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The Mosasaur exhibit in the Natural History Museum and Biodiversity Research Center at the University of Kansas, retains “the special appeal of the museum — its fundamental weirdness as a public space.” Visitors are awed by the thought that giant marine lizards once ruled the sea that covered much of what is now Kansas.

COMMENTARIES

Revisiting Natural Science¹Thomas H. Benton²

Toward the end of *The Catcher in the Rye*, Holden Caulfield — depressed, confused, adrift — wanders into the American Museum of Natural History: “I loved that damn museum. I remember you had to go through the Indian Room to get to the auditorium. It was a long, long room, and you were only supposed to whisper. ... The best thing, though, in that museum was that everything stayed right where it was. Nobody’d move. You could go there a hundred thousand times, and that Eskimo would still be just finished catching those two fish, the birds would still be on their way south, the deers would still be drinking out of that water hole. ... Nobody’d be different. The only thing that would be different would be you.”

A couple years ago, I wrote an essay about the “Decline of the Natural History Museum” (*The Chronicle of Higher Education*, 13 October 2006³). It was a lament about the way such museums have changed from how I remembered them as a child. I was moved, in particular, by the renovation of Dinosaur Hall at the Academy of Natural Sciences in Philadelphia, which struck me — after being away for many years and returning with my own children — like the destruction of Penn Station might have hit a long-absent New Yorker.

In *Dry Storeroom No. 1: The Secret Life of the Natural History Museum* (Knopf, 2008), Richard Fortey describes the transformation of the museum where he worked as a paleontologist from 1970 until his retirement in 2006. In many respects, his memoir shares the elegiac tone of recent memoirs of the book trade and librarianship (*The Chronicle of Higher Education*, 10 October 2008). Just

as books are supposedly being replaced by electronic media, and libraries are being filled with computer terminals, so the familiar material culture of the museum — oak cabinets with brass hardware, exotic butterflies, lacquered bones, taxidermied beasts: the apotheosis of Victorian maximalist eclecticism — have yielded to the aesthetics and values of Modernist minimalism: chrome, concrete, walls of glass, a white emptiness so overpowering that there is nowhere for the mysterious to hide from the scrutinizing power of modern science.

Fortey affirms the sensibilities of those who chafe under the tyranny of the clean, well-lighted museum. “I well recall,” he writes, “how specimens were put away back behind the scenes — down to the vaults from which they had once emerged: less was regarded as more, providing it was dramatically lit and accompanied by signage to satisfy all groups.”

Over the course of his career, the shift from comparative anatomy to genomics as the dominant method of natural science com-

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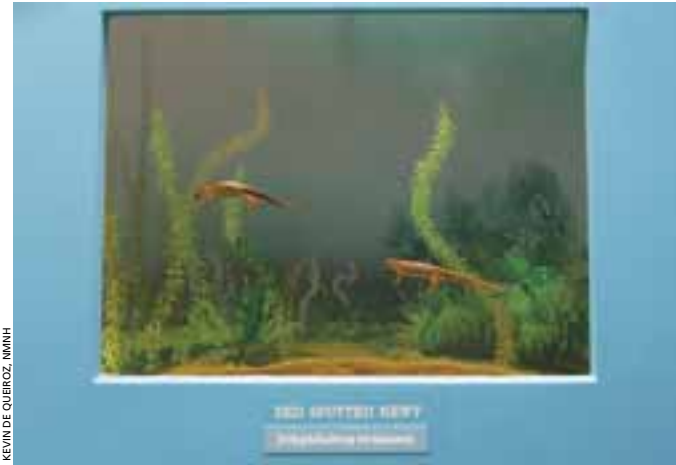
² Thomas H. Benton is the pen name of William Pannapacker, an associate professor of English at Hope College, in Holland, Michigan. He welcomes reader mail directed to his attention at careers@chronicle.com. For an archive of his previous columns, see http://chronicle.com/jobs/news/archives/columns/an_academic_in_america.

