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Map of South America showing distribution of the pygmy marmoset

The pygmy marmoset

Pygmy marmosets, sometimes called *pocket monkeys*, are the smallest monkeys in the world. They live by the edges of rivers in tropical forests in the north-west of South America.

Fully grown pygmy marmosets can comfortably fit in a human hand. Their tiny bodies measure about 14–16 centimetres long, not including the tail which can add another 20 centimetres to the length. They only weigh around 120 grams—that's less than an apple. In spite of their small size, these tiny animals can jump more than four metres, or over 30 times their own body length. That's quite a distance for such small creatures!

Because these monkeys are so small and light, they can move along slender branches higher into the trees than other monkeys. There they feed on their favourite food, the sap of the trees. They also eat fruit and insects such as grasshoppers.

Pygmy marmosets have to watch out for birds of prey and other creatures like snakes and cats that think they are a tasty meal. They dash about quickly from one safe place to the next. Their necks are very flexible and they can rotate their heads backwards to check for danger.

The female pygmy marmoset usually gives birth to twins, each about the size of a human thumb. The male helps in the birth and then takes over caring for the babies, carrying them around on his back for the first two weeks and bringing them back to the mother to feed.



The mission

I knew there had been a mistake. Although Bella had assured me that the house was empty, a dog bark, followed swiftly by unwelcome lights glimpsed between twitching curtains, suggested otherwise. I signalled to indicate it was time to abandon the operation.

We melted soundlessly into the shadows of the garden, gathering at the meeting point to consider our options. Ty was angry. ‘You have to face it, Sam. She didn’t analyse the intelligence properly,’ he seethed. ‘How could anyone make such a fundamental error again?’

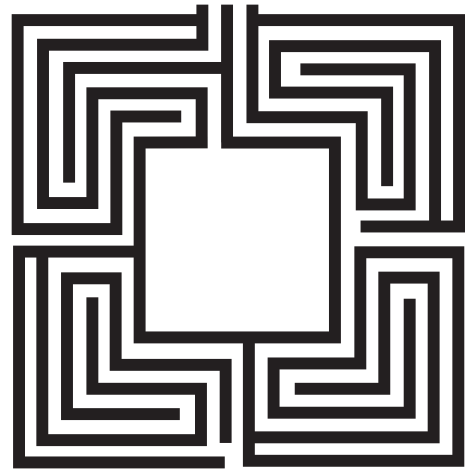
‘Let’s not waste our energy blaming Bella,’ I said, asserting my authority. Ty’s negative feelings towards Bella had already threatened to disrupt the mission. I’d been in Bella’s position myself and knew: sometimes there simply wasn’t enough time to recheck intelligence. You hoped it was accurate, but sometimes hope wasn’t enough. ‘Let’s concentrate on what to do next,’ I said to the whole team while looking directly at Ty.

Organising another ‘visit’ was out of the question. We were here, the file had to be retrieved, and it was our task to do so. We needed to abandon our existing strategy and come up with something new.

Ty looked doubtful when I mentioned the idea of improvising. He was still a novice and floundered for a minute or two when operations varied from the expected. Strange, considering nothing had really gone to plan for days now. He’d learn.

I quickly outlined my idea. Ty’s expression changed from doubt to intrigue, ‘I can’t believe I’m saying this, but it might just work. It’s better than doing nothing.’

As the suburban street came alive with morning activity, we shed our night-time black, put on the uniforms, and marched boldly up to the front door to finish the job.



The Minotaur

In ancient Greek mythology, Ariadne was the guardian of the labyrinth (maze). At its centre was the monster named the Minotaur.

A cry went up as the ship from Athens was sighted. Waiting on the docks, Ariadne and her father, Minos, the powerful King of Crete, were curious about the ship's human cargo. Minos was weary of war with Athens and had proposed a terrible bargain in exchange for peace. If Athens would send seven of its finest young men and seven of its finest young women to be sacrificed to the Minotaur, then Minos would spare the rest of Athens. The Athenians had been shocked by the cruelty of the proposal, but for the sake of peace they reluctantly accepted it.

