

EATING INSECTS



You may have seen chocolate-covered ants in a joke shop, you may even have eaten a bug or two without realising it, but did you know that insects have been a source of food for humans for tens of thousands of years? In the developed world eating insects is rare. We rely on farmed meats such as chicken, lamb and beef, but insects remain a popular food in many developing regions of Central and South America, Africa, and Asia. People from Thailand, Vietnam, Cambodia,

China, Africa, Mexico, Colombia and New Guinea to name just a few, eat insects for nutritional value as well as for their taste.

Some of the more popular insects eaten around the world are: crickets, grasshoppers, beetles, wasps, ants and caterpillars such as the mopani worm, silkworm and waxworm. Other common choices include scorpions and even tarantulas (yes, that's spiders!)

ENTOMOPHAGY

Entomophagy is the name given to the practice of eating insects, and is quickly becoming a hot topic for scientists concerned with the ever increasing problem of how to feed the world's growing population. Each year, around 70 million people are added to the world's population. If growth continues at this rate, by 2050 the population is expected to reach a jaw dropping 9 billion people. To feed all of these people, we will need to produce almost twice as much food as we currently do. The problem is, we already use 70% of agricultural land to raise livestock

(cows, pigs, sheep, and chickens), oceans are overfished and environments are becoming polluted due to greenhouse gases. Climate change and disease also threaten crop production. With almost 1 billion people already chronically hungry, it's evident we need to become more efficient in reducing food waste and find easier ways to produce food. One possible solution? Insects.

So what's so good about insects? Well, they're a sustainable food source, they're nutritious, and insect farming can provide jobs and income to people living in poor areas.

SUSTAINABILITY

Consuming insects as opposed to livestock is more environmentally friendly as they need significantly less land and water than traditional farm animals, and they also reproduce much more quickly. They also have shorter life spans so they can be grown quickly in large quantities. Another use for insects

could even be as food for other livestock, for example they could replace fishmeal therefore increasing the fish supplies available for humans to eat. Insects also produce a fraction of the environmentally harmful greenhouse gases (such as methane and ammonia) that livestock (such as cattle) produce.



NUTRITION

Despite their small and somewhat crispy appearance, insects actually have a high fat, protein, vitamin, fibre and mineral content often comparable to fish or livestock. House crickets, for example, contain on average 205g per kg of protein; beef contains 256g per kg. Termites are also surprisingly protein rich, one species found in Venezuela is 64% protein (and apparently they taste like mint!) Some insects are even as much as 80% protein by weight.

Insects are also rich in essential amino acids and omega-3 fatty acids. Mealworms contain more unsaturated omega-3 and fatty acids than beef or pork and the same amount as fish.

Some insects are also surprisingly high in iron; locusts contain up to 20mg per 100g of iron and Mopane caterpillars contain a mighty 31mg per 100g; beef contains around 6 mg/100g.

JOBBS

Gathering, rearing, processing and selling insects could offer important livelihood opportunities for poorer individuals living in developing countries. These activities can offer employment and generate cash income through the sale of the produce. It doesn't even require a lot of experience or sophisticated equipment, meaning many individuals can participate in these activities, including women and those living in rural or urban areas that are lacking in available land.

