To Flea, or not to Flea:

The Curious History of Flea Circuses

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Step right up and stay to learn about the strange history of these famous insect performers! Flea circuses found their origins back in the 16th century, at a time when watchmakers and blacksmiths took to making miniature sculptures[1]. In order to demonstrate their skills they made intricate metal designs, such as functioning locks, weighing 'but one grain of gold' (c. 65 mg)[2]. Human fleas (*Pulex irritans*) were chosen to show off these lightweight works of art, being attached to them with tiny harnesses - as they lifted them off the ground with ease. This set in motion a domino effect, and several centuries later, in the early 1800s, Louis Bertolotto became one of the first and biggest names in the flea circus world. Yet, to many of us living in the 21st century, flea circuses are but a distant memory, merely a fairy tale hinted at in modern media. So – what happened?

I hope that I shall never see
A poem as ugly as a flea

- Savino, n.d.

To fully understand this mysterious rise and fall, it is important to question why, out of all the millions of insects, the human flea was chosen as star of the show. They don't exactly have the most charismatic appearance and have been considered a nuisance for thousands of years[3]. Furthermore, in the 19th century they were retrospectively blamed for the spread of the Black Death; a 14th-century outbreak of the bubonic plague (caused by bacterium *Yersinia pestis*) that ultimately led to the death of more than 200 million people. However, this has since been contested and researchers are now pointing the finger at alternative explanations[4,5].

The first - and most straightforward reason - was ease of access. *P. irritans*, aptly referred to as the human flea, lives in intimate proximity to humans and their settlements. Mere centuries ago they were one of the most common household pests across the globe[5]. It was therefore easy for the circus ringleaders, or flea professors as they preferred to be called, to maintain a steady stream of new performers. Yet, the human flea was chosen out of more than just convenience.

They have a trick of their small sleeve that makes them the ideal circus performer: the ability to jump up to 38 times their body size in only 1/1000th of a second[2]. They evolved this ability in order to access hosts to feed on their blood and to avoid predation, as they are wingless and thus lack the ability to fly. Unlike lice (small wingless insects that spend their entire life cycle on a host), fleas only attach to their host during feeding, after which they jump off[6,7].

For decades the strength possessed by these small beasts puzzled researchers, as jumping fleas seemed to exert a force more powerful than their muscles alone should allow them to. The secret was found to be a rubber-like protein called resilin, which is capable of bending and storing great amounts of energy[8]. In fleas, resilin is stored in their large hindlegs. When this great burst of energy is released, the flea is catapulted forwards – allowing them to glide through the air like true acrobats. It furthermore allowed them to push, pull, and drag objects numerous times their body size in order to amuse the circus-loving masses.

The supporters of the women's rights movement will be delighted to know, that my performing troupe all consists of female (fleas), as I have found the males utterly worthless, excessively mulish, and altogether disinclined to work.

- Bertolotto, n.d.

Alas, nothing lasts forever, and there is a rather simple reason behind the disappearance of this fantastical form of entertainment. The flea circus craze reached its peak in the early 20th century, as the traveling shows featuring fleas performing various tricks and stunts had taken Europe and the United States by storm. But the post-WWII widespread distribution of the vacuum cleaner led to an increase in hygienic conditions in people's homes, resulting in a rapid decline of human flea populations.

"*So*," you wonder, "*why not just use a different type of flea*?". After all, there is more than one species of flea, around 2500 worldwide, in fact. As it turns out , they tried exactly that, but found that other species (such as the cat and dog flea) lacked the strength needed to pull forth the circus contraptions[9]. And thus, the art of the flea circus slowly died out. With its final breath, it spread the popularity of the 'fake flea circus'. Instead of real, live fleas, small magnets or mechanics (sometimes containing dead fleas for added realism) were used to simulate the experience. The few remaining shows that were still using live fleas were accused of faking the acts, spreading the idea that *real* flea circuses must have been nothing but a popular myth.

Throughout the decades that followed, this is what people started to think the flea circus shows had been all along – nothing but a facade. But, for those who know and understand their complicated story, Furgurson[2] did an excellent job at summarising the curious truth:

"In the beginning, there were fleas."

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