BOOKS: PALEONTOLOGY

Fossils, G-Men, Money, and Museums

John Pojeta, Jr.

The most notorious fossil ever may be the specimen of *Tyrannosaurus rex* named "Sue." Named for the woman who discovered her, she is the largest, most complete, and best preserved *T. rex* yet found. Her story is the paleontological epic of the 1990s. After being excavated, she was confiscated by a federal prosecutor with the aid of the FBI and the National Guard. She was eventually auctioned by Sotheby's for $8.36 million (including a 10% commission). Disney and McDonald's helped pay for her, and the net $7.6 million went to the rancher from whose land she had been extricated. This May, Sue was formally placed on exhibit at Chicago's Field Museum of Natural History.

Tyrannosaurus Sue
The Extraordinary Saga of the Largest, Most Fought Over *T. rex* Ever Found
by Steve Fiffer
Freeman, New York, 2000. 248 pp. $24.95. ISBN 0-7167-4017-6.

As a lawyer, journalist, and writer, Fiffer has the appropriate background to tell Sue's story. He describes her odyssey magnificently and objectively. He weaves all the paleontological, legal, and auctioneer's arcana into a highly readable tale that keeps one's interest from beginning to end. Fiffer enlivens his narrative with anecdotes from Sue's auction and the history of paleontological collecting (including the place of commercial and amateur fossil hounds). My only complaint about the book is that it lacks illustrations.

Sue was discovered 12 August 1990 in Cretaceous rocks on land belonging to Maurice Williams (who is one-quarter Native American) near Faith, South Dakota. She was only the twelfth *T. rex* skeleton to be found (another 17 specimens are now known). At the time, Sue's finder, Sue Hendrickson, was associated with the Black Hills Institute of Geological Research (BHIGR), Hill City, South Dakota, which, among other activities, sells fossils. The BHIGR, owned by Peter Larson, Neal Larson, and Bob Farrar, had permission to explore for dinosaurs on Williams' land. After determining that Sue was essentially complete, Peter Larson paid Williams $5000 and five tons of rock and fossilized bone were transported to the BHIGR lab on 1 September. At the 1991 meeting of the Society of Vertebrate Paleontology (SVP), Larson announced that Sue was not for sale and would always be available for study and research. In March 1992, BHIGR created a nonprofit corporation to build a natural history museum in Hill City.

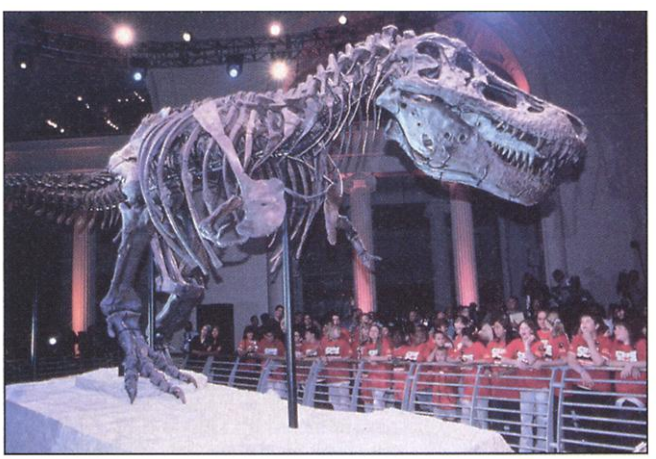
But the second act of the drama had already begun. In November 1990, Williams sent Peter Larson a letter stating: "I didn't sell the fossil to you. I only allowed you to remove it and clean it and prepare it for sale." And shortly after Sue's discovery, the Cheyenne River Sioux passed a resolution claiming that Sue "was illegally taken from land on their reservation." U.S. Attorney Kevin Scheiffer investigated the case for several months. In May 1992, FBI and sheriff's officials presented Peter Larson with a federal search warrant alleging "criminal activity, including felonies of stealing from government land and from tribal land as well as violations of the Antiquities Act of 1906." Under the watchful eye of the National Guard, Sue was packed up by a crew from the South Dakota School of Mines and moved to the school machine shop. The citizens of Hill City, the chairman of the Sioux tribe, BHIGR, and some notable vertebrate paleontologists took great exception to the seizure. But other vertebrate paleontologists applauded the government's actions. Citing concerns about heightened activities of commercial collectors, the chairman of the SVP's Government Liaison Committee issued a press release that claimed the SVP "firmly supports the action of the U.S. attorney's office in Rapid City...."

