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1. [Conscious creatures](#)

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## Conscious creatures

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## NewScientist

**Section:** CULTURE; Review; Pg. 30; Vol. 255; No. 3400; ISSN: 0262 4079

**Length:** 677 words

**Byline:** Simon Ings

**Simon Ings** is a writer based in London

**Highlight:** Evidence that some animals dream helps to make the case that they have a sense of self, of "animalhood", finds Simon Ings

## Body

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### Book

[\*When Animals Dream\*](#) David Peña-Guzmán Princeton University Press

HEIDI the octopus is dreaming. As she sleeps, her skin changes from smooth and white to flashing yellow and orange, then to deepest purple and, finally, to a series of greys and yellows, criss-crossed by ridges and spiky horns.

David Scheel, Heidi's human carer, has seen this pattern before in waking octopuses: Heidi, he says, is dreaming of catching and eating a crab.

The story of Heidi's dream, told in the 2019 documentary [Octopus: Making contact](#), provides the starting point for a barnstorming new book, *When Animals Dream: The hidden world of animal consciousness* by David **Peña-Guzmán**.

A philosopher at San Francisco State University, **Peña-Guzmán** delivers an intellectual tour de force as he explores the extraordinary world of non-human imaginations.

The Roman philosopher-poet Lucretius thought that animals dreamed. So did Charles Darwin. The idea only lost respectability for about a century, roughly between 1880 to 1980, when the reflex was king and behaviourism ruled the psychology labs.

In the classical conditioning model developed by [Ivan Pavlov](#), it is possible to argue that trained salivation at the sound of a bell is just a reflex. Later studies relied on a different method, called operant conditioning, in which a rat, say, has its behaviour reinforced either positively or negatively.

But none of these studies ever banished the notion that animals had imaginative interior lives. The experimenter can claim as much as they like that their trained rat is "conditioned", but that rat running through its maze looks for all the world as though it expects something.

## Conscious creatures

In fact, there is no "as though" about it. **Peña-Guzmán**, in a book rich in detail about experimental work, describes how rats, during their exploration of a maze, will [dream up imaginary mazes and imaginary rewards](#) – all of which is revealed by distinctive activity in their brains' hippocampi.

By which paths did dreaming find its way into so many branches of the evolutionary tree?

Evidence that animals have a kind of imagination is intriguing, but what really dragged the study of animal dreaming back into the light was a better understanding of how humans dream.

From the 1950s to the 1970s, dreams were seen as mere random activity in the pons, a part of the brainstem that links the brain to the spinal cord. Now we know that dreaming involves many more brain areas, including the parietal lobes, which are involved in the representation of physical spaces, and the frontal lobes, which are responsible for emotional regulation, among other things.

So which animals dream? **Peña-Guzmán**'s list is long, but includes mice, dogs, belugas, platypuses, ostriches, penguins, chameleons, iguanas, cuttlefish and octopuses. "The jury is still out on crocodiles and turtles," he adds.

While the brain structures of these animals may be nothing like our own, studies of sleeping brains do expose startling commonalities, suggesting, perhaps, that dreaming is a skill upon which many branches of the evolutionary tree have converged.

**Peña-Guzmán** asks big questions. When did [dreaming](#) first emerge and why? By which paths did it find its way into so many branches of the evolutionary tree? And, perhaps the biggest question of all, what do we do with this information?

For him, dreams are morally significant because "they reveal animals to be both carriers and sources of moral value, which is to say, beings who matter and for whom things matter". In short, dreams may imply the existence of some sort of self.

The issue of whether or not that self can think rationally, act voluntarily or talk about its dreams, just like a human, is neither here nor there. The fact is, says **Peña-Guzmán**, animals that dream "have a phenomenally charged experience of the world... [they sense, feel and perceive](#)".

Starting from the tricky assertion that Heidi the octopus dreams of fresh crab suppers, **Peña-Guzmán** assembles strong evidence with which he makes a short, powerful, closely argued case for "animalhood". This book will change minds.

## Classification

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Conscious creatures

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