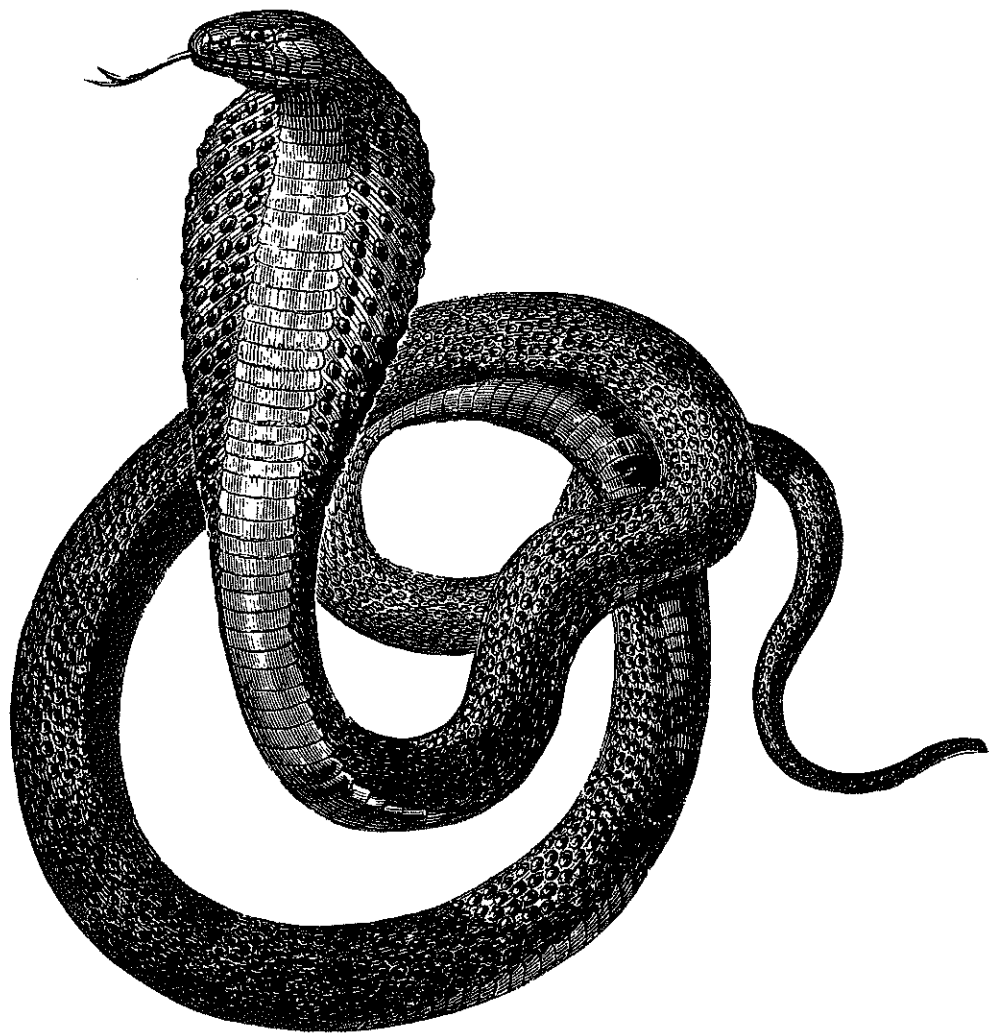
HOW DO THEY TASTE?

Well, like most proteins, they taste better when they have been seasoned, perhaps with a little chilli and lime or barbecue salt. According to National Geographic while stinkbugs may have a foul odour, they actually taste like apples. Red agave worms are, by

all accounts, spicy, and tree worms supposedly taste a bit like pork rind.

If the idea of eating bugs still makes you feel sick, you should probably know that you've already been eating them for years! Much of the food that is grown, harvested and

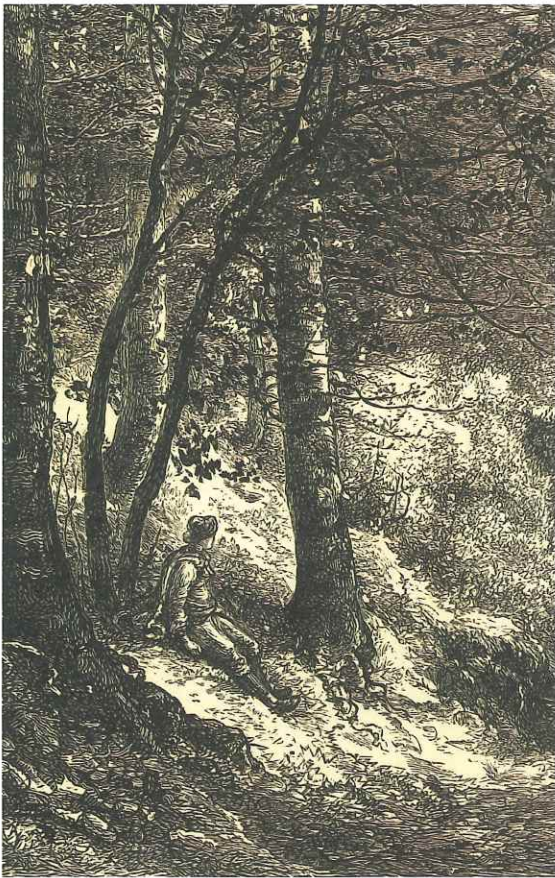
packaged, (despite washing processes) will have a certain number of bugs in it. It would be impossible to check every single fruit that gets turned into juice or canned in a tin. It would simply take too long and cost too much money-not to mention the fact that they are perfectly harmless!