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MILWAUKEE PUBLIC MUSEUM

A diorama at the Milwaukee Public Museum takes visitor 66 million years back in time to Hell Creek of eastern Montana.



Small dioramas, such as this exhibit at the National Museum of Natural History of the Smithsonian Institution, immerse visitors into the natural world.

pletely altered the nature of museum displays. Once one could teach evolution with a series of articulated skeletons showing the development of the eohippus into the modern horse, but how does one create a display for research that is conducted primarily with microscopes and computers? What is there to do but put the scientists themselves at the center of the museum experience? The visitor can observe them through a window the same way one might tour the facilities of McDonnell Douglas. Meanwhile, behind the glass, Fortey writes, conversation focused on “the virtues or deficiencies of a new piece of software rather than the discovery of a new species of butterfly.”

The title of Fortey’s memoir refers to a type of space, unique to natural-history museums, that arouses mingled feelings of awe, curiosity, and whimsy through the gathering of unlikely natural and man-made objects: “Science, treasure, rarity, beauty, scholarship: this hidden gallery made me understand again the heterogeneous attraction of museum life.”

Like the old Dinosaur Hall, such storerooms are warehouses of human consciousness; they dramatize the transience of our attempts to explain and control the natural world. There are shadowy corners, mislabeled objects, expedition boxes that have never been opened, the apparatus of failed experiments, the history of



“Sue,” at the Field Museum of Natural History in Chicago, evokes “something spiritual” in museum visitors — something that cannot be elicited by interactive exhibits relying on the newest technology.



Smilodon, the Saber-toothed Cat, lived during the Pleistocene (~1.6 million years ago to ~11,000 years ago). Today’s children can experience the real thing only in museum exhibits.

natural history and the people who pursued it. Of course, natural-history museums are primarily scientific and educational institutions, but with the passage of time, they can become works of art as poignant as the lives of the workers who staffed them.

In addition to his loving descriptions of the collections, Fortey provides an account of the lives of the people behind the display cabinets. A couple of generations ago, young scientists could take up daily residence in one of the hidden rooms of the natural-history museum and disappear, for all practical purposes, to everyone but their families and perhaps the small, international community of scholars specializing in the crinoids of the Middle Jurassic. Some of those scholars continued to work long after their official retirement, like a member of the spectral cast of *Harry Potter*: “Professor Binns had been very old indeed when he had fallen asleep in front of the staff-room fire and got up next morning to teach, leaving his body behind him.” Such people are one more reason to cherish museums that resemble Hogwarts School of Witchcraft and Wizardry more than antiseptic, corporate research bunkers imagined by smug Scandinavian starchitects who wear only black.

As Fortey rightly observes, “Those who have devoted their lives to collections — obdurate people, odd people, admirable people —



The renovation of the Dinosaur Hall at the Academy of Natural Sciences in Philadelphia struck the author much like the destruction of Penn Station might have hit a New Yorker returning home after a long time away.



Like exhibits that take visitors back in time, those that document endangered species and threatened habitats may be the closest encounter many youngsters will ever have with such animals and ecosystems. Those inclined to look beyond the obvious message will be enticed to meditate on the role played by humans.

actually make a museum what it is and should be.” With nearly Pythonesque humor, Fortey shows how gifted eccentrics were once sheltered by natural-history museums, which were unpredictably enhanced by alcoholic, chain-smoking whale-defleshers and curmudgeonly obsessives who had spent so many years with bats — or beetles, or barnacles — that they began to resemble them and mimic their behavior.

“Formerly,” Fortey writes, “there was more leisure for people behind the scenes to cultivate their eccentricities like prize vegetable marrows, mulching them regularly with their prejudices and fertilizing them with long draughts of solitude.”

Curators had tenure in those days, so they were free to express themselves naughtily by, say, installing a secret distillery in the belly of the blue whale, or, perhaps, by furtively dining on a hunk of thawed mastodon (who knew what its taste would reveal?). Such people once had the freedom to spend 20 years producing a magisterial book on weevils that might save a billion lives — someday.

