

# New Threats to Old Bones

## The Theft of Fossil Vertebrates from Museum Collections

*The Three Principles of the First Law of Collections Management may be formulated as follows:*

*If it exists, people will collect it.*

*If people collect it, they will exhibit it.*

*If people exhibit it, someone will try to steal it.*

**T**here is no better proof of these principles than the recent theft at the Frederick's of Hollywood Bra Museum in California.

During the Los Angeles riots following the Rodney King incident, the museum was broken into and one of the items stolen from the exhibits was a bustier worn by Madonna on one of her concert tours. It was never recovered.

Traditionally, interest in fossils has been rather limited—as research material for scientists and as natural curios to the public. Although some important fossil vertebrates have been destroyed during wars, fossils have generally not been treated as war booty and have thus been spared the disastrous systematic, large-scale plundering suffered by cultural items in Europe.<sup>1,2,3</sup> Over the last several decades, however, the commercial market for fossils has exploded, and over the last 10 years, there has been a sharp increase in the theft of fossils from museum collections

and exhibits. Fossils in collections now face the same threats as artwork, archeological artifacts, and other valuable items. The First Law of Collections Management has finally caught up with paleontology.

It is certainly no secret that the commercial trade in fossil vertebrate remains is extensive, international in scope, and lucrative, with single specimens realizing millions of dollars at auction. The trade and the price of specimens have been growing steadily for decades. The issues are complex; some specimens are collected under contract from private land, a perfectly legal activity, while other specimens are taken without permission or permit from private and public lands, including units of the National Park Service. In some cases specimens have been stolen or vandalized in active research quarries. Steeply rising prices further fuel the trade. Donors to The Field Museum of Natural History paid \$8 million at auction for the *T. rex* known as Sue, and the North Carolina State Museum of Natural Science paid \$3 million for a skeleton of *Acrocanthosaurus atokensis*.<sup>4</sup> The immense success of “Jurassic Park” and “The Lost World” serve to further drive the market. One only needs to visit the Tucson or Denver Gem and Mineral Show to see first hand the dizzying array of spectacular fossils regularly available for purchase.

As a result, fossil rustling has become a growing concern for land managers and has sparked a heated debate within the scientific community. This debate has risen to the attention of the general public through books, magazines, and television documentaries. Less well known to the public and, I suspect, to many of the readers of *CRM* are the increasing instances of theft of fossil vertebrate remains from museum and private collections. These thefts are international in occurrence and collections managers need to be aware of this new threat to specimens under their care. It is a threat that is here to stay and collection managers and scientists need to

*At Dinosaur National Monument some 1,500 dinosaur bones are preserved in place within the visitor center, yet even here thieves have stolen bones right off the quarry face. Courtesy Dinosaur National Monument, National Park Service.*



work together to prevent it and to recover specimens.

### **The Scope of the Problem**

The best known and documented incidents involve the Paleontological Museum of the Russian Academy of Sciences (PIN), Moscow, which is the main repository for the fossils of the former Soviet Union. In 1992, Dr. L.P. Tatarinov alerted colleagues to the fact that 12 skulls of 230-million-year-old Early Triassic amphibians had been stolen, and it was possible that the specimens might be offered for sale in the West.<sup>5</sup> Shishkin provided more details and noted that a total of 15 amphibian skulls had been stolen, all from a single exhibit case.<sup>6</sup> Stolen items were single skulls of *Aphanerama rostratum* (PIN 42771/1), *Benthosuchus sushkini* (PIN 2243/1 holotype), *Benthosuchus bystrowi* (PIN 37831/1, holotype), *Benthosuchus korabkari* (PIN 3200/65), and 11 skulls of *Thoosuchus jakavlevi* (PIN 3200 nos. 6, 81, 82, 132, 154, 160, and 190, plus 4 more skulls). All the skulls

were in an excellent state of preservation and some had been chemically prepared and thus were devoid of infilling matrix, making them very fragile. Included in this theft were several type specimens, i.e., specimens that are the formal name bearers for a species. Such specimens are of great paleontological importance, and the loss is a disaster for systematic and phylogenetic research.

Subsequent revelations showed that the theft problem was much more serious than initially thought and that nearly 50 specimens were missing.<sup>7</sup> Even worse news was that the exhibit case from which the specimens disappeared did not have a broken lock, leading to the suspicion that someone from within the institute might have been involved. In 1994, the Joint Moscow-Bristol Working Group for the Return of Stolen Russian Fossil Material was established to repatriate missing specimens.<sup>8</sup> However, to date only one specimen, a skull of *Thoosuchus*, has been recovered, thanks to the sharp eye of Dr. Rupert Wild, paleontologist of the State Museum for Natural History in Stuttgart.<sup>9</sup>

In 1996, word came of the additional theft of five 65-million-year-old dinosaur specimens from the PIN.<sup>10</sup> The specimens were two undescribed skulls of *Protoceratops andrewsi* (PIN