ADVENTURES WITH PIP

The wind whistled past as we turned the corner at the bottom of the field. Pip grew more and more excited as she anticipated the next stretch. She knows I'm going to ask her to go faster as we climb the hill alongside the woodland, up towards the train tracks; I always do. Before I even had a chance to gee her up, she was pulling at the bit. One clicking noise made in the side of my mouth with the sliding of the reins up her neck and we were off, flying at full pelt!

The feeling I get during this moment is always the most exhilarating rush. It's not just about speed; it's about the complete and utter freedom of being alone in the wild. Pip gives me the opportunity to cover distances I could never muster on foot and together we are able to explore some of the most beautiful places; places rarely visited by humans. Now we were at the top, looking out over the undulating fields of brilliant yellows and greens. I like to wait at the top for a minute to take it all in. I just close my eyes and take a deep breath. It doesn't matter what worries I may have at home, the feeling of being out in the open with nature all around gives me comfort.



The path ahead was a stony track leading into the woods but this whole section of land was not like any other footpath or bridle path. There were never any dog walkers here or people on bikes (which was just as I liked it), but it did mean that the path was overgrown with low hanging branches and prickly bushes. I lowered my body so that I was hanging at Pip's side as she carefully picked out a route. I trusted her with my life, and she trusted me with hers.

Soon we came to a clearing where the sun was able to penetrate the canopy, creating a fairy-like atmosphere of dappled light. I sat on a log and took an apple out from my bag. Pip sniffed it with her soft, downy nostrils, blowing hot air on my hand. Then she placed her rubbery lips around it. Crunch! In two gulps it was gone. Just then, we heard a rustling sound coming from the right. Pip caught sight of something and was spooked.

She started to make the strangest sound. I've never heard her make a noise like it before, it was terrifying. Before I had a chance to grab her reins or calm her down, she was rearing high, violently punching the air with her two front hooves.

I turned back to where the rustling was coming from. Right in front of me was a snake! It was not the sort of snake I'd ever expected to see in the English countryside, I mean, it was simply huge and rather exotic looking. Perhaps it was an escaped pet? Either way, my body completely froze. I could hear Pip charging off in the opposite direction. So much for trust! What was I going to do?



SPACEX

TESLA

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Elon Musk

So, who is Elon Musk? Some might say he is “the world’s most remarkable entrepreneur.” He is also known as “the man who plans to live on Mars”. So, if you haven’t heard of him yet, you’re in for a treat!

Elon Musk grew up in Pretoria, South Africa, and is the son of a Canadian model and a South African engineer. Now he is a wealthy entrepreneur involved in many different industries including: Automotive, Aerospace, Solar Energy, Energy Storage, Satellite, High-Speed Ground Transportation and Multi-Planetary Expansion. But how did he get to where he is now at only 39 years old?

Well, his interest in technology began early when he bought his first computer at the age of 10. Musk soon taught himself to write computer programs and in 1983 he sold his first piece of software to a computer magazine for \$500 (\$1,200 in today’s money). He was only 12 years old!