The seizure began a protracted legal process that lasted until November 1997. Fiffer devotes several chapters to the legal wrangling, grand jury, trial, and sentencing. Their titles—which include "Taking a Howitzer to a Fly," "Jurassic Farce," and "You Can Indict a Ham Sandwich"—give a sense of their contents. While a grand jury was evaluating the charges in the search warrant, there were heated disagreements in the vertebrate paleontological community about possible deterioration of Sue in the machine shop, the scientific efforts of BHIGR, and access to public lands by amateur and commercial paleontologists.

Decisions were also being made as to who owned Sue and whether she was land or personal property. After Williams bought the land in 1969, he had it put in trust with the U.S. Department of the Interior for 25 years. That status gives Native Americans certain advantages, but they cannot sell the land without permission of the Interior Department. This raised the question, does a fossil qualify as land held in trust?

In March 1993, the Interior Department's acting solicitor informed the governor of South Dakota that Sue belonged to Williams. In May, the Larsons began to purchase a 10-acre site for their Hill City museum. But in June, federal law officers returned to BHIGR with a new search warrant supported by affidavits alleging that the "Larsons were operating a multistate criminal enterprise."

Fiffer's fascinating account of the subsequent indictment and trial provides unsettling insights into the U.S. legal system. In late November 1993, the grand jury indicted the BHIGR, the Larsons, Farrar, and their partners. They were charged with 148 felonies and 6 misdemeanors. None of the counts were related to Sue despite the fact she had been seized as evidence necessary for the criminal investigation. During the six-week trial that began in January 1995, Sue was mentioned only once—on the penultimate day. The judge promptly ruled she was irrelevant to the legal proceedings.



CREDIT: JOHN WEINSTEIN/FIELD MUSEUM

Center of attention. The restored and mounted *T. rex* skeleton draws crowds to Chicago's Field Museum.

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The defendants were convicted of 8 felonies and 5 misdemeanors, most of which dealt with customs-form violations in transferring money into and out of the United States (not declaring cash or travelers checks). The following fall, the 6 felony convictions against Farrar and BHIGR were thrown out by the judge. In January 1996, Neal Larson received two years probation and a $1000 fine. Peter Larson was fined $5000 and sentenced to two years in prison plus two years of supervised release. Of the paperwork filled out when he entered prison the next month, he recalls: "Under 'reason for incarceration,' the guard put 'failure to fill out forms.'" He was released to home confinement after serving 18 months.

Meanwhile, the Eighth Circuit Court ruled that Sue was land held in trust by the United States for Williams. The Interior Department then decided that Sue would be sold to the highest bidder—domestic or foreign, private collector or museum. Williams put Sue up for auction through Sotheby's in New York City. The tale of the October 1997 auction is well dramatized by Fiffer. The intricacies of the acquisition of Sue by the Field Museum make interesting reading: the inspection of Sue by preparator, scientist, and administrator; the involvement of McDonald's and Disney; the recruitment of a veteran of the auction business to do the bidding; and the bidding by telephone from a room screened from the view of bidders on the floor.

With the exception of Williams, and possibly the Field Museum, everyone else involved in the Sue affair lost. Probably it was paleontology that suffered the greatest loss; at $8.36 million for a single fossil, a worry in the profession is that land owners will now charge researchers for access to land. One is forced to agree with the conclusions drawn by dinosaur paleontologist Robert Bakker in the book's forward: elitism has developed among some professional paleontologists about who should be allowed to collect fossils; there was resentment and envy among some professionals that the "perfect" fossil was not in their hands; the crazy tangle of lawsuits crippled the study of the skeleton for years; and millions of taxpayer dollars were squandered on unnecessary court cases.

Fiffer has produced a marvelous book full of ironies. Anyone interested in dinosaurs, paleontology, fossils, or fossil collecting should read this lively saga.

