Fact and fantasy

The zoology created by our imagination is far outstripped by that of reality.

Sandra Knapp

"I have come to these conclusions by personally leading my pupils on wanderings through the tangled web of nature, in order that I can spur others on to an examination and explanation of nature rather than the reiteration of perceived ideas … I shall take exception to the tales of actors and the barkings of dogs with equal measure." With this dismissive final paragraph, Carolus Linnaeus notified the readers of the sixth edition (1748) of *Systema naturae*, his compendium of life on Earth, that he would no longer be including imaginary beings in his system.

In all the editions of the *Systema* (the first was published in 1735), Linnaeus specified three kingdoms of nature — "stones, which grow", "plants, which grow and live", and "animals, which grow, live and feel". In the earlier editions, however, he also included, floating in limbo and belonging to none of these kingdoms, the Paradoxa — a group including such creatures as the hydra, the fabulous monster known as the manticore and the Automa Mortis, the death-watch beetle.

Linnaeus described each member of the Paradoxa with great care, as if unsure that they did exist. By 1748, however, he had clearly decided that the Paradoxa had to go. They were actors' tales and as meaningless as the barkings of dogs, mere noise in the system, with no place in his carefully observed and documented scheme of life on Earth. He reassigned some of the names used for the Paradoxa to living organisms — 'Pelecanus' became a bird, 'Hydra' a coelenterate and 'Draco' a reptile. Others he made synonymous with real genera — 'Satyrus' (the satyr), for example, was considered a monkey and Rana-Piscis (tadpoles) a type of salamander. Some of the Paradoxa just disappeared without trace, such as the 'Borametz', or 'vegetable lamb'.

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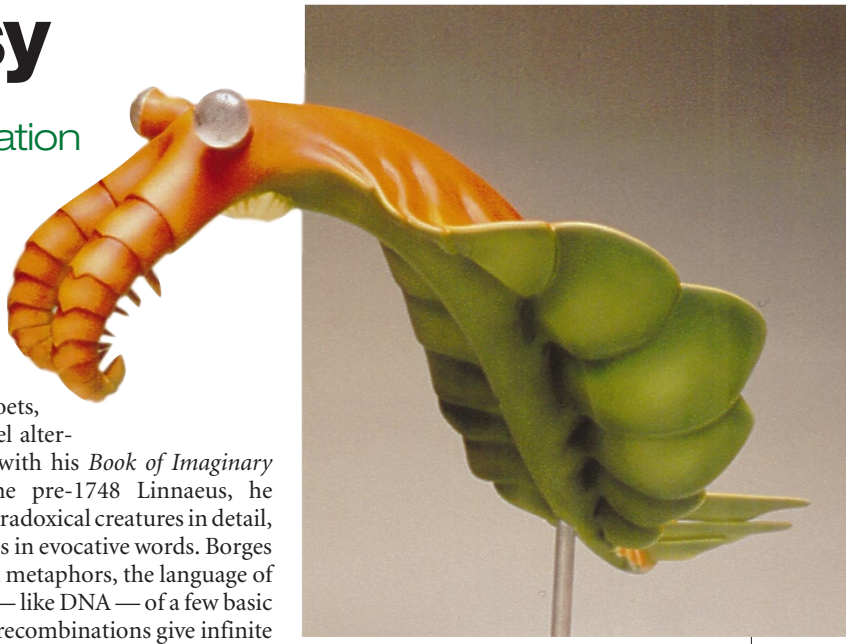

NATURAL HISTORY MUSEUM, LONDON

Strange but true: a model of *Anomalocaris*, based on fossils from the Burgess Shale.

Jorge Luis Borges, one of the most learned and lyrical of twentieth-century authors and poets, created a parallel alternative zoology with his *Book of Imaginary Beings*. Like the pre-1748 Linnaeus, he described the paradoxical creatures in detail, painting pictures in evocative words. Borges maintained that metaphors, the language of poems, consist — like DNA — of a few basic patterns whose recombinations give infinite diversity. Every author's reinvention of the metaphor allows readers to see and feel new things. The imaginary beings of Borges, although sharing a name with those of Linnaeus, free the reader to explore the diversity of the human imagination. Borges, in his introduction, wrote that "anyone looking at the pages of the present handbook will soon find out that the zoology of dreams is far poorer than the zoology of the Maker". At first this seems paradoxical in itself; how can we not imagine a world of beings that is infinite, by "evolv[ing] an endless variety of monsters — combinations of fishes, birds, and reptiles, limited only by our boredom or disgust?" Surely our imagination can devise a world more strange than the one we inhabit.

But Borges was certainly right — the zoology of the imagination is far poorer than that of reality. Who could imagine a plant that flowers under water (*Thalassia*, a sea grass), a phylum of creatures that live only on the 'lips' of lobsters (see *Nature* **378,** 711–714; 1995), or *Anomalocaris* and *Hallucigenia*, the seemingly impossible Precambrian creatures of the Burgess Shale? Evolution and natural selection, the forces that shape diversity in nature, are far more potent engines for innovation than even the most fertile human imagination.

Our imagination is limited perhaps by the nature of language — by words themselves. In a series of lectures Borges gave at Harvard University in the late 1960s and which have recently been edited from long-lost tape recordings (*This Craft of Verse*), he contends that words themselves are not one-for-one symbols for abstract thoughts; they are, in fact, deeply rooted in the concrete, and they evolve. A not surprising notion, perhaps; but, taken in conjunction with his idea that "a nation evolves the words it needs … language comes from the fields, the sea, from rivers, from night, from the dawn", it reveals how science and poetry, often thought to be uneasy bedfellows, have a similar basis in empirical observation.

The vocabulary of science is also firmly rooted in the concrete — in observation and careful documentation of structure and events. Linnaeus excluded the Paradoxa from his kingdoms of nature because he had no concrete evidence of their existence. These 'imaginary beings' are metaphors — reinventions and recombinations of existing organisms. The 'real beings' of nature must be described to even begin to be understood. Both poets and scientists choose words with precision. But in describing the diversity of nature, scientists create new words — a new vocabulary of meanings for concrete objects — for that which exists but is outside our imagination. In so doing, they provide the words with which poets fashion dreams. ■

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FURTHER READING

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