



Bees in Ibn Butlan's eleventh-century *Maintenance of Health*, published in Italy as the *Tacuinum Sanitatis*.

APICULTURE

# Telling the bees

John Burnside reflects on the role of art and myth in the health of the hive.

Skill, orderliness, productivity and, most of all, industry lie at the heart of bee mythology. Hence, for example, this image in philosopher Bernard de Mandeville's *The Fable of the Bees* (1714):

A Spacious Hive well stockt with Bees,  
That liv'd in Luxury and Ease;  
And yet as fam'd for Laws and Arms,  
As yielding large and early Swarms;  
Was counted the great Nursery  
Of Sciences and Industry.

As the Industrial Revolution unfolded, this anthropomorphic and mechanistic view of bees as little machines of honey production came to obscure their importance as the means through which more than 30% of our food crops and 90% of the world's wild flora survive. "Every third bite of food you take, you can thank a bee or other pollinator for," as biologist E. O. Wilson, doyen of the social insect, notes in his introduction to Stephen Buchmann and Gary Nabhan's *The Forgotten Pollinators* (Island, 2012).

For almost as long as humans have cultivated the land, we have kept honeybees (*Apis mellifera*). The ancient Egyptians used honey

in their rites for the dead; the Bible, the Hindu Vedas and the Koran all make reference to the healing qualities of honey. Today we are faced with widespread colony collapse disorder, in which commercial hives die off within weeks. According to one survey, "between 0.75 and 1.00 million honey bee colonies are estimated to have died" in the United States over the winter of 2007–08 alone (D. vanEngelsdorp *et al. PLoS ONE* 3, e4071; 2008); that is, 30–40% of the total. Suggested culprits range from climate change to the varroa mite — which transmits deformed wing virus, among other conditions — and pesticides such as neonicotinoids (see *Nature* 520, 416; 2015).

The causes are not yet clear, but in my view the myth of the indefatigable honeybee has played a part. What is happening serves to highlight how dangerous our stories about other animals can be, if they warp our understanding of the animals' real nature and needs.

In *La Vie des Abeilles* (*The Life of Bees*, 1901), Belgian playwright and nature writer Maurice Maeterlinck tells how apiculture saw a revolution in capacity and production with Venetian

officer Francesco de Hruschka's invention of the centrifugal honey extractor in 1865. Humans, Maeterlinck notes, became "furtive" masters of the insects: "For the destiny once imposed by the seasons he has substituted his will ... He will five or six times in succession deprive the bees of the fruit of their labour."

Even Maeterlinck, with his inflated regard for the human will, did not foresee the management regimes that are now common in industrialized honey production. Bees are consistently deprived of the fruit of their labour, routinely being given corn syrup in place of their honey. Yet research indicates that a key ingredient in the bee's natural diet is *p*-coumaric acid, a compound that triggers the expression of detoxification genes and is present in honey, but not in corn syrup (W. Mao *et al. Proc. Natl Acad. Sci. USA* 110, 8842–8846; 2013). Another crucial factor might be propolis, a sticky substance that bees gather from sap, and a known modulator of their immune systems. The hive is not only a residence and honey factory; it is a sophisticated regulatory system for its busy denizens.

Alert to the plight of pollinators, writers and artists have begun retelling the bee's story. Composer Kelvin Thomson and entomologist Mark Brown, for instance, premiered their one-act opera *The Silence of the Bees* in 2013. Some poets have taken their cue from Henry David Thoreau's observation that the keeping of bees is "like directing the sunbeams" — good practice should be a matter of "very slight interference".

We need these new stories: as long as the old myth of inexhaustible productivity dominates popular thinking and commercial practice, we risk continuing destructive regimes. One of the ways in which poets, for example, have restored the idea of slight interference has been to recall beekeeping practices that once helped to maintain the hive's well-being.

One was the ancient folk tradition of 'telling the bees' about important events, including when their keeper died. This observance elegantly reinforced the sense that bees were not just a resource, but integral to human communities. US poet John Greenleaf Whittier was already writing about such rituals in 1858; the speaker of Jo Shapcott's 'I tell the bees' (2010) enacts a new version of the rite, as an abandoned woman takes over the hives left behind by her lover:

I went outside when the sun rose, whistling  
to call them out as I walked towards the hive.  
I pressed my cheek against the wood, opened  
my synapses to bee hum, I could smell bee  
hum.  
'It's over, honies,' I whispered, 'and now  
you're mine.'

