

Science, bitches: it works

Kris King – May 13th 2012

<http://www.rantinaminor.co.uk/2012/05/science-bitches-it-works>

Disgracefully, I haven't written a blog post in a little over a month; predictably, I have an excuse; surprisingly, it's a really good one. Since easter weekend my partner, Raven, and I have been engaged in a seemingly never-ending battle against the forces of contagion present in the numerous furry creatures we've chosen to take on as pets. As you may be aware, we are the proud keepers of a number of rats, and since Good Friday we've been trying desperately to manage an outbreak of respiratory infection that spread through the colony faster than internet rumours about John Travolta's predilection for man-handling the occasional man-handler. As we spent many an hour trying to persuade our collection of adorable nuisances to take a variety of different medicines, weighing them to ensure correct dosing, measuring the amount of food and drink they were taking each day to make sure they were getting enough, and looking for changes in both their behaviour and demeanour, it occurred to me that we were, in a very real way, demonstrating successful application of the scientific method. How do I know it was successful? Simple ... it got results.

At first, we dealt with the problem of one of our ratties making breathing noises that sound like a rusty gate in the way we always do; we went straight down the vets (literally only six doors away) for a proper listen and a course of Baytril (enrofloxacin) oral antibiotics which we would then coax into them through the cunning ploy of mixing it into small quantities of Nutella. What didn't quite fit into our normal poorly rodent procedures was when another started getting ill ... then another ... and another ... and another. Within about a week, seven of our nine rats were being medicated daily, and with some of them doing worse than the others, we were seeing the vet almost every day for cortisone steroid injections (to reduce inflammation and aid breathing) and refills of Baytril (as well as injections of Baytril when they wouldn't take it orally). Along the way we'd also be administering meloxicam (a non-steroidal anti-inflammatory and analgesic to help with pain relief), atenolol (a beta-blocker to help one rat whose heart was going mental with the stress of being ill), and doxycycline (another antibiotic).

Right from the start we were working from, and constantly updating, a chart we'd drawn up and stuck to our kitchen pin-board that showed which rat was on what meds, how big of a dose, when they first started them, and how many days they'd been on them up to that point. We kept a close eye on all of them, monitoring for signs of deterioration, and taking as many opportunities as we could to get food and water into them (in the past we've lost a rat or two because, while they were taking their meds, they weren't eating or drinking). We took no chances, we observed their progress and assessed the situation regularly; if it warranted another trip to the vets, back we went. Since illness is no respecter of bank holidays or the fact that most people tend to be sleeping at 3am, we made numerous visits to the PDSA PetAid Hospital; when they had no-one on staff that night, we were referred to the main veterinary hospital a few miles away. Without the PDSA covering out-of-hours emergencies, we probably would have lost a rat or two, and for that we donated whatever we could give them towards treatment costs.

While I slept, Raves would keep watch, filling any spare time he had researching online and reading everything he could regarding the variety of medicines and treatments so that we could be sure we were doing everything we could (most vets tend to deal with cats, dogs, and rabbits more than anything else, so they're not always as fully knowledgeable about some animals as they otherwise might be). When I went to work, Raves would sleep, setting several alarms to wake him at 2 hour intervals so that he could try and get a bit of food or drink into each of them. When I came home, I would take over so Raves could get some uninterrupted rest. And on it went for weeks, watching, dosing, feeding, more watching, more dosing, and yet more trying to get the little bastards to eat yoghurt off of our fingers so they could at least get some nutrition (at one point we noticed that a couple of them started trying it on – they were more than able to eat from a spoon or bowl, but they just seemed to really enjoy being babied).

There were a number of occasions when it looked likely that we could lose one of them. In fact,

throughout the whole process we faced the very real possibility of losing no less than *four* of them. Fuzzy, our sickest rat at the time, spent a night in the PDSA hospital after we had failed to get him to eat or drink anything for nearly two days. When I called the hospital the following morning, they told me that they'd had similar problems and that it might be worth calling it a day for him. We disagreed, not for predictable selfish reasons, but because we suspected, based on our observations, that Fuzzy hated being away from this cage-mate, Flash; he hated our "hospital cage" (a small cage we have for a rat to recuperate in isolation), and only perked up previously when we briefly put him back in with Flash. The vet understood what we wanted to do, and recommended we give it a couple of days, but no more ... our suspicions proved well-founded, and within just over a week it was almost as if Fuzzy had never been sick.

