

[Back to article page](#)

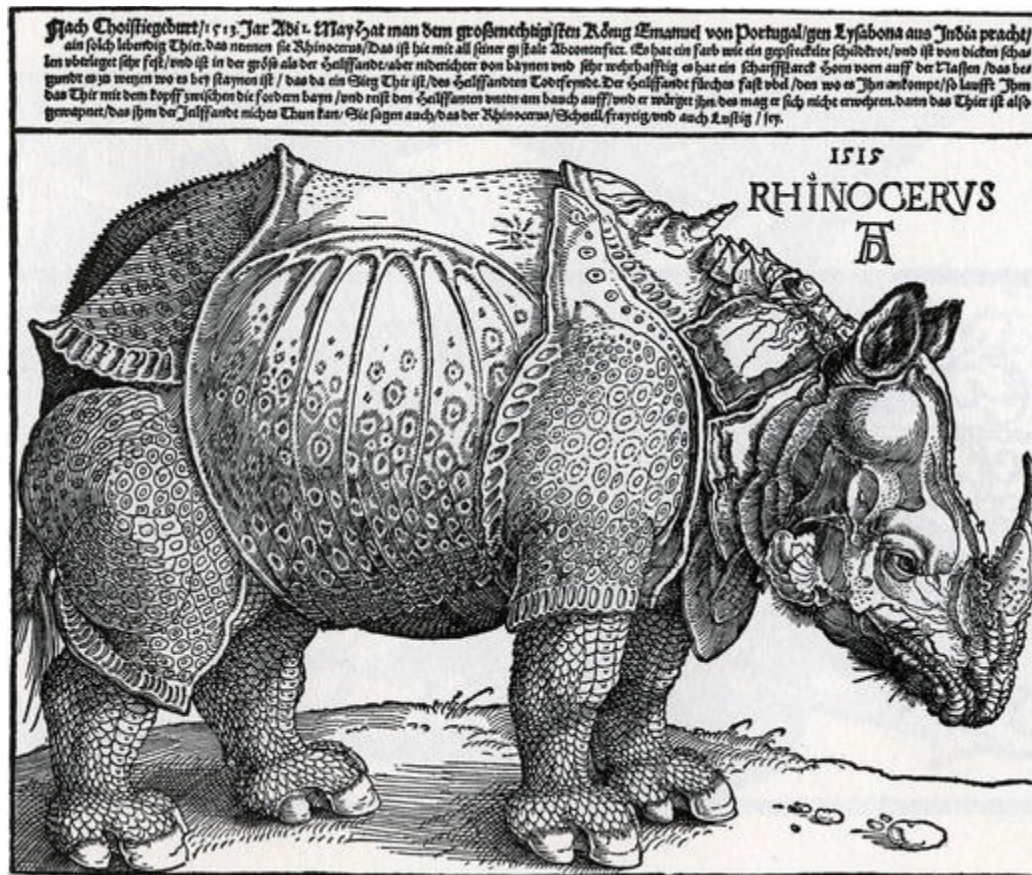
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Bare Bones

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The Rhinoceros and the Megatherium: An Essay in Natural History by [Juan Pimentel](#), translated by [Peter Mason](#)
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What does a rhinoceros look like? If you are fortunate enough to have seen one in the flesh, you can summon up an image from memory. If you haven't seen one, you will have to conjure a mental image from pictures seen in books or in nature documentaries. There's at least a chance that in forming this image your imagination will have tapped into a picture that is more than five hundred years old – Albrecht Dürer's woodcut of the outlandish pachyderm, made in 1515. Dürer himself never saw a rhino. He too had to imagine the beast, so your imaginings might have something to do with his imaginings, which 'bodied forth the forms of things unknown', giving them a shape, a name and a durable engraved image.



Now imagine an animal called the *Megatherium*. Unless you're a biologist of the right sort, that's going to be harder. In all likelihood, you'll never have seen, or even heard of, such a creature. There is no well-known Dürer-like representation of it circulating in the culture and there are no living examples to see moving about. So you'll probably have no idea what kind of thing a *Megatherium* is, or what it might look like. Neither did anyone else before the end of the 18th century. That's when the *Megatherium* first surfaced. What came up out of the ground in a gully near Buenos Aires was a jumble of fossilised bits and pieces that puzzled local naturalists. If you do have a sense of what a *Megatherium* looks like, it will be because you have seen an artful assemblage of its fossil bones, a model or an artist's impression. With a rhino, you can in principle check your imagination against the real thing; with the *Megatherium*, it's imagination all the way down.