Sean Borodale's lyric chronicle of his first year as a beekeeper, *Bee Journal* ▶

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▶ (Jonathan Cape, 2012) goes for close day-to-day observation, in poems “written at the hive wearing a veil and gloves” that express a wonderfully detailed and subtle appreciation of honeybee life:

How bees touch and re-align their touch.  
Light migration;  
noise of a body in continual repair

This is one vital function of art in our lives: it restores our sense of wonder, and so increases our respect for other life forms. Yet writers and artists can also actively contribute new knowledge. One example of this is the work of visual artist Amy Shelton, whose engagement with bees and beekeeping over a number of years led her to set up the *Honeyscribe* project in 2011.

In ancient Egypt, ‘honeyscribes’ recorded the productivity of the hives. Shelton goes further, charting in multimedia artworks threats to honeybee health and reflections on the species’ behaviour. Her project, she writes, “emphasizes communication, diversity and collaboration” in our shared environment. “The beehive reflects the flora, the temperature and the pesticides present in the environment within which it is situated, amalgamating these things into one vastly complicated self-regulating organism” (see [www.amyshelton.co.uk/art\\_works](http://www.amyshelton.co.uk/art_works)).

I was fortunate to collaborate with Shelton on the artist’s book *Melissographia*, which sets a series of poems drawing on Maeterlinck’s study alongside embossed, hand-painted pollen maps. These, as Shelton puts it, reference “a selection of seasonal pollen loads collected by the honeybee from single plant species” and “tiny botanical samples of flowers collected over the apiarist’s calendar year, which are important to sustaining the health of the honeybee”.

Besides making her own extraordinary, often moving pieces, Shelton aims to foster a dialogue on bees between apiarists, scientists, writers and artists, children and the public by means of art, workshops and events. Hopefully, through this and other projects, we will continue to create less-mechanistic stories about *A. mellifera*. In so doing, we will evolve better practices in our dealings with a creature that is essential to our agriculture and our culture. ■ [SEE NEWS & VIEWS P.38](#)

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The 40,000-year-old ‘Lyuba’ is one of the best-preserved woolly mammoths ever found.

#### DE-EXTINCTION

## A behemoth revived

Henry Nicholls examines a clear appraisal of what it would really take to resurrect extinct species.

A hazard of studying an extinct charismatic species such as the woolly mammoth is that you spend a lot of time answering the same question: “Is it possible to clone it?” For evolutionary molecular biologist Beth Shapiro, who has a long-standing interest in both ancient DNA and mammoths, the solution was to write a book.

In *How to Clone a Mammoth*, Shapiro has an alluringly simple goal: “to provide a road-map for de-extinction” in a single volume “that separates science from science fiction”. She begins by considering which species might be targeted for de-extinction, anticipating many of the difficulties to come. The poor preservation of dodo remains, for instance, means that any DNA fragments recovered are unlikely to give a clear idea of its genome. The moa, a giant flightless bird from New Zealand, is probably out on the basis that its closest living relative (the tinamou) is not close enough to assist in assembling its DNA. Steller’s sea cow (*Hydrodamalis gigas*) has no living surrogate that could accommodate a cloned fetus, and the natural habitat of the Yangtze River dolphin (*Lipotes vexillifer*; widely thought to be extinct) is currently too polluted to receive the cetaceans.

Shapiro contends that the focus on individual species is misguided. “De-extinction



**How to Clone a Mammoth: The Science of De-Extinction**  
BETH SHAPIRO  
Princeton Univ. Press:  
2015.

has a place in our scientific future, but not as an antidote to extinctions that have already occurred,” she writes. Engineering extinct traits into living organisms, however, could help those organisms to adapt to environmental shifts, and could re-establish ecological interactions that disappear when a species goes extinct. In

Shapiro’s view, this is

the real value of de-extinction technology. Yet the little that we currently understand about the operation of bygone genes means that her argument is necessarily vague on detail.

Targeting the woolly mammoth (*Mammuthus primigenius*), a keystone species of the steppe-tundra during the last glacial period (from roughly 110,000 to around 12,000 years ago), Shapiro begins the journey towards de-extinction, and hunts for a well-preserved specimen. One bizarre expedition to Siberia ends with the juxtaposition of armed nomadic reindeer herders and a French couple with a cooler box filled with cheese. But