Then at the age of 17, he went to work on a relative's farm in Canada and from there he was able to get a place at the University of Pennsylvania. He graduated with two degrees, one in physics and the other in economics, before winning a place in 1995 at Stanford as a graduate student. After only two days at Stanford he decided to leave in order to start his first internet company, Zip2, which produced publishing software.

In 1999, he sold Zip2 for \$307 million. Musk, who was only 27 at the time, made \$22 million from the sale! With this, he went on to co-found a company called X.com, which became the online payment provider PayPal. PayPal was then sold to eBay in 2002 for \$1.5 billion. So far, a very successful beginning for Mr Musk; but it doesn’t stop there.

Musk says, "When I was in college there were three areas that I thought would most affect the future of humanity. Those were

the internet, the transition to a sustainable energy economy, space exploration and ultimately extending life beyond Earth and making it multi-planetary." In 2002, before the sale of PayPal even went through, Musk started reading about rocket technology. Later that year, with \$100 million, he started one of the most unthinkable and ill-advised ventures of all time: a rocket company called SpaceX. The aim of this company is to reduce the cost of space travel in order to help humans become a multi-planetary species. His plan is to colonize Mars with at least 1 million people over the next century. Crazy, right?

Despite this rather insane project, Musk was also nurturing interests in more earthly ventures, ones that would help us live a much greener life on Earth (should we decide to stay!) In 2004, Musk decided to

launch another unthinkable and ill-advised venture: an electric car company called Tesla. He wanted to produce a good-looking, fast electric car which could compete against the leading, gas-guzzling sports models. Again, Musk personally funded this project, pouring in \$70 million. A few years later, in 2006, he invested another \$10 million to co-found another company, called SolarCity. Musk's plan was to help dramatically reduce the consumption of fossil fuel-generated electricity and speed up the world's adoption of sustainable energy by installing solar panels on millions of people's homes.

He managed to set up all of these companies in the relatively short four years following the PayPal sale! However, despite his PayPal riches, he was not rich enough to keep these companies afloat for very long on his own. It's not





that Musk was some crazy millionaire who had a few too many hare-brained ideas. It's not that he'd built bad companies. It's just that creating a reliable rocket is extremely difficult, as is launching a start-up car company, and no investor ever wants to invest in what seems like overambitious, risky ventures. He could have taken his millions and lived a life of luxury on a private island but instead he risked it all in an attempt to create a better world for all of us.

Then, in his most dire hour, everything turned around. First, in September of 2008, SpaceX launched their fourth and final rocket (as it was the last they could afford) and it succeeded brilliantly. That was enough for NASA to take a gamble, offering SpaceX a \$1.6 billion contract, saving the SpaceX company! The next day, on Christmas Eve 2008, when Musk

scraped together the last of his money to keep Tesla going, Tesla's investors agreed to make a further contribution and another five months later another investment of \$50 million came from Daimler, saving the Tesla company! Since 2008, over the next seven years, Elon Musk enjoyed earthshaking success with his companies.

SpaceX has now successfully launched 20 times and NASA is a regular client. To this day, the four entities in history who have managed to launch a spacecraft into orbit and successfully return it to Earth are the US, Russia, China and SpaceX. SpaceX is currently testing their new spacecraft, which will bring humans to space, and they're busy at work on the much larger rocket that will be able to take 100 people to Mars at once.

Tesla's Model S has also become a great

success, blowing away the automotive industry with the highest ever Consumer Reports rating of 99%. They're also becoming the world's most formidable battery company, currently working on their giant Nevada "Gigafactory," which will more than double the world's total annual production of lithium-ion batteries.

SolarCity, which went public in 2012, has become the largest installer of solar panels in the US. They're now building the country's largest solar panel-manufacturing factory in Buffalo, and they're likely to be entering into a partnership with Tesla

to package their product with Tesla's new home battery, the Powerwall.

Furthermore, in true Elon style, in his "spare time" he is pushing the development of a whole new mode of transport; the Hyperloop. In a couple of years, when their newest factories are complete, Musk's three companies will employ over 30,000 people. His net worth now adds up to \$12.9 billion, so let's see what he comes up with next!

