We are highly adaptable. We have been for the past few million years, and continue to be so on a daily basis. Whichever way you look at it, the art of adaptation really is just a way of preserving your integrity – physical or psychological – and coping the best way possible with the environment you are evolving in. Throughout the animal world and over the aeons, the capacity to adapt has always been Nature’s answer to predators and hostile physical, geographical or climatic conditions. In short, adaptation is the best way to survive and Charles Darwin was the first to explain animal diversity in this way in his Origin of Species. Ever since, the study of fossils or more recently genomes is a constant support to Darwin’s theory of what was then coined ‘natural selection’. But it all remained very theoretical; it is difficult to observe animal adaptation within a man’s lifetime when it occurs over thousands or even hundreds of years. However, there is a moth in Great Britain, known as the Peppered Moth which, over a relatively short period of time, adapted to the effects of pollution resulting from the Industrial Revolution by changing the colour of its body and wings. The protein involved in this change was recently discovered and named ‘the cortex protein’.

Title taken from Leonard Cohen’s latest album, “You Want It Darker”

By the early 20th century, air pollution caused by the Industrial Revolution had begun to hit parts of Europe and, in particular, parts of Great Britain quite hard. Following decades of manufacturing, soot had settled on buildings, walls, fences and trees and gradually painted towns and the nearby countryside a dull grey. Needless to say, it had a profound effect on plant and animal life living close to industrial centres. During this period, amateur naturalists and moth collectors couldn’t help but notice that a moth known as *Biston betularia*, or more commonly the peppered moth, was changing colour: the original black-speckled white moth was gradually becoming only black. It wasn’t due to the deposit of soot on their wings, but seemed to be an actual modification in the colour of their wings and bodies. The phenomenon was termed ‘industrial melanism’ to describe the blackening of the moths’ colour – as opposed to melanochroism which is the darkening of any given colour. Many theories attempting to explain the process emerged, while in the wake of Charles Darwin’s Origin of Species published in 1859, evolutionists saw the change as an example of natural selection taking place before their very eyes. For camouflage purposes, the peppered moths were slowly adopting a darker colour, less conspicuous when resting against the bark of a tree or on a soot-darkened wall. However, their theory needed evidence.

The English entomologist J.W.Tutt (1858-1911) was one of the first to describe the colour change in peppered moths. He saw it as a form of crypsis, i.e. an animal’s ability to make itself discreet – invisible to predators for instance – by means of camouflage or mimicry. The normally occurring light-coloured lichen on trees was gradually being killed off by soot and leaving the bark of trees, bare and dark. In the presence of predators, the original peppered moth would have been very visible on such a surface, while the all black version – named *carbonaria* today – would be unnoticed. In the 1950s, the British geneticist and lepidopterist H.B.D. Kettlewell (1907-1979) carried out a few elegant investigations which
protein cortex, Biston betularia (peppered moth) : P0DOC0

References