As the young Athenians stumbled from the ship, trembling and with eyes downcast, Minos observed them without pity. Ariadne gazed intently at each of them until her eyes fell on one of the youths, the handsome Prince Theseus. He had volunteered to take the place of one of his young countrymen and to attempt to kill the Minotaur. Ariadne sensed he was the leader of the group, and she wondered if he could help her escape from her island home.

That night she went to where Theseus and the others were being held. 'If you agree to take me with you when you leave, I will help you to defeat the Minotaur.'

Theseus was astounded. He had come with no plan, only a burning desire to save his fellow Athenians. Suddenly he was being offered a way to succeed. 'I will meet you inside the entrance to the labyrinth tomorrow,' she whispered, 'and give you a sword to kill the Minotaur and some string to guide you back to the entrance when you have slain the beast. When you have done that, we must flee immediately.'

And so the hero, Theseus, defeated the Minotaur and escaped with the Athenians and Ariadne.

The honey bee mystery



Having an entire bee colony disappear overnight is not unknown. There are written records of cases in North America and Europe from as long ago as the 1800s. At that time, unusual weather conditions were blamed.

But in 2006, after a huge and sudden increase in the disappearance of bee colonies in North America, the worrying phenomenon was given a name: Colony Collapse Disorder (CCD). That year, and in many of the years since, North American and European apiarists (beekeepers) have recorded losses of up to half of their bee colonies. No-one knows exactly why, or why so far, Australia has been spared.

CCD is blamed for the death of a colony only when the following characteristics occur simultaneously:

- a complete absence of adult worker bees
- few or no dead bees evident in or near the hive
- the queen bee is present
- there is plenty of food
- there are unhatched eggs.

While you may think the absence of bees is no more than a mild inconvenience for honey-lovers, the reality is that bees are a vital link in the production of our food. Bees are responsible for pollinating about a third of the fresh produce that we eat. The shortage of bees in the USA has caused significant problems for farmers, with many having to hire honey bees from all over the country and as far away as Australia to guarantee pollination of crops. Bee-hire and transportation have become huge expenses for food growers, which in turn result in higher prices for consumers.

Scientists and beekeepers are racing against time to discover both the cause of and a cure for CCD before it is too late. Theories about climate change, pesticides, parasites and bacteria have all found favour at various times and current thinking suggests that it is a combination of all these factors that has created a 'perfect storm' of environmental stresses for bees.

Colony collapse has put bees firmly in the scientific spotlight, and it is a problem we cannot afford to ignore.



Hard running

Benny hated his father's eager-beaver approach to weekends. His idea of the perfect Saturday was to get up late and spend the rest of the day doing nothing but recover from the week at school. Yet at his father's insistence here they were down near Sydney's Botanic Gardens in the early morning—and on one of his beloved Saturdays!—the pair of them jogging along the harbour foreshore through weather that had kept all but the most determined tourists indoors.

'Isn't this fun?' his father shouted above the roar of the wind.

And what a wind! It snatched at the overcast sky, sending unwary birds tumbling through the air like scraps of torn paper; it whipped the harbour into a frenzy, the grey waters erupting into ridges of fleeting white; it beat at the great Port Jackson fig trees until they creaked and groaned under the onslaught.

This is fun? Benny thought to himself, plodding wearily along. As far as he was concerned it was more like torture. Or worse, like being caught up in some ancient battle, with the whole of Sydney under siege from an unnamed force.

As though in opposition to that force, the wind shrieked louder than ever, bringing Benny to a stop. Even his father faltered. While over to their left there was a grinding, tearing sound followed by a frantic swish of limbs and leaves, and with a thump that made the whole slope tremble, one of the giant figs came crashing down.

'Come on,' his father insisted, straining forward, dismissing the fallen tree with a wave of the hand.

But Benny had had enough. 'Let's take a look,' he shouted back, and walked across to where the tree was lying forlornly on its side, its roots fanned out like the tentacles of some dead octopus.