The difference between the two cases is this: no rhino was available to be seen in Europe in the early 16th century, but very many Europeans had expectations of rhino reality. At the end of the 18th century, the public hadn't seen a *Megatherium* either, but they had no conception at all of what that animal was like. Only a very few were in a position to imagine it into being, and among those few there were arguments about what, indeed, it had been when it roamed the earth.

Juan Pimentel's purpose in juxtaposing stories about these two animals that were 'imagined without being seen' isn't immediately obvious. The episodes were separated in time by almost three hundred years; the Renaissance rhino and the late Enlightenment *Megatherium*

belonged to radically different cultural contexts; different sorts of people and institutions were involved in representing them; and the ways they were imagined and the imaging techniques used to represent them were different too. Pimentel knows he 'runs the risk of creating remote analogies', but that doesn't bother him. He means to play with us, seeking to stir our imaginations in such a way that we come to recognise the role of imagination 'in all forms of representation and knowledge'.

Imagination has pride of place in appreciations of art, music and literature, but only a marginal role in the academic understanding of science. Scientists do occasionally endorse the role of imagination in generating ideas. 'Imagination is more important than knowledge,' Einstein said. 'For knowledge is limited, whereas imagination embraces the entire world, stimulating progress, giving birth to evolution.' 'When a man desires ardently to know the truth,' the pragmatist Charles Sanders Peirce wrote at the close of the 19th century, 'his first effort will be to imagine what that truth can be ... It is not too much to say that next after the passion to learn there is no quality so indispensable to the successful prosecution of science as imagination.' And historians of science have written books and essays about the 'scientific imagination'. But philosophers, in general less concerned with the chaos of 'discovery' than with the formal processes of 'justification', have tended to dismiss or downplay scientific imagination – too undisciplined, too suggestible, too vulnerable to the personal and the emotional. Or they have domesticated imagination through the more manageable notion of 'theory-laden observation'. Pimentel doesn't have much to say about this sort of philosophical commentary, but one of the strengths of his book is the attention it gives to the relationship between imagination and images – pictures of things seen and then made available to those who have not seen. If imagination is the capacity to form mental images, then the mental residues left by physical images powerfully connect seeing with imagining.

Start with the rhinoceros. Early 16th-century Europeans knew that rhinos existed in the past, and they had reliable testimony that they still existed in Africa and Asia. Trusted Roman sources told them about rhinos, describing – though not, of course, picturing – their physical characteristics and some of the ways they behaved. The *Natural History* of Pliny the Elder (23-79 CE) gave an account of the rhino alongside its fellow pachyderm the elephant, the latter favoured among beasts as 'the largest and the closest to human sensibility', intelligent, good and endowed with religious feeling – as Pimentel says, 'a blessed animal'. The earlier Greek geographer Strabo (c.63 BCE-c.24 CE), who may have seen a rhino in Egypt, offered a physical description: it had a single horn ('rhinoceros' from the Greek ῥινόκερος: nose + horn); it was smaller than an elephant; it bore some resemblance to a wild boar; and it had a welted hide very like heavy metal armour. Elephants and rhinos, the ancients agreed, were blood enemies: they naturally fought each other, and a star turn in Roman games was a spectacular cage-fight between the two, the rhino sharpening its horn on rocks and going viciously for the elephant's soft underbelly in an attempt to rip out its guts. (The elephant was

the clear crowd favourite.)

The rhino that Dürer imagined into being bears the trace of these ancient sources, but the immediate occasion for the engraving was the first arrival of a rhino in Europe for almost 1500 years. It came from India and was a present. What to give the man who has everything? In the Renaissance, you might give him jewels or silks or spices or valuable paintings or religious relics, but best of all were rare living animals – leopards, giraffes, camels, and especially pachyderms. These were exotic gifts from the exotic East, already imagined but scarcely ever seen. It was hard to know how to evaluate such gifts, but part of the extravagance of presenting someone with an alien living beast was that, unlike a fine sculpture or a diamond, it *didn't* last for ever. The ponderous pachyderm in a cage represented the labour of many people in capturing it, transporting it and keeping it alive, yet it could be enjoyed only for a period of years. The Renaissance was, as Pimentel reminds us, a 'gift economy', and there were few gifts as magnificent as a rhino.