But over the course of Fortey’s career, that mix of self-governing professionals and genteel amateurs has given way to a business culture in which the eccentricities of introverted curators — their peculiar means of coping and rejuvenating — can no longer be tolerated: Public-relations specialists “attempted to bring out the scruffy old scientists from their hidden redoubts. Their elbow patches were confiscated. Corporate culture had arrived.”

As state support dwindled, every square foot had to be turned to profit; there was no more room for the mysterious, no more scientifically suspect displays left over from the era of P.T. Barnum. “The requirement to bring in as much money as possible led to the expansion of the shopping area in the galleries and the proliferation of all manner of trinkets for sale,” Fortey writes. “Small, fluffy tyrannosaurs will growl at you and sing the theme song from *The Sound of Music*.”

The special appeal of the museum — its fundamental weirdness as a public space — was replaced by the ethos of bland consumerism and banal spectacle.

While I share many of Fortey’s sensibilities, I am admittedly no scientist. From the ages of about 4 to 10, I thought I wanted

to be a paleontologist, not because I was fascinated by the science — or at least not the precise, mathematical work that undergirds it — but because there was something about the natural-history museum that appealed to me as an aesthetic experience, though I wouldn’t have used that word at the time.

Unlike the open-air, circuslike experience of zoos, there continues to be something spiritual about the older natural-history museums. They are dark and quiet; you are on your best behavior; your mind wanders, freely associating objects. You approach the displays with a kind of reverence for the dead, as one might approach the coffin at a funeral. As Fortey writes, such museums give children a rare “encounter with the bony truth”; they have “overdosed on simulations on their computers at home and just want to see something solid — a fact of life.” The last thing the young visitor probably wants is an experience mediated by technology that seems dated before it even arrives at the museum, like an old teacher trying to be hip.

Living in the rural Midwest, I don’t get to natural-history museums as much as I used to. Sometimes I am able to sneak away from a conference in Washington or New York to visit their museums, but, for whatever reason, I now find the experience is best shared with my children. Chicago’s Field Museum — one of the finest in the world, with a good mix of the old and new — is about three hours away, and we have driven there a couple of times. But for the most part, our family interest in natural history is satisfied by collecting shells, leaves, rocks, and insects — and, increasingly, as my kids get older, by reading nonspecialist books on natural history, particularly the ones with lots of illustrations that almost capture the experience of visiting a real museum.

There isn’t room in this short essay to review all of the books we’ve enjoyed over the past few years, but I recommend a couple that evoke the sensibilities I find so appealing in Fortey’s memoir: *The Rarest of the Rare: Stories Behind the Treasures at the Harvard Museum of Natural History* (Harvard, 2004) and *Windows on Nature: The Great Habitat Dioramas of the American Museum of Natural History* (Abrams, 2006). One forthcoming book of a similar kind sounds particularly promising: *Treasures of the Natural History Museum* showcases at least 200 of that London museum’s most notable items. The book is scheduled for release in January.



Effective dioramas draw the visitor into ecosystems and trigger the desire to look for the tiny details that bring such exhibits to life.

If one wants to delve into the ancestry of natural-history museums, *Cabinets of Curiosities* (Thames & Hudson, 2002) is the most gloriously illustrated work on the subject. *Amazing Rare Things: The Art of Natural History in the Age of Discovery* (Yale, 2007) is a fine anthology of drawings and engravings. And if you are prepared to splurge, *Albertus Seba's Cabinet of Natural Curiosities* (Taschen, 2001) is a jumbo, slipcased volume that includes hundreds of color illustrations from the early years of natural history.

Several books published in recent years that are more scholarly — not for the kids, but not over the heads of the average nonscientist — focus on the history of natural history: *Stuffed Animals and Pickled Heads: The Culture and Evolution of Natural History Museums* (Oxford, 2001) is the most engaging comprehensive history that I have read. More-focused studies include *A History of Paleontology Illustration* (Indiana, 2008), and *Victorians and the Prehistoric: Tracks to a Lost World* (Yale, 2004), and *The Legacy of the Mastodon: The Golden Age of Fossils in America* (Yale, 2008), which chronicles the wild-west era of paleontology in the 19th century, when the great museums were building their collections. *Nature's Museums: Victorian Science and the Architecture of Display*

(Princeton Architectural, 2005) makes the case for the ideological significance of museums and the importance of preserving them for cultural reasons as much as for their scientific value.

