of S56E from the back door of the land-owner's old homestead.
5. The site is located in a patch of moderately high badlands, overlooking a grass-covered series of low hills trailing off to the west. The Snake River can be seen about ¼ mile to the east. The site itself is located in an area of very few permanent landmarks. A narrow, deeply incised dry drainage winds to the east of the site by about 4 meters. An east-west fence line presumably corresponding to the boundary between Sections 7 and 8 is just to the north by about 6 meters. A semi-permanent quarry stake was placed at the south end of the fossil-bearing horizon.

g. Site plotted on a USGS 1:24,000 topographic map- Following the recording of the above stated data in your field journal, one should plot the location on a standard USGS 1:24,000 scale topographic map while in the field. Later this can be more accurately plotted using the GPS coordinates and a standard topographic mapping software package. These can be purchased at many outdoor shops where GPS receivers are sold. When purchasing software, be sure to read what GPS receivers it supports, the scale of the maps, any 3-D capabilities, additional applications, the map resolutions, and the coordinate systems used. Read the fine print closely on these mapping programs. The first program I purchased had a picture of a standard USGS 1:24,000 topographic map on the packaging; which, of course, led me to assume that the software would have the USGS topographic maps in its database and look identical to what I was used to. When downloaded, it was far from what I expected with terrible resolution and jagged topographic lines! Often the best programs are very expensive, so watch out for cheap programs that will not be sufficient for the applications you need.

Once your site has been plotted, the image should be cropped, magnified and included as one of the first figures on any *Journal of Paleontological Sciences* publication unless the site is still under excavation or is in a highly sensitive area. Exclusion from the paper may require *Journal of Paleontological Sciences* board approval and justification.

h. Site photographs taken from various labeled directions- While at the site it is very important to photograph all aspects of the fossil excavation. This is particularly true when just starting out so, others can see the condition of the fossil site prior to excavation and towards the end, so workers can see the condition of the site, after excavation has ceased. When taking photographs, it is important to note the orientation of the camera so future workers will be able to tell which direction is which in the photos (Fig 1). Many field workers recommend taking a mix of both digital and film images. This provides an all-too often redundancy that might help matters down the line (particularly if you or someone else using the digital camera accidentally erases the disk!) if something goes wrong.

Setting up a time-lapse camera or videotaping certain elements of the site also has many benefits for establishing provenance, history and location.

Figure 1: (JPS.P.06.0008) - This image, of a partial *Triceratops* dig-site (AAPS.V.06.0002) in western South Dakota, is a good example of a "site location reference photograph". The flat-topped miniature "mesa" in the center of the image makes for a nice traceable landmark for future workers. The land-owner's ranch house can just barely be seen in the upper center of the photo just below the horizon (see arrow). Orientation is also recorded in your field journal (in this image we are looking N45W).

OUTCROP DESCRIPTION

a. Outcrop description- A description of the outcrop containing a fossiliferous rock layer assists future workers in reconstructing the quarry prior to excavation. In some circumstances this will enable reclamation should any be required in the future. Just like the physical description of the locality, the physical description of the outcrop can help workers return to the site at a later date. This description may be combined with the physical description of the location if this aides in clarity and uniformity. A sketch or series of sketches of the outcrop including its important structures, fossil discovery locations, landmarks, etc. should be drawn in your field journal as the excavation continues. The outcrop description in the journal should include; the nature, height or thickness of the outcrop, the bedding of the sedimentary units, color of the rocks when weathered, general rock descriptions, nature of overburden, nature of the vegetation if any is present, angle of the slope, direction and extent of the fossil bearing horizon, strike and dip of the sedimentary layers, degree of weathering, extent of debris field and other bits of important data. I like to think of this as a painting composed solely with words. A few examples of outcrop descriptions follow:

1. "The outcrop extends approximately 100 meters from east to west with a maximum height toward the eastern end of four meters. The dig site is located closer to the western edge of the outcrop where the maximum height of the overburden is less than two meters. Much of the section is covered in light vegetation, so a detailed view of the stratigraphy is not available at this time. The lithology appears to be a loosely consolidated, medium yellow-brown sandstone (lithic arenite?) with abundant micro-fossils (fish, turtle, crocodile, dinosaur) based upon the large debris field extending laterally more than 10 meters. The bone bearing horizon is at least 30 cm. thick where it is overlain by a greenish-gray floodplain mudstone at least 1 meter thick. The bedding is essentially horizontal with minor variations. Due to the nature of the lithology it is impossible to recover an accurate strike and dip of the beds. Much of the exposed skeletal material is highly weathered but unbleached indicating delicate preservation."