In 1515, the gift-rhino was a present from a Gujarati sultan to the Portuguese colonial governor; it was sent along with a chest-full of precious baubles to the king of Portugal. As with many gifts, there was a diffuse expectation of reciprocity – in this case, the hope that the gesture might forestall a disastrous war with the European power. The rhino was loaded in chains onto a Portuguese ship in Goa and delivered to King Manuel I, who had two bright ideas. The first was to organise a duel in Lisbon between the rhino and an already captive elephant. (Witnesses say the elephant ran away.) The second was, some months after the duel, to re-gift the rhino – then, Pimentel says, 'one of the most valuable objects in the world' – to the Medici pope, Leo X, in the hope that, together with other luxuries, this astonishing gift would help smooth the path to papal bulls legitimising the boundaries of the Portuguese empire. Continuing its role in Renaissance realpolitik, the rhino took ship again. But it never got to Rome. In January 1516, the vessel bearing it was caught up in a storm off the Ligurian coast and sank, with the loss of many hands and one horn.

The rhino died, but it had already been immortalised. A Moravian witness to the Lisbon match with the elephant had sent an account to one of Dürer's German friends, accompanying it with a drawing, now lost. The letter and drawing formed the basis for Dürer's own sketch and the celebrated woodcut. The Moravian's description of what he saw had been shaped by the Roman sources and so in turn was Dürer's representation – the end-product of a historical cascade of imaginings, images, words and witnessings. Dürer's stunning image is, as we would now say, incorrect in many respects: a second horn protrudes from the rhino's back; its hide resembles chain-mail armour; its legs are covered in reptilian scales; the upper plate of its hindquarters is serrated like a bread knife. Dürer's engraving, Pimentel writes, is 'a chimerical rhinoceros ... halfway between fact and fiction, an image from a sample book of imaginary zoology', the sort of monster-wonder you'd expect from the East. (Though there are, it should be said, imaginary beasts far less fantastical than a real

rhino.) Above the rhino, Dürer placed a verbal description in German, glossing image with words. It closely followed Pliny: 'This animal is the deadly enemy of the elephant.'

It was this imagined rhino that was copied and copied again, mechanically reproduced and continually modified over time. Forty-five thousand copies were made in Dürer's lifetime alone, and by now the images must number in the millions, even before we get to the innumerable digital herds roaming the Cloud. (You can buy Dürer-rhino coffee mugs and T-shirts online.) The horned beast from the East, a gift fit for kings and popes, was, already in the 16th century, a wall-tchotchke the masses could afford. It belongs to the class of images, Pimentel notes, that 'fashion rather than reflect the world, its phenomena, or its forms', though he might more forcefully have said that its reflection of rhino-reality did much to fashion perception.

Dürer's rhino belonged to the world of art, though it lived on to influence late 18th-century scientific images of the animal. But the image of the *Megatherium* was always a scientific object. There were no ancient literary sources saying what it was like, no folkloric or contemporary testimony. The *Megatherium* had to be imagined into being by reconstruction from the bones that surfaced in Argentina in 1787. First, they had to be recognised as bones, and as objects worthy of scientific attention; they were sketched roughly in situ; then carefully packed up, sent off to Buenos Aires, sketched again, packed in seven boxes, and shipped to Spain, whose Royal Cabinet of Natural History in Madrid was then yearning for rarities to equal those in the collections of other European sovereigns. The bones were clearly fossilised, but some thought it possible they belonged to an as yet unknown creature still at large on the pampas. Whatever the animal was, it was evidently an enormous vertebrate, elephant-sized: four and a half metres long and about two metres high, with a sacrum that weighed 175 kilograms. If others of its sort survived, they would be hard to miss, and while the idea of species extinction remained a tough pill for some to swallow, it didn't take long for European experts to be satisfied that the species was no more. It had no name when it emerged from the ground; some years later, it was blandly anointed *Megatherium* – from the Greek μέγας ('big') and θηρίον ('beast') – and its conditions of existence and relationship to other animals, living and dead, had become major issues to be addressed in the research agendas of comparative anatomy and palaeontology.

The 'ensemble of disjointed bones', as one early student put it, had to be made up into a specific sort of animal. The scientific imagination in such cases ran in a reconstructive circle: the fossilised bones were evidence of what the living beast must have been like, but you needed some conception of the living beast to know how best to fit the bones together, to construct a mounted skeleton and a two-dimensional image of the thing, and (if you wanted) to imagine flesh on its bones and how it might have behaved in a natural habitat.