A way forward

Budi glanced around the room. Most of the village had turned out for the meeting and every spot on the bamboo mats was taken. Mothers fanned sleeping children, fathers sat cross-legged and shared jokes with neighbours. Budi's nephew Ari had turned up, even though his young daughter was sick with dengue fever.

Budi cleared his throat. As the village head, it was time for him to start the meeting.

'Thank you for coming. We all know why we are here. We have had a new offer from the logging company. In exchange for access to our forest, they will bring doctors from the city and set up a full-time medical clinic. The time has come for us to debate their offer,' he said.

There was a brief silence before Wawan, a visiting activist from a global conservationist group, spoke up.

'I'd like to repeat what I have said before: you should not trade your precious trees to this company. We have a duty to protect this forest—for the sake of the Earth and the animals that depend on it for survival!'

'That's easy for you to say,' muttered Ari. He coughed, and spoke again, this time with more confidence. 'You can go back home, to your city doctors. I am tired of seeing my children shivering with fever because we have no medical care. I say we accept the offer, for the sake of our children and our elderly.'

An older man sniffed loudly in response. 'Hmph! You think you can speak for your elders? You need to think about what you are asking for. You can take your child to a doctor, even if it is a long way. It's not easy, but it is possible. But once the forest is gone, it's not possible to get it back. Our traditional way of life will be gone forever.'

Diah, one of the mothers, stopped fanning her child to speak up. 'There are no jobs in tradition. My husband had to move to the city to find a job. Wouldn't it be better for our children if he could find work here in the village with the logging company? Don't we have a right to jobs?'

Wawan angrily pushed his spectacles up. 'What about the endangered animals that live in this forest? Don't they have rights too?'

Soon, villagers began speaking all at once.

'Enough!' cried Budi and silence descended on the room again. 'It's time for us to make a decision together,' he said.

Gliding through the deep

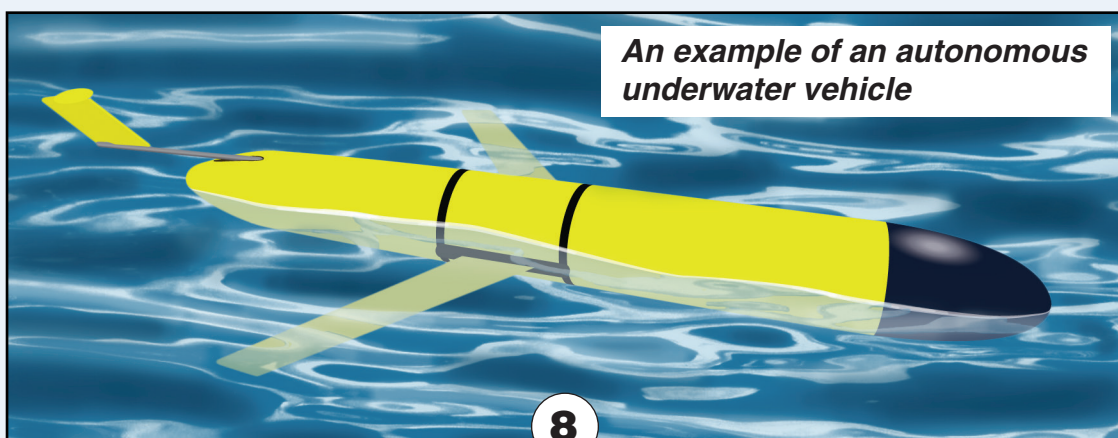
Deep in the ocean 200 kilometres off the coast of Western Australia, a sleek shape glides through the water, its half-metre-long fins steering it through the current. For more than 100 days it has roamed the ocean alone, breaking the surface every four to five hours before diving again into the unknown deep.