If, by now, you're still wondering how it is that I can claim we were successfully employing the scientific method in the ongoing treatment of our pets, you should probably go back to school for a few years and re-learn exactly what science is (ideally you'd receive your lessons from a proper science teacher and not one who believes the earth to have been created several thousand years after the domestication of the dog, and over 20,000 years after the invention of the dildo). You should also probably not make use of a toilet without adult supervision lest you insist on sitting *in* the bowl to await the long, slow operation of capillary action in drawing water up into your bum hole to dissolve all of your body's waste products by diluting them over the course of several years (if you do, however, please feel free to bottle the resulting dilute faecal matter upon excretion and challenge a homeopath to take it with your firm reassurances that it's a cure for hepatitis).

Science is, quite simply, a means for establishing fact from fiction through observation and analysis, and it is far and away the single most reliable method for doing so that we have ever devised. No, it's not perfect, no-one ever said it was, but there is nothing to touch it in terms of the results it gets, and that's the most important benchmark to consider in *any* methodology ... does it actually **work**? The fact that you're sitting there (or standing, if that's how you choose to live your life) reading this is testament to the fact that it does. To be fair, the fact that you're sitting there at all, drawing breath, enjoying all that oxygen and nitrogen, and contemplating the somewhat obscure origins of blancmange in that crazy, living on the edge way of yours, is more than enough evidence to support the notion that, by doubling your projected lifespan through advances in medicine and technology, the scientific method is pretty much the absolute fucking bollocks when it comes to getting shit done.

The reason it has been able to demonstrate time and time again that, of all the methodologies available, science is the number one choice for the busy thinker about town, have a lot to do with the way it seeks to eliminate bias at all stages of enquiry. Reality can be a frustrating, interfering pain the arse sometimes, rather like an elderly relative who constantly tells you that your marriage is doomed to failure unless the two of you can learn to enjoy shared interests like caravanning, collecting porcelain dolls that harbour the souls of paedophiles lynched by marauding News Of The World readers, or hosting swingers parties at the weekends. Human beings, by contrast, represent an even bigger dog dropping in the picnic basket with their constant refusal to stop having opinions, beliefs, ideas, or other such nebulous, unquantifiable thoughts that don't help anyone. Nothing buggers up a good theory like irrelevant crap getting in the way and confusing the situation (especially if its the elderly relative with an obsession for proposing a sex-festival as a relationship panacea).

Amazingly, it turns out that if you remove everything that has absolutely fuck all to do with what it is you're trying to understand, your understanding will be immeasurably more accurate than it would otherwise. The best place to see this in action is in the controlled testing environments that are established when trialling new drugs; in a blind trial the patient doesn't know whether they're getting the drug or the sugar pill, thus eliminating the placebo effect and any other conscious or subconscious bias; in a double-blind trial those conducting the experiment don't know whether the patient is getting the drug or the sugar pill either (assignments to the experimental or control group having been randomised), thus eliminating any observer or experimenter bias. This method of enquiry has been the cornerstone of medical advancement over the centuries, and is unquestionably a major contributing factor in the reason you're even alive; without it, we wouldn't have the drugs and the knowledge that we do, and your ancestors would possibly have not lived long enough to reproduce.

Evidence, too, plays an enormous part in the success of the scientific method. It's not enough to simply offer a personal anecdote, an assurance that, "Honestly, you must believe me - I saw a couple of times how tumours would shrink in patients who played the oboe for a minimum of 4-6 hours per week". It's not enough for evidence to only present itself to specific individuals, it has to be

as free from bias as the experimental process that produces it. Evidence must be objective, the same for everyone, and subject to testing *by* anyone (obviously I don't mean just *anyone* – you wouldn't want some creationist college reject with no scientific background and the kind of wilful ignorance that even Kirk Cameron would refer to as “needlessly playing dumb” attempting to recreate such experiments – after all, “god did it” is not evidence, no matter how much Team Sky Fairy insist to the contrary – no, you need someone with the relevant knowledge and apparatus for recreating the experiment with a high degree of fidelity).

