

DEVELOPMENTAL TWISTS

The Pond

Tsuku Mogami

I should have arrived by now. But where was it? No sign of water, let alone Salamandra Creek. Perhaps I'd better retrace my steps? No, my friends would be merciless: "Shortcut, eh? You mean 'short' as in where the f... am I?" Their smugness would be unbearable.

I looked up to see someone ambling towards me. He had white spherical eggs strapped to his thighs.

"Are you lost?" he asked.

"What me? No, not at all."

"Only you looked a little confused... Wait a minute, don't I know you from somewhere?"

"I don't think we've met."

"Yes of course, the Kammerer affair! Our relatives were both involved, weren't they?"

Having always had a passion for the history of science, I knew all about it. Paul Kammerer was a notorious developmental geneticist from the 1900s, proponent of the inheritance of acquired characteristics. He claimed my relatives developed yellow stripes when raised on yellow soil, black stripes on black soil, and then passed the trait on to their children. Same with my egg-laden companion: his relatives developed dark pads for grasping females when raised in water and passed that on. But Mendelians were sceptical of Kammerer's results. In 1926, the dark-coloured pads of one of his specimens was shown to have been caused by injection of black ink. Kammerer was proclaimed a fraud. He protested his innocence and blamed an assistant. He shot himself six weeks later.

The matter seemed closed until 45 years on, when Arthur Koestler published *The Case of the Midwife Toad*. According to Koestler, Kammerer was the innocent victim of bigoted Mendelians: the ink couldn't have been injected by Kammerer, a decent fellow, but must have been the work of a jealous colleague. If anything, Mendel was the fraud, not Kammerer. His pea-breeding results were too close to his predicted ratios: 'Mendel's statistics in that classic paper were faked'.

Koestler's book became a best seller. Then in 2009, 38 years later, it inspired evo-devo investigator Alexander Vargas to rehabilitate Kammerer as a misunderstood pioneer of epigenetic inheritance: 'Rather than committing fraud, it seems that Kammerer had the misfortune of stumbling upon non-Mendelian inheritance at a time in which Mendelian genetics itself was just becoming well accepted.'

Having followed the story with considerable interest, I was curious to know what my companion made of it: "So, who do you think was the fraud?"

He rearranged his eggs before answering. "Let me tell you about a curious pond where pure objectivity lies at the surface. Its inhabitants try to swim near the top but sometimes sink a little through sloppiness, cutting corners, selecting their best results, or ignoring those that don't fit. Critique from themselves or their colleagues helps keep them afloat. But a few individuals, hooked on glory, find their eyes adapt to the fading light as they sink. It is their ignorant critics who can't see, not them. Their eyes continually adjust to the growing dimness as pride drags them deeper. The deeper they go, the harder it is to rise back up. Finally, the weeds of delusion wrap round their legs."

"But critics can be wrong, can't they, or have sunk themselves?"

"Yes, you need to exercise judgement. Being open minded and self-questioning helps."

"So, which one sank: Mendel or Kammerer?"

"After Mendel published his paper on peas, Carl Nägeli, a leading botanical authority, was heavily critical and encouraged him to repeat his experiments with hawkweeds. Mendel bred hawkweeds for five years but failed to replicate what he'd found with peas and became disheartened. Turns out hawkweeds are unusual in reproducing by apomixis, so he had no chance. Mendel may have dipped down, but he never lost sight of the pond's surface, though his critic, Nägeli, could have benefited from being more open minded. Kammerer, by contrast, found his theories confirmed wherever he looked, even though others failed to replicate his findings. His numerous disbelieving critics were narrow-minded fools. The implications of his revolutionary findings were clear: human heredity was not fixed but could be improved by education and better living conditions."

"But if Kammerer was deluded, why did Koestler defend him? Koestler had nothing to gain."

"Seven years before Koestler wrote his best seller, Nobel Prize-winning biologist Peter Medawar published a scathing review of his previous book *The Act of Creation*. Maybe Koestler saw Kammerer as a kindred spirit, a fellow visionary unfairly savaged by the scientific establishment. It's hard for any of us to stay near the pond's surface, particularly when on the receiving end of fierce criticism. The main thing is to stop yourself from sinking before it's too late... Look it's been wonderful meeting you, but I really must be getting on. Are you sure I can't help?"

"Actually, I am a little lost. Do you happen to know the way to Salamandra Creek?"

"Sure. I'm heading that way myself."

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