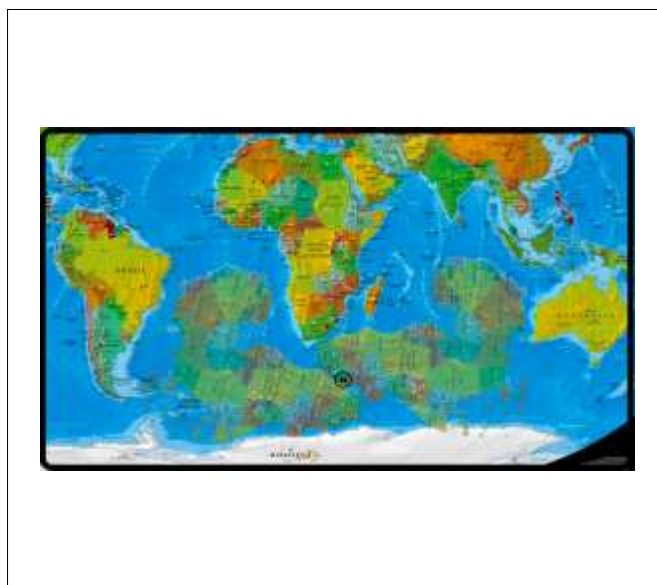


LIVING ON A SOUTH AFRICAN VOLCANO

BY ANTON FEUN

"Living on a South African Volcano" sounds like a news headline around a political issue which is poised to erupt. Surely no relevance to anything of geological nature since there are no volcanoes in South Africa. We know that South Africa lies very well balanced on the African tectonic plate and enjoys stable geological conditions. No earthquakes such as elsewhere in recent times. Remember Christchurch? Nor any volcanic eruptions - such as is presently the situation on the island group of Hawaii and now joined by Puyehueu in Chile.

However if you were to search the Internet for "Volcanoes in South Africa" you would find two - Prince Edward Island and Marion Island. The two together form the Prince Edward Island group and are located 1800km south east of Port Elizabeth. Both are of volcanic origin although volcanic activity on the Prince Edward Island lie beyond



Very large ocean.

living memory. By 1980 it was thought that volcanic activity on Marion Island had ceased altogether and the volcano was classified extinct. Peculiar as it may seem, it erupted in the same year and stirred yet again as recent as 2004. It seems in the nature of certain events to arrive whenever they are ready and not when humans predict them to.

However, considering its location it is not at all surprising. Marion Island ridges on a continental plate boundary in the Southern Indian Ocean and earthquakes and volcanoes come with that kind of territory!

Continues page 2

AN EVOLUTIONARY TALE

BY OTTO WHITEHEAD

It was a Sunday morning and my gumboot-wedged feet and I were strolling languidly through a landscape carpeted in snow. It stretched all the way up the valley and past the scoria cones where it hugged the majestic peaks of the interior with a delight-

ful frigidity. The air was so crisp and still; a tranquil remnant of the storm's wake. The only inklings of sound were the distant murmurs of chattering king penguins and the intermittent cries of giant petrels.

I thought about how strangely dinosaur-like these petrels sounded and began imagining them as the reptiles from which they descended. I came across a colony and stopped and stared at them like a

*'Life harbours
deep
mysteries.'*

LIVING ON A SOUTH AFRICAN VOLCANO CONTINUED

Who goes there? The expanse of ocean around southern Africa is vast and supports multitudes of creatures who by their nature are forced to go ashore on one of a handful of islands to mate and or breed. Marion Island is such a nugget. These beings occupy a wild ocean living space larger than twice the size of Africa. Some swim and some fly. They go all over and all are able to find their way back to a specific grain of sand in a desert of ferocious wind and water. I salute them. Life harbours deep mysteries.

That's if you were a seal or pelagic bird. Otherwise, if you

were associated with the South African National Space Agency - like myself - you would come here to tune into aspects of space. In particular the physics of outer space. How does that earn or save money in your personal wallet?