It's this ability (and willingness) for an experiment to be carried out by others that helps introduce the error correction that sits at the heart of the scientific method. The peer review process, where scientific theories go to be subjected to the kind of ruthless, brutal testing that Ivan Drago would have dismissed in that “Rocky IV” montage scene as being the sort of horror that would haunt his nightmares forever, is specifically designed to put an idea to the most intense scrutiny, and test it until it breaks. If it does, you rebuild, refine, and try again; just as how your mum stood over you while you did the washing up, constantly returning each plate to you because you “missed a bit”, every scientific theory worth a damn spent incalculable amounts of time washing its plate over and over and over again until it was proven beyond reasonable doubt to be clean. It may seem harsh to have the whole world trying to break your idea, but you should be grateful that such a practice exists.

It has been the single biggest contributor toward the advancement of our species; without it, we would be making ourselves ill, or worse, with untested drugs and recklessly dangerous procedures (assuming we ever got past the point of believing possession by devils or the weakening of the humours to be the causes of our maladies). Without it we would have no understanding of physics, chemistry, biology, medicine, geology, cosmology, genetics, epidemiology, and a thousand other disciplines, not to mention that there would be no engineering or technology beyond “Blunt Stone” and “Sharp Stone” (or “Blunt Stone 2S” as I believe many prehistoric humans referred to it). Without the scientific method to help us discern the mechanics of reality, we would still be stumbling around in the dark, looking to the skies for clues as to why things are the way they are, and having no idea how anything really works ... oh wait, there *are* still people around who do that.

For a start there are the astrologers who believe that the position of giant nuclear furnaces many billions of miles away from you on the day you were born somehow exert a profound, yet indescribably vague and non-specific, influence on your day to day existence in the present. Ignoring the fact that no mechanism for the transmission of this “influence” has ever been proposed (and that, whatever it is, it cannot be any of the four forces known to science unless you're willing to completely ignore the existence of the greatest influence on our lives, the sun), they profess to be able to predict the future, and millions of people believe them, in what can only be described as a mass exercise in confirmation bias and wilful blindness to the fact that measurable results aren't even possible when the predictions are so diffuse as to be almost meaningless.

Then we have homeopathy, or as some genius (I wish I knew who) once described it, “the air guitar of medicine” (I am *so* stealing that expression). I shan't go in to detail here, having [already eviscerated the ludicrousness of it in a previous post](#), but will simply say that, incredibly, people still buy into the horse-shit peddled by ethically-bankrupt wallet-fuckers like “Homeopathic” Dana Ullman (who, in his Twitter profile picture, even sports a homeopathic beard – it appears to have been diluted almost entirely out of existence). Remarkably its popularity seems to have endured *despite* the two centuries of total failure on the part of homeopathy apologists in demonstrating consistently positive results that elevate it above a mere placebo. And, now that I think about it, you can throw ear-candling, magnet-therapy, applied kinesiology, naturopathy, aromatherapy, iridology, faith healing, reiki, hypnotherapy, reflexology, and any number of other forms of “alternative” medicine into the same big ol' bucket of result-dodging bullshit along with the magic water.

In our eternal quest to find out what's going on in the world and figure out how stuff works (particularly “Golden Balls” – if anyone has been able to decipher the incomprehensible rules of that sodding show, will someone please explain it to me?), we have explored a million and one different ways to get to the truth, and almost every one has resulted in the morally-reprehensible, and often potentially dangerous, charlatanism of the kinds described above. So far, only one of the methods ever devised by our species has proven consistently reliable in enabling us to determine what is fact and what is fiction; only one way of thinking has ever produced repeatable, positive results that can be measured and compared; only one tool has ever actually gotten the fucking job done, and that tool is *science*. Not supernaturalism, not superstition ... **science**. It has doubled our lifespans, allowed us to explore other worlds, and built a global network of computers that help us expand the

horizons of our knowledge and connect us with one another like never before.

But, more importantly, it has ensured that Raves and I have nine living, healthy rats, instead of a number of small, labelled boxes destined for his parent's garden. Through a process of diligent observation, and rational analysis of the situation, along with a constant willingness to modify or refine our approach whenever new information dictated it, we were able to manage an outbreak which, if handled differently, could have killed every one of our pets. Instead, we were able to look after seven sick rats (some of whom were, at times, down to the point of being completely out of options) and bring them back to full health. Since our beloved ratties can't tell you the following themselves, we'll have to speak for them; so, on behalf of Bartleby, Sky, Pandora, Fi, Bug, Flash, Fuzzy, Baldrick, and Smouse, remember:

"Science, bitches: it works!"

A handwritten signature in black ink, appearing to be 'LMS' or similar, written in a cursive style.