2. "The outcrop is cliff forming, resistant to erosion and at least 1/4 mile in total length based upon aerial photographs and limited field reconnaissance. The rock strata are clearly visible with little to no vegetation or ground cover. The overlying rock consists of over seven meters of massive, planar cross-bedded and cross laminated quartz arenite sandstone which forms a protective cap overlying the fossil bearing strata. The bed thickness ranges from a low of 20 cm to a high of well over 1.25 meters. The unit is strongly cemented. The fossil bearing strata appears to be a greenish-grey, glauconitic, lithic wacke sandstone. Overlying beds are striking N35E and dipping 10-20 degrees to the northwest."

3. "The outcrop is located on the south side of Two-Calf Creek, in a narrow river valley, with little vegetation. Pine trees cover the tops of both ridges and short grasses cover some of the flatter slopes. Site is approximately 4 meters above the base of the gently meandering creek. The bone bearing strata is steeply dipping, reddish brown, iron-rich, medium to fine-grained, strongly fossiliferous, sandstone; cliff forming and resistant to erosion. Beds dip approximately 45 degrees to the north east. Striking N45W. This overlies a yellow to buff-colored medium to course-grained sandstone (not sure but probably a lithic arenite). The iron rich sand is at a maximum of 30 cm. thick. There is probably a major fault in the area as rocks on other side (north side) of the creek flatten out very quickly with less than a 5 degree dip. The Fe-rich sand is laterally continuous without much change in thickness, though it does appear to become rapidly unfossiliferous to the NW and the SE. A cattle trail has been cut into the red-brown sandstone and runs uphill, parallel to strike, past a lone pine tree whose thick roots cut down through the fossil bearing sandstone. Rock samples were collected from the bone-bearing horizon and the horizons immediately above and below the bone bed"

b. Rock formation and estimated age- Obviously, one of the most important bits of data that must be recorded is the name of the rock formation the specimen is contained in. Surficial geologic maps with appropriate scales and resolutions should be employed to help you determine what rock formation your dig-site is located in. These maps can be purchased from the USGS, state geological surveys or from several independent companies. Many maps can even be found free of charge online. This is particularly true with the state geologic surveys, some of which (Montana and New Mexico immediately come to mind) are quite good. Even www.geology.about.com has downloadable geologic maps for each state, which can get you started. Aerial photographs through *Google Earth*™ may also be employed. Descriptions of rock formations written by other geologists should also be researched in order to further pinpoint the location. A good general reference for rock formation descriptions and stratigraphic sections for North America is "*Regional Stratigraphy of North America*" by William Frazier and David Schwimmer (1987). An estimate of the overall stratigraphic position (upper 1/3, middle 1/3 or lower 1/3 or specific member) should be written into

your field journal and a more thorough analysis of the stratigraphic description should be done prior to publication in any professional scientific journal. Some rock units are further subdivided into smaller units called "members". Each member is defined by a certain set of lithologic, ecologic, stratigraphic or biological characteristics that separates it from the overlying or underlying strata. If the rock containing your fossils meets those characteristics you should mention the dig-site's probable position in that named member of your rock formation.

c. Stratigraphic description- Completing a stratigraphic section is something that should also be done at your dig-site. The exact methods for doing this are beyond the scope of this paper, but can be found in many sedimentology texts. I recommend using the methods outlined in Robert R. Compton's "Geology in the Field" (1985), which is an industry standard.

Stratigraphic descriptions help scientists place the fossils at the site into a chronological, taphonomic and ecological framework. Each distinctive rock layer or significant stratigraphic change is measured for thickness and orientation and is then described. The most accurate stratigraphic descriptions are done at large outcrops with lots of vertical relief and limited vegetation where lithologic and formational contacts are clearly present. Certain low-lying fossil dig sites will not have this luxury and some distances may need to be covered far from the site. Unfortunately the further from the fossil dig site that one goes in order to do a section, the higher the degree of error, since variations in the lateral extent of many fossil bearing strata often limit the precision and correlation of the stratigraphic section. This is especially true in terrestrial rocks where lateral thickness of strata is highly variable and often inter-tongue or pinch out entirely. Despite these problems an estimate in some form should be attempted.

The location of the nearest formational contact in the area should be discovered using a combination of geologic maps, aerial photographs, and field reconnaissance. A measurement of the average strike and dip of those beds are taken at various points between the known contact and the fossil site. Based upon the distance from the formational contact to the fossil site, reported geological formation research and measurements of the strike and dip, the field worker can then estimate the relative position within any rock formation (assuming structural problems such as faults, complicate matters).

CONCLUSION

In summary, the accurate recording of a site description is one of the most important things a field paleontologist must collect at any fossil dig site. Memories fail (particularly mine) - therefore a field journal (or two) with a detailed site description is an absolute necessity. Repeatability and independent verification are key to collecting good scientific data. By recording the exact position of the specimen in space and time as well as the details of the discovery, you enable workers in the future to rediscover old sites, retest old hypothesis and develop new ones. This information should be gathered whenever a potentially significant specimen is discovered prior to removal from the ground. Doing this makes your discovery more valuable, more scientifically significant, more worthwhile and far more marketable to academic institutions.

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CITATIONS

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