

# Field Museum News

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## FOSSIL'S 30-MILLION YEAR HISTORY TRACED FROM BURIAL TO DISCOVERY

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"How do you know where to look for them?"

"How do you suppose they got there?"

"How do you go about digging them up?"

"Are they really turned into rock?"

These are some of the questions most commonly asked about fossils. The first of a new series of exhibits which will answer these and other general questions about

searching for "petrified bones." A few relatively simple facts should enable such people to collect intelligently and to realize lasting satisfaction from their efforts by helping to unravel knotty problems concerning the life of the past. Aside from furnishing general information to the average Field Museum visitor, the facts revealed in this new exhibit may serve the practical function of encouraging people to save important fossils which otherwise

a small rhinoceros (*Hyracodon*) that lived during the Oligocene epoch (some thirty million years ago). Although the death of the hero usually marks the end of a tragedy, the death of *Hyracodon* is only the opening chapter of our story. The first scene shows his bleached skeleton lying on the flood plain of an Oligocene stream. Such streams were numerous at that time and meandered widely over the plains east of the Rocky Mountains. Ordinarily skele-



THIRTY MILLION years ago a bleached rhinoceros skeleton lay on a flood plain east of the Rocky Mountains.



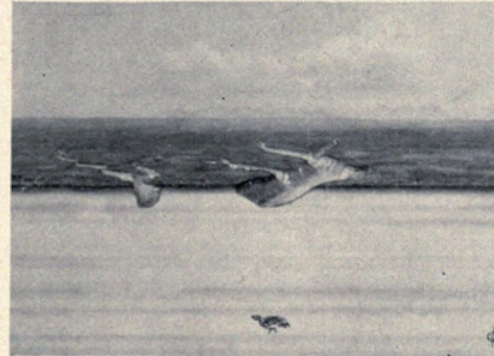
A FLOOD carrying large quantities of clay and mud from the distant mountains rolled over and inundated the plain.



SEDIMENT left by the receding water buried the skeleton (shown in section) and protected it from damage.



SEDIMENTS DEPOSITED during many millions of years accumulated and buried the skeleton still deeper.



AS THE REGION ELEVATED, the increased stream gradient caused deposition to stop and erosion to begin.



CANYONS WERE CUT into the ancient sediments, and now by careful search the exposed fossils may be found.

fossils and their broad significance recently has been installed in Ernest R. Graham Hall of Historical Geology (Hall 38).

The public obviously has little knowledge of the way fossils are preserved or how they are properly collected. This lack of information has resulted in the innocent destruction of an enormous number of specimens, which, had they reached the hands of a specialist, might have been of untold scientific worth. Many people living near fossil-bearing deposits find relaxation in

might be destroyed by careless collecting.

The exhibit is divided into three parts, the first of which consists of six original oil paintings by Mr. John Conrad Hansen. These depict the principal stages in the history of a fossil from death to discovery, and thus represent a scene in the same locality through a period of thirty million years, with the most important geological changes which have occurred during that great span of time.

The "leading character" in this story is

tons lying exposed in such a place were scattered by carnivores or destroyed by the weather. Occasionally, however, the bones were protected as illustrated in the second and third pictures.

Heavy rains in the mountainous highlands turned streams and their tributaries into raging torrents. Rushing down the mountain valleys the flood waters picked up countless tons of mud, clay, and sand, products of weathering rock. Upon reaching the flat plains the waters spread and



inundated large areas. Having lost its great velocity, the water was no longer able to transport the heavy load it had carried down from the mountains. This resulted in the deposition of an expansive blanket of sediment over the region when the flood waters receded. The sediment buried the skeleton and protected it from damage.

During the succeeding millions of years this process was repeated time after time until hundreds or even thousands of feet of clay and sand covered the skeleton. Because of obvious limitations the great depth to which specimens are usually buried cannot be shown in the fourth picture which represents this stage. During this time the surface of the area also was subjected to many changes. The streams changed their courses continuously, and the mountains were gradually worn down by the loss of so much material.

After these millions of years of deposition a change took place that completely reversed the process that had gone on so long. The entire region was elevated, the gradient and velocity of the streams increased, and deposition no longer took place. The streams and tributaries cut deep valleys, large regions became dissected by deep gullies, and thereby a period of erosion was initiated. With continuation of this process, canyons cut deeply into the deposits that were laid down at the time the rhinoceros lived. By this means—fortunately for the paleontologist—the skeleton was again exposed to view.