NOTA BENE: CHEMISTRY

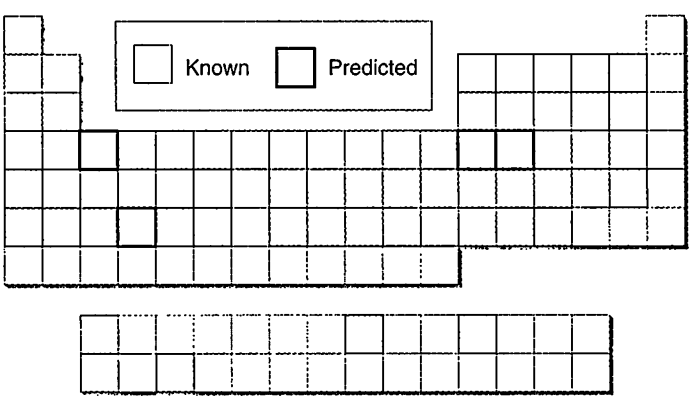
Organizing the Elements

In 1869, the Russian Dmitri Mendeleyev was puzzling over how the chemical elements might be organized according to their properties. Forty years earlier, Doebereiner had recognized that some elements, such as the halogens, formed triads with similar properties. During the 1860s, Alexandre-Emile Beguyér de Chancourtois and John Newlands had independently recognized that the properties of the elements tended to repeat themselves with increasing weight. But it took Mendeleyev's theoretical insight to create the arrangement of the elements that closely resembles the periodic table we use today. Mendeleyev was bold enough to leave gaps where no known element fit into the pattern and to suggest that the atomic weights of some elements had been calculated incorrectly. Initially, his reliance on as-yet undiscovered elements was heavily criticized. Then, in 1874 a new element (gallium) was discovered that exactly fit the weight and properties predicted by Mendeleyev. Discoveries of other missing elements and corrected atomic weights provided further confirmation. Mendeleyev's creation of a periodic table was a turning point for chemistry: After a long history of experimental advances that lacked a consistent theoretical framework, the field matured into an exact science.

Mendeleyev's Dream
The Quest for the Elements
by Paul Strathern
Hamish Hamilton, London, 2000. 320 pp. £12.99. ISBN 0-241-14065-X.

Mendeleyev claimed that the periodic table came to him in a dream. In *Mendeleyev's Dream: The Quest for the Elements*, novelist and writer Paul Strathern takes this story as the starting point to sketch the history of chemistry from its beginnings in Greece and the Arabic world to the confirmation of Mendeleyev's arrangement. Strathern is at his best when describing particular scientists and their times. One such case is Paracelsus, who in the early 16th century applied a highly scientific approach to medicine. Paracelsus viewed life as a series of chemical processes; illnesses were the sign of a chemical imbalance or malfunction. At a time when orthodox medicine was based on the theory of the "four humors" (blood, phlegm, choler, and melancholy), this scientific approach was revolutionary and not always popular.

Strathern's account of Paracelsus' life is entertaining and informative, but here and elsewhere his view seems too heavily influenced by what we know today. For example, he heavily criticizes Paracelsus and others for their continuing belief in alchemy and their searches for the philosopher's stone that turns base metals into gold. But at a time when chemists did not know that elements could not be converted into other elements by chemical means—indeed, did not even know what an element was—the possibility of converting one metal into another would not haved seemed unreasonable. I cannot agree with such statements as "Alchemy achieved a great deal for chemistry ... though its wizardry is now seen as laughable." On the contrary, it seems extraordinary how much the early alchemists and chemists achieved, and I do not consider them laughable at all.



Mendeleyev's Dream contains a wealth of information and anecdotes, and it is an entertaining read. Strathern shows how many of the chemical concepts that we take for granted, such as chemical notation and the definition of elements and molecules, emerged from centuries of experimentation and debate. At times, the writing is overly colloquial and the author loses the thread of his story because he tries to pack too much into the book. But overall, Strathern's account should be accessible and interesting to many, scientists and nonscientists alike.

—JULIA UPPENBRINK