Forrey asserts — rightly, I think — that the older, interdisciplinary, vocational culture of natural history can no longer comfortably exist in the context of the modern museum. Such work is now wholly professionalized and dependent on advanced, specialized education, expensive technology, and access to the latest research. It depends on the same kind of management strategies and values that are transforming our universities along similar lines. And the experience can be quite alienating. One can only gape at the astounding power of technology. There is not much room left for the museum visitor who is as fascinated by a timeworn marble staircase as by the cast skull of a *T. rex* in a Lucite box.

One goes to a natural-history museum not just to contemplate the minutiae of comparative anatomy — or to watch scientists demonstrate the insidious might of their corporate sponsors — but also to meditate, like Holden Caulfield, on the meaning of time, death, change, and the succession of generations.

Dead Reckoning: Calculating the Costs of an Ongoing Mass Extinction¹

Scott LaFee

San Diego Union Tribune

On 2 March 2009, an asteroid discovered just three days earlier narrowly missed the Earth. Dubbed 2009 DD45, it passed within 47,000 miles of the planet — a distance only slightly more than twice the altitude of a geostationary communications satellite. The moon is five times farther away.

It was a relatively small asteroid: 100–130 ft in diameter, roughly the size of the comet or asteroid that flattened Russia's Tunguska River region in 1908. If 2009 DD45 had actually collided with Earth, it would not have ended life as we know it. We're doing that ourselves.

Over the past 500 million years, the Earth has endured five mass-extinction events, periods when 50 to more than 90% of all known species perished. The last event — the Cretaceous-Tertiary event 65 million years ago, which spelled the end of the dinosaurs — was likely instigated by the impact of an asteroid far larger than 2009 DD45, but other phenomena have been cited as possible causes of mass-extinction events, including massive volcanism and extreme climate change. Now, most scientists agree, we're in the midst of a sixth mass extinction, this one human-induced. What remains to be seen is just how bad it will be.

"Extinction is a difficult phenomenon to measure because we are still counting and describing the number of living species on Earth," said Mark Wilson, a professor of geology at the College of Wooster in Ohio. "We may be losing tens of thousands of species every year which we haven't even met yet." However, the sense among researchers is that the current mass extinction, known as the Holocene Event, will be very bad indeed. In the past, the Earth invariably rebounded, different but alive, eventually refilling with new and more diverse creatures and plants. Life moved on.

Odds are, humans will, too. At this point, scientists tend to think humanity will persist in some form or fashion. As a species, we are remarkably adaptable and resourceful.

The planet, not so much. Phenomena like global climate change and habitat destruction, both powerfully propelled by modern human activities, have fundamentally changed the rules. A University of Leeds study says current emission trends may raise global temperatures by the end of the century to levels not seen in

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Giant Garter Snake
(*Thamnophis gigas*)



Mountain Yellow-legged Frog
(*Rana muscosa*)



Yangtze River Softshell Turtle
(*Rafetus swinhoei*)



Hawaiian Goose
(*Branta sandvicensis*)



Mushroomtongue Salamander
(*Bolitoglossa diaphora*)



Purple Marsh Crab
(*Afrithelphusa monodosa*)



Hellbender
(*Cryptobranchus alleganiensis*)



Grand Cayman Blue Iguana
(*Cyclura lewisi*)



Gharial
(*Gavialis gangeticus*)



Squartail Coral Grouper
(*Plectropomus areolatus*)



Living Rock Cactus
(*Ariocarpus bravoanus*)



Iberian Lynx
(*Lynx pardinus*)

The rare and endangered species shown here are among those at risk in the current human-induced mass extinction.

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