But what in the world was it? Juan Bautista Bru de Ramón, the Madrid museum painter, dissector and taxidermist tasked with making sense of the fossil remains, was at a loss. There was little in the living world, and nothing at all in the historical record, on which he could draw. The thing was, as Pimentel says, an 'impossible animal': 'Bare bones, washed clean of legends and stories ... unprecedented and impossible to classify – naked, mute, silent bones, petrified by time, lacking words, flesh, skin and history. And without history, [it] had no name or identity either.' Bru speculated that the beast might have 'housed all the anger of the elephants, all the fury of the lions, and all the raging of the tigers'. It was another chimera, but one about which – unlike the rhino – there was no human testimony. Working with ordinary tools, wire and glue, and using a selection of living beasts as models, he jerry-rigged the bones into a coherent physical shape – a big cat, perhaps, or some kind of gigantic horse. Some bits implied a carnivorous way of life; others implied the animal was a herbivore. Bru added a mule's skull and ad-libbed a tail. In Pimentel's account, Bru 'sawed, filed and cut various bones, filled many others with cork, placed several of them in the wrong place, added others that did not even exist, and in general altered the anatomy of the big vertebrate to such an extent that he gave it an incorrect posture'.

This colossal dog's breakfast remains on show at the Museo Nacional de Ciencias Naturales in Madrid. In the years immediately following its assembly, around 1789, many people came to gawk at it, but many more saw only the images produced by Bru's engraver, Manuel Navarro, which soon circulated outside Spain. In 1796 it was given the name *Megatherium americanum* – 'the great American beast' – by a young French comparative anatomist, Georges Cuvier, who hadn't seen the mounted skeleton in Madrid. What Cuvier had seen was a copy of the Madrid engravings that depicted both individual bones and Bru's reconstruction of the skeleton. Here was an opportunity to deduce not only the body shape of this sensational beast, but also its way of life and its habitat – and to do so by linking imagination to method.

Cuvier reckoned that an expert comparative anatomist could infer much about the bones that were missing from the structure of those that survived; he thought that bone structure conveyed information about life-function; and he believed that comparative knowledge of structure and function in a range of already known animals licensed expert speculation about as yet unidentified specimens. Osteology, Pimentel says, was for Cuvier 'a game of logic, a practice of forensic science: give me a few bones and I will reconstruct an individual, give it a skin, shape, habits, life.' Cuvier's interpretation of the *Megatherium* was a founding gesture, demonstrating the capacity of scientific skill and imagination to 'burst the limits of time', producing a world we now take for granted, a world in which images of life-forms that no longer exist are just a walk to the museum – or, now, just a mouse click – away.

Scientists eventually came to think that the bones unearthed in Argentina belonged to an extinct species from a group including the armadillo, the ant-eater, the pangolin and the sloth. They identified *Megatherium* as a giant ground sloth, one of the largest land mammals ever to have existed – believed now to have weighed about two and a half tons. Over time, specimens emerged in other parts of the world, notably in the newly independent United States of America, where they figured in cultural and scientific contests between those, such as the French natural historian Buffon, who thought that the cold and wet climate of the New World and its supposed geological youth couldn't have supported creatures of such majestic proportions, and celebrants of the newly discovered lands like the politician and naturalist Thomas Jefferson, who cherished a vision of prehistoric American greatness and were keen to establish that America had indeed once supported giants.

What happened in Madrid had an enduring significance: it was 'the first reconstruction of an entire extinct animal', long before reconstructed dinosaurs, mastodons and sabre-toothed tigers became star specimens in natural history museums around the world. A bunch of bones in Argentina, Bru's reconstruction, Cuvier's interpretations, and generations of palaeontological work made the deep past visible and comprehensible, moving extinct creatures out of fantasy into science and then on to theatre. These days we take the visibility of the deep past for granted – we need to be reminded of the imaginative work needed to

achieve it – and it takes more than bones to move us. The virtual velociraptors of *Jurassic Park* have more appeal than the giant sloths whose reconstruction paved the way. The temporally distant past has become as ordinary as the spatially distant present. For £15 you can buy a stuffed *Megatherium* from the shop at the Natural History Museum in South Kensington – ‘perfect for cuddles and educational playtime’ – and while there is, of course, a stuffed rhinoceros in the collection, there is no soft rhino toy. Museum captions warn of the present danger that the rhino – a victim of unslakable Asian demand for its medically magical horn – may soon join the *Megatherium* in extinction. In that event, imagining will be our only way of knowing either beast.

Vol. 40 No. 5 · 8 March 2018 » [Steven Shapin](#) » Bare Bones
pages 25-26 | 3089 words