

# Edge

*To arrive at the edge of the world's knowledge, seek out the most complex and sophisticated minds, put them in a room together, and have them ask each other the questions they are asking themselves.*

<http://edge.org/response-detail/23806>

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### Close Observation And Description

Take a potato from a bag of potatoes. Look at it closely. Yes, that's right, you really have to do this exercise. Now put it back with the other potatoes, mix them up and see if you can find it again. Easy? Now try this with oranges. Still easy? Now recruit a friend, and describe, draw or even photograph the potato in enough detail for them to pick it out. Or the orange.

There is a weed with a pink flower growing in my flower border, and something very similar with a yellow flower growing in the wall. These are fumitory (*Fumaria officinalis*) and corydalis (*Pseudofumaria lutea*), wild flowers of the poppy family, and yes, the field guide tells me former is commonly found in cultivated ground, and the latter in limestone walls. To identify exactly which of the 12 or so UK fumitories I am holding in my hand requires me to consider the precise descriptive language of botany, and count and measure inflorescences, peduncles and sepals. The field guide helpfully provides hand drawn coloured illustrations, black and white diagrams of flower parts, and a backwards look-up key ("If the inflorescence is shorter than the peduncle and ... then it is a ... ") to supplement the textual descriptions.

Once upon a time such observation, description and illustration was the bread and butter of professional and amateur scientists. My eight volume flora, on heavy paper with lovely illustrations that are now collectors' items, was well-thumbed by the original owner, a nineteenth century lady of leisure. It claims to be written for the "unscientific", but the content differs from a modern flora only by the inclusion of quantities of folklore, anecdotes and literary references.

Darwin's books and letters are full of careful descriptions. The amateur struggling with a field guide may take comfort reading how he frets over the difference between a stem with two leaves and a leaf with two leaflets. Darwin seems to have had a soft spot for fumitories, giving wonderfully detailed descriptions of the different varieties, whether and under what conditions they attracted insects, and how the geometry and flexibility of the different parts

of the flower affected how pollen was carried off by visiting bees. He was looking for mechanisms that ensured evolutionary variability by making it likely that bees would occasionally transfer pollen from one flower to another, giving rise to occasional crosses—analysis later reflected in the Origin of Species.

Shakespeare and his audiences not only knew their weeds, they knew their habitats too, and the difference between arable land and permanent pasture. In Henry V we hear how wartime neglect has changed the countryside, so that arable land left fallow has been taken over by dandelion, hemlock and fumitory, and in the un-mown meadows, "hateful docks, rough thistles, kecksies and burs" have replaced cowslip, burnet and clover. Gardeners everywhere will sympathise.

Google can give a happy hour or so tracking down references to fumitory: online data sources allow the capture and analysis of images, sightings and geographic and other data in a way never before possible, informing the creation and testing of broader scientific hypotheses. But the analysis is only as good as the input provided—citizen science projects founder if the citizens are unable to do more than record a "pink flower" and a blurred mobile phone image. No amount of image analysis or data mining can yet take the place of the attention and precision practiced by Darwin and thousands of other professional and amateur naturalists and ecologists.

So let's hear it for observation and description. Fumitory and corydalis may be for the advanced class. Start with the potato.

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