3147/7, 3148/8), one skull of *Breviceratops kozlowskii* (PIN 3142/1, syntype), and the upper and lower jaws of the tyrannosaurid *Tarbosaurus eferemovi* (PIN 551/2, 551/3, holotype). Once again, some type specimens were taken. However, this time the specimens were stolen from locked museum cabinets in storage areas. On December 21, 1995, a German fossil dealer was charged with taking meteorites and fossils out of Russia without proper documents, although none of the missing items were part of the package.<sup>11</sup> However, this dealer had sold the *Thoosuchus* skull in Germany, which was ultimately recovered by Dr. Wild.<sup>12,13</sup> Other missing vertebrate material from the PIN includes six mammoth tusks.<sup>14</sup>

Theft problems are more widespread in Russia than just the PIN. Mammoth tusks have been taken from the Zoological Institute in St. Petersburg.<sup>15</sup> In late 1999, the holotype specimen of the 270-million-year old shark *Helicoprion bessonovi* disappeared from the St. Petersburg Museum of Geological Research. Fortunately, this

specimen has been recovered with the aid of a fossil dealer.<sup>16</sup>

From the other side of the world, bad news came from Argentina in February 1994. A break-in at the Museum of Paleontology at the University of La Rioja resulted in the theft of numerous 230-million-year-old reptile specimens.<sup>17</sup> Lost material included a cast of the skull and 56 actual vertebrae of the prosauropod dinosaur *Riojasaurus incertus*, two skulls of the mammal-like reptile *Probainognathus jenseni* (UPLR16, 17, including the holotype), and the holotype skulls of the mammal-like reptiles *Probelesodon lewisi* (UPLR 18) and *P. minor* (UPLR 12). To date none of the material has been recovered.

Even private collections have been struck. The Maxberg specimen of the 140-million-year-old *Archaeopteryx*, the third of only eight specimens of this earliest known bird, was part of a private collection in Pappenheim, Germany. When the owner, Mr. Eduard Opitsch, died in 1991, the specimen could not be located in his estate. There was no evidence that it had been sold and the Department of Public Prosecution in Ansbach investigated the case as a theft. The specimen has not been recovered.<sup>18</sup>

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### **Because that's where the money is.**

Response of Willie Sutton (1901-1980) when asked why he robbed banks.

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We cannot sit back and be smug about this. Theft is not merely a problem overseas; there have been numerous incidents here at home. The traveling exhibit “The Dinosaurs of Jurassic Park and the Lost World” includes a number of pieces of amber with animal inclusions that were on loan from The Swedish Amber Museum. In 1999, after touring cities in Alabama and Maryland, a number of the amber specimens were missing. Most of the stolen 40 million-year-old pieces contained invertebrates (including spiders, flies, beetles, etc.), but one piece contained mammal hair, an extremely rare inclusion in amber. An investigation is currently underway.

The Cleveland-Lloyd Dinosaur Quarry in Emery County, Utah, is a National Natural Landmark on BLM land and has produced the remains of nearly 50 specimens of the 145-million-year-old carnivorous dinosaur *Allosaurus*. In September 1996, unknown persons broke into both the visitor center and the protective building over the quarry site and took fossil bones of *Allosaurus* and the giant plant eating-dinosaur *Apatosaurus*. The specimens have not been recovered.<sup>19</sup>

In 1996, two 25-million-year-old fossils of the rhinoceros *Diceratherium* were stolen from the Ruthven Museum Building at the University of Michigan. The thieves dismantled the exhibit case, took a skull and a limb, and then reassembled the case.<sup>20</sup> The specimens have not been recovered.

In 1997, a number of bones of the carnivorous dinosaurs *Torvosaurus* and *Albertosaurus* were stolen from an exhibit case in the Museum of Western Colorado. The specimens were on loan from Brigham Young University and have not been recovered.<sup>21</sup>

In 1994, half of a *Tyrannosaurus rex* jaw was stolen from the collection storage area of the Museum of Paleontology at the University of California, Berkeley. The theft was not publicized for fear of driving the thief and the fossil underground. The FBI became involved because the specimen had come from BLM land and was technically federal property. Later a paleontologist noticed a cast of the missing specimen on exhibit in a private museum in Wyoming and also noticed that similar casts were being sold in a fossil catalog. The FBI tracked the fossil market through Belgium and Germany before locating the specimen in the hands of a European dealer.

The specimen was returned, with much fanfare, to the Museum of Paleontology in July 1999.<sup>22</sup>

Finally, collections theft has occurred even at my own institution. A visitor leaned over the railing and pulled part of a foot bone of the giant plant-eater *Diplodocus* (DINO 14840) off the quarry face within the visitor center at Dinosaur National Monument. A nearby ranger was being distracted by friends of the thief, and it was only the sharp eye (and loud voice) of a German visitor that called attention to the fact that the bone had been pulled off and slipped under a shirt. Although the individuals were forced to return the bone before they left, subsequent examination revealed that part of the bone was missing and is presumably still in the possession of the thieves. This blatant theft occurred during our busy season with several hundred visitors in the center.