This oceanic spectre, though, is not a natural part of the marine environment. Instead, it is one of the most potent research tools in Australia's Integrated Marine Observing System (IMOS) arsenal—an autonomous underwater glider. It utilises a highly energy-efficient form of buoyancy-based propulsion. The glider moves by pumping in and then expelling sea water. Water going in causes the glider to descend and its expulsion propels the glider up again and forward. More than 15 gliders in the IMOS fleet gather data on water temperature, salinity, depth, chlorophyll and dissolved oxygen, transmitting the findings electronically to IMOS during their regular surface stops.

Initially this might sound like something of a novelty, but the practical value of these autonomous underwater vehicles (AUVs) is hard to overestimate. Whereas previously getting accurate readings would have entailed expensive and time-consuming ship-based oceanic observations, today, IMOS is able to dispatch its fleet of AUVs to remote locations in the Coral Sea or Southern Ocean for a fraction of the cost. With no engine to fuel or maintain, they are able to operate for extended periods. Zigzagging up and down utilising ocean currents, they gather information according to pre-programmed instructions which can be changed remotely when the AUV surfaces to transmit data.

With an operational life span of around six months between maintenance stops, the gliders can be launched and recovered cheaply and quickly from small two-person boats, avoiding costly support and logistics procedures. Already they've proved very useful in measuring the complex boundary currents off Australia, which are a main link between open-ocean and coastal systems. The data collected makes a valuable contribution to the world weather communications network. Although they are only about two metres long, these little craft are surprisingly robust, with the capacity to dive to around 1000 metres and travel great distances.

One AUV, similar to those in the IMOS fleet, has demonstrated just how economical underwater gliders really are. The glider nicknamed the 'Scarlet Knight' crossed the Atlantic Ocean (7409 km) using the same amount of energy it takes for the average car to travel just 10 km—a more than 700-fold difference in efficiency.



Peer pressure – a positive perspective

Like the scientific concept of gravity, the negative nature of peer pressure is often presented without question. Scientific investigations of peer pressure which go beyond investigating negative impacts are typically overlooked in favour of emotionally charged anecdotes about the harmful consequences that peer pressure can have for adolescents. The undesirable effect of peer pressure cannot be denied, but is it also possible that peer pressure might not entirely deserve its bad reputation? Could peer pressure also have positive effects on the personal development and behaviour of young people?

A scroll through the scientific literature reveals exactly that: peer pressure is not always a force for the dark side. Humans, after all, are highly social beings with complex social systems that have developed over extremely long periods of time. The innate human desire to conform—which drives our susceptibility to peer pressure—is actually an advantageous response to our highly socialised environment. Peer pressure and the desire to conform, these studies suggest, are simply a part of being human.

If humans are hard-wired to respond to peer pressure, then it makes sense to examine how it can be used to change behaviour in a positive way. Consider a hypothetical situation: student X has always enjoyed playing the guitar but is lazy and unmotivated. Although initially reluctant, she is persuaded to join a school band. The group of students is rehearsing for a performance and the existing members are enthusiastic, focused and hardworking. Gradually, student X is caught up in the spirit of the band and before long she is willingly making the same commitment of time and effort so they can all achieve a common goal.

So how does it work? Peer pressure—both positive and negative—follows a recognisable psychological process. If student X does not conform to the established ethos of the band, she risks rejection. To eliminate this tension, student X alters her habits and increases the amount of time and energy she devotes to practice (this may cause other tensions in her life but she decides that the benefits outweigh the disadvantages). Some psychologists describe this realignment of personal goals or standards to achieve harmony as part of a group as an ‘identity shift’.

The key to understanding the concept of peer pressure and its power over humans is to closely examine the science of the process, rather than dwell on its pathological aspects. Providing a one-dimensional view of the concept encourages the biased presumption that peer pressure is a strictly undesirable feature of human society. Instead we should be exploring ways to harness its power for good.

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ACKNOWLEDGEMENTS

The pygmy marmoset

Pygmy marmoset image © Disc Pictures/AsiaPix/Corbis

Hard running

Extract from 'Footprints' by Victor Kelleher. Reproduced with permission of Victor Kelleher c/o Margaret Connolly & Associates

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