Our last scene shows a portion of the Bad Lands of Nebraska, South Dakota, and Wyoming as they appear today. The skeleton, now petrified, is being collected by a fossil hunter who, after careful prospecting, has discovered the bones weathering out of a canyon wall.

During the time the bones lay buried, their chemical composition was altered by the action of ground water that carried mineral in solution. The type and amount of alteration varies considerably, and examples of the more important types are shown in the exhibit.

Once discovered, a fossil must be collected with great care. As the top of the specimen is uncovered with small tools, repeated coats of thin white shellac are applied. This penetrates the cracks and pores, and when hard lends considerable strength to the fossil. After the top is covered with a layer of tissue paper it is bandaged with burlap dipped in plaster of Paris. Not until the plaster is hard is the specimen removed from its original position; then it is carefully turned over and receives the same treatment on the under side. When the fossil is completely encased in the plaster jacket it may be handled and transported in comparative safety.

This modern technique of collecting fossils is vividly illustrated in the exhibit

by a series of five models made by Mr. Orville L. Gilpin. These show the most important steps in the procedure.

### THINGS YOU MAY HAVE MISSED

#### A 312-Pound Lapis Lazuli

One of the largest masses known of the semi-precious stone called lapis lazuli is displayed in an individual case among the minerals in Hall 34. Composed wholly of lapis lazuli, it is a rectangular block two feet long, fourteen inches wide, nine inches thick, and weighs 312 pounds. It was found in an Inca grave in Peru six or seven hundred miles from the nearest known deposit which is in the mountains behind Antofagasta, Chile. Compare the extra-



HUGE LAPIS LAZULI

This enormous block of a popular semi-precious stone weighs 312 pounds, or almost exactly three times as much as Mrs. Peggy McGann who is comparing her own lapis lazuli ring with it. It is exhibited in Hall 34.

ordinary size of this specimen with the statement of an eleventh century author: "It is oftentimes of so great a bigness that spoons and hafts of knives are made of it."

Lapis lazuli is an opaque semi-precious stone of a rich blue color not equalled in any other stone suited for ornamental use. It is often spangled with brilliant yellow specks of pyrite which the ancients believed to be gold. An apt description is that of Pliny: "It is like a serene sky adorned with stars." The richness of its color is not displayed at its best on this rough block, but is adequately shown on polished pieces in the gem collection in H. N. Higinbotham Hall (Hall 31).

The value and beauty of the stone depends upon its color—the more intense the blue the more valuable the stone. It is soft, as gem stones go—about the hardness of feldspar—and loses its polish when subjected to wear, becoming dull and lusterless. It is not a simple mineral but a mixture of several common minerals to which its opacity is due. Other components are one or both of two bright blue minerals, lazurite and haüynite, to which it owes its color. The blue minerals are silicates and sulphates of calcium, sodium, and aluminum with a small quantity of sodium sulphide.

In jewelers' terms the Museum's enormous block of lapis weighs 706,000 carats. If ordinary market prices applied to such huge specimens it would be worth about \$425,000, but practical economics reduces the actual value of such a stone to about \$10,000.

In the Occident lapis is not as highly esteemed as formerly, but it is still used for beads and a variety of small ornaments. In mediaeval and ancient times it was the most highly esteemed of all blue stones. Marbodius, in the eleventh century, wrote concerning it:

"Opaque of color which excludes the eye  
"By Nature with superior honors graced,  
"As gem of gems above all others placed."

The Romans, Greeks and Hebrews called it sapphire, a name now given to an entirely different gem. In ancient times it was esteemed a sovereign remedy for numerous ills and believed to be a potent charm to avert many evils. An early Hindu legend ascribes the origin of lapis lazuli to the cry of a prince of demons in Ceylon—"From a cry of the giant son of Diti, resembling the roaring of the troubled ocean at the close of the Calpa sprung the variegated Vaiduryam (lapis lazuli), source of colors, of a bright and ravishing splendor." —H.W.N.

#### Visiting Hours Change March 1

Beginning March 1, spring visiting hours, 9 A.M. to 5 P.M., will replace the winter schedule of 9 to 4. The new hours will continue in effect until April 30, after which the Museum will be open from 9 A.M. to 6 P.M. until September 6 (Labor Day).

#### Mummified Animals

The bodies of animals, as well as human beings, were mummified by the ancient Egyptians. An exhibit of mummified birds, and another of mummies of other animals with the coffins provided for some of them, is included among the collections in the Hall of Egypt (Hall J). Animals were mummified in some cases because of religious significance due to their association with various deities; sometimes as food offerings for dead humans in whose graves they were placed; and sometimes animals which had been pets were mummified for sentimental reasons.





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