### **Where Do We Go From Here?**

Is this litany of woes complete? I don't know, but I suspect not. Is this just the tip of the iceberg? Maybe, but we really don't know. There is no central clearing house tracking the theft of vertebrate fossils from museums. Thus, the stories related here are merely some of a collection of those that I have run across through my own ongoing informal research on this topic. Thefts may not be publicized for a variety of reasons, such as institutional embarrassment, suspicion that the specimen is merely misplaced within the collections, or fear of alerting the suspects during the investigation. Regardless, it is clear that vertebrate fossil theft is an international trend in collections management.

The frequent failure of stolen specimens to show up on the open market indicates that there is a booming underground market for stolen specimens. How do we, as collections managers, mitigate this threat, yet provide the public and the scientific community the necessary access to specimens for research and education?

There needs to be an increased proactive approach to prevent the theft of specimens. Increased security is an obvious step, including the alarming of exhibit cases (not just exhibit areas) and enhanced security in collections storage and exhibit areas. There are some promising new technologies for permanently documenting specimen ownership through implantation of micro-grams size digital watermarks.<sup>23</sup> This “gamma watermarking” will make identification

of stolen specimens easier and hopefully may serve to discourage theft. However, this really only comes into play **after** a specimen has been stolen. Museum security issues have been discussed in many places, and I will not dwell on them here. However, it is clear that the problem of theft is going to force implementation of ever more stringent policies and practices.

It is in the area of what to do after a specimen is stolen that the greatest improvements can be made. Some reports of stolen specimens have been published in the *News Bulletin of the Society of Vertebrate Paleontology*. While that is a good, direct notification to the scientific community, the *News Bulletin* comes out only twice a year, and reports often lack photos or drawings of the specimen.

I believe the time has come to develop an international database for stolen vertebrate fossils. Many such databases already exist for cultural items.<sup>24</sup> Such online databases can be very effective. Since its establishment in 1991, The Art Loss Register has been involved in the recovery of over 1,000 stolen items valued at \$80-90 million.<sup>25</sup> The development of such a database does not necessarily require the involvement of law enforcement agencies; it may be best managed under the auspices of a professional scientific society, such as the Society of Vertebrate Paleontology.

Crucial to such a database will be the posting of images of the missing specimens. When the stolen specimen is a described one, there may be sufficient published photos or line drawings in the scientific literature to post with an alert. However, except for the smallest of museums, it will simply not be financially feasible to photograph entire collections as a matter of standard curatorial practice. Even having a photographic collection of the highest-value specimens will often be impossible, especially in larger museums. This is where the broader scientific community can play a crucial role. While institution X may not have a photographic archive of every bone of taxon Z that is in its collections, it is highly likely that photos of all those bones can be found in the research files of one or a few of the scientists who work on taxon Z (at least for vertebrates). By announcing the theft of a specimen, it becomes probable that a researcher can provide a photo of the specimen that can be used to further alert the scientific and commercial communities. This

increases the buy-in of the entire scientific community in the recovery effort.

Ultimately, the database must go beyond just vertebrate fossils and include fossil invertebrates, and paleobotanical, and paleoichnological items. Fossil invertebrates such as trilobites and ammonites can command high prices. Only a few years ago a single specimen of the trilobite *Arctinurus* sold for \$10,000. If any fossils are being stolen from an institution, all fossils are at risk, as evidenced by the fact that the thefts at the Paleontological Institute in Moscow included a substantial number of ammonites.<sup>26</sup> A full paleontological theft database will require a coordinated effort between international scientific societies, such as the Paleontological Society, The Society of Vertebrate Paleontology, and the Palaeontological Association. Such a database will also serve to increase the interest of law enforcement agencies in retrieving stolen fossils.

Finally, we must move beyond the issue of institutional embarrassment. It is in the best interest of the specimens and the discipline to report thefts in a timely manner and to disseminate the information as widely as possible. An analysis of how the theft occurred might allow other institutions to take steps to close that loophole and prevent another theft. While the strategy of silence may have worked in the case of the Berkeley *T. rex* jaw, I believe that ultimately more thefts will be prevented and fossils retrieved by making it widely known that the specimens have been stolen.

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#### Notes

- 1 L. Pishoyos, *Hunting Dinosaurs*. (New York: Random House, Inc., 1994), 252-254.
- 2 Konstatin Akinsha, Grigorii Kozlov, and Sylvia Hochfield, *Beautiful Loot: The Soviet Plunder of Europe's Art Treasures* (New York, Random House, Inc., 1995).
- 3 Lynn H. Nicholas, *The Rape of Europa: The Fate of Europe's Treasures in the Third Reich and the Second World War* (New York: Vintage Press, 1995).
- 4 Richard Monastersky, "Another Dinosaur Sells for Millions," *Science News* 153: (1998): 95.
- 5 Leonid P. Tatarinov, [no title]. *Society of Vertebrate Paleontology News Bulletin* 156: (1992): 20.
- 6 Mikhail A. Shiskin, "Russian Triassic Amphibians Stolen," *Lethaia* 25 (1992): 360.
- 7 Toni Feder and Allison Abbott, "Concern Grows over 'Trade' in Russian Fossils," *Nature* 371: (1994): 729.
- 8 *ibid.*
- 9 *ibid.*

- <sup>10</sup> Allison Abbott, "Missing Dinosaur Skulls Raise New Fears of Smuggling in Moscow," *Nature* 384: (1996): 499.
- <sup>11</sup> *ibid.*
- <sup>12</sup> *ibid.*
- <sup>13</sup> Allison Abbott, "Moscow's 'Missing Fossils' Come Under New Scrutiny," *Nature* 391: (1998): 724.
- <sup>14</sup> *ibid.*
- <sup>15</sup> Allison Abbott, "Fossil Dealer Charged over Russian Cache," *Nature* 397: (1999): 189.
- <sup>16</sup> <[http://www.elasmo.com/leecreek/other\\_pg/news9901.html#holotype\\_found](http://www.elasmo.com/leecreek/other_pg/news9901.html#holotype_found)> provides details as well as a photograph of the specimen.
- <sup>17</sup> Andrea Arcucci, "Stolen Fossils," *Society of Vertebrate Paleontology News Bulletin* 161: (1994): 62.
- <sup>18</sup> Peter Wellnhofer, "Missing *Archaeopteryx*," *Society of Vertebrate Paleontology News Bulletin* 155: (1992):53-54.
- <sup>19</sup> Anonymous, "Cleveland-Lloyd Dinosaur Quarry Suffers Break-In." *Al's Archives, Newsletter for Paleontology, Archeology, and Natural History Enthusiasts* 13:2 (Winter 1996), College of Eastern Utah's Prehistoric Museum, Price, Utah: no pagination.
- <sup>20</sup> <<http://www.netscape.org/users/herald/issues/100196/brief4.f.html>>
- <sup>21</sup> Dr. Brooks B. Britt, personal communication, 1999.
- <sup>22</sup> The University of California (Berkeley) press release on the theft and recovery, including a photograph of the specimen, is available at <[http://www.urel.berkeley.edu/urel\\_1/CampusNews/Press Releases/releases/7-2-1999.html](http://www.urel.berkeley.edu/urel_1/CampusNews/Press%20Releases/releases/7-2-1999.html)>.
- <sup>23</sup> Muriel Ishikawa, Lowell Wood, James I. Kirkland, and Kenneth Carpenter, "Gamma Watermarking of High-Value Specimens for Robust Establishment of Provenance," *Journal of Vertebrate Paleontology* 19, suppl. to no. 3 (1999): 54A.
- <sup>24</sup> See the FBI National Stolen Art File at <<http://www.fbi.gov/majcases/arttheft/art.htm>> as one of many examples.
- <sup>25</sup> <<http://www.artloss.com/>>
- <sup>26</sup> A. Abbott, "Moscow's Missing Fossils," *Nature* 391.
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## Biological Inventories to Use Museum Voucher Information

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**F**iscal year 2000 marks the first year of the National Park Service (NPS) Natural Resource Challenge, a five-year initiative designed to revitalize natural resource management throughout the Service. One of the major goals of the Challenge is to accelerate completion of the basic natural resource inventories being funded through the Servicewide Natural Resource Inventory and Monitoring (I&M) Program. Those basic inventories consist of 12 biological and geo-physical datasets and are being completed in approximately 270 parks throughout the nation. In FY 2000, the I&M Program received a base increase of approximately \$7.3 million. With that increase, the program expects to complete the basic resource inventories over a period of about eight years. One of the inventories receiving emphasis in FY 2000 is biological resources.

### **Goals of Biological Resource Inventories**

The basic goal of the biological inventory program is to provide park managers with comprehensive, scientifically-based information about the nature and condition of selected biological resources occurring within park boundaries. The information will be presented in a form that increases the accessibility and utility for making management decisions, for scientific research, and for educating the public. The inventories will also lay the groundwork necessary for park managers to develop effective monitoring programs and to formulate effective management strategies for resource management and protection. To attain these basic goals, biological inventories have been designed to meet three basic objectives:

- To document through existing, verifiable data and targeted field investigations the occurrence of at least 90% of the species of vertebrates and vascular plants currently estimated to occur in the park