Well, one particular component in a power grid like that operated by ESCOM in South Africa costs around R90 million and takes a year to manufacture. In October 2003, 8 of these components were permanently damaged and a further 8 degraded as a result of an event which occurred in outer space - a volcano on the sun.

This specific event had no damaging impact on the European or North American infrastructures. Hence we are taking the leading role in managing our own resources and destiny. Learning and teaching, observing and creating awareness - from within our own back yard. Reading the signatures which the volcanos on the sun leave in our earth's magnetic field. Learning to foretell them.

AN EVOLUTIONARY TALE CONTINUED

; my brain twitching as it tried to unravel the immediate mysteries surrounding the evolution of birds from dinosaurs. Why did dinosaurs suddenly develop feathers? What did they use them for if they couldn't fly? And how did they even develop feathers in the first place? I thought about this long and hard and eventually did some reading.

I'm sure that for some of you *Archaeopteryx lithographica* will sound familiar and for others it won't. Either way, welcome to the world of the most famous transitional fossil linking birds and reptiles. This feathered reptile was discovered in a limestone quarry in Germany in 1860. 'Archaeopteryx' means "ancient wing" and 'lithographica' comes from the Solnfern limestone in which it was found. Archaeopteryx lived around 145 million years ago and although most of its traits were reptilian, it possessed asymmetrical feathers (symbolic of aerodynamic flight) and an

opposable big toe (probably used for perching). So it had both very bird-like and very reptilian-like features; what evolutionists call a "mosaic". This fossil was revolutionary (or evolutionary) in the sense that it bridged the divide between fossils of fairly modern birds, which appear about 70 million years ago, and those of their theoretical ancestors, the theropods, which were agile, carnivorous dinosaurs that walked on two legs and lived around 200 million years ago. Have a look at the figure below (extracted from Why Evolution is True by Jerry Coyne) and think about the transitional similarities in the skeletal structures of *Compsognathus*, *Archaeopteryx* and the chicken. From the bottom up you can see the reptilian tail shrinking, the teeth disappearing, the claws fusing together, and the appearance of a large breastbone to anchor flight muscles.

After the discovery of *Archaeopteryx*, no other reptile-bird

intermediates were found for many years, leaving a gaping hole between modern birds and their ancestors. Then, in the mid-1990s, a veritable parade of feathered theropods were discovered in the lake sediments of China. Two of these are shown below (extracted from Why Evolution is True by Jerry Coyne); *Sinornithosaurus millenii*, the "Chinese bird-lizard", and *Microraptor gui*, the "four-winged dinosaur".

Theropod dinosaurs didn't just have primitive bird-like features, it seems; they even behaved in bird-like ways. One fossil shows a feathered female theropod who met her end while sitting on her nest of twenty-two eggs, showing brooding behaviour similar to that of birds. Another fossil shows a small feathered theropod named *Mei long*, Chinese for "soundly sleeping dragon", sleeping with its head tucked under its folded, wing-like forearm - exactly as birds do today (see below; extracted from Why Evolu-

tion is True by Jerry Coyne).

Okay, so there's all this evidence buried in the apple skin of our earth that indicates that once upon a time there existed transitional forms of reptiles and birds, **but it still doesn't tell us why** or how the first dinosaurs developed feathers. The truth is nobody is sure. Some scientists have suggested that feathers derive from the same cells which give rise to reptilian scales, and that they developed in these cold-blooded reptiles to increase insulation and help maintain body temperature, but not everyone agrees. Whatever the case, they did develop, and that is a fact.

Another important fact to consider is that early carnivorous dinosaurs evolved longer forelimbs and hands, which probably helped them grab and handle prey. That kind of grabbing would favour the evolution of muscles that would quickly extend the front legs and pull them inward: exactly the motion used in the downstroke of true flight.

So, once feathers arrived on the scene and started having beneficial effects on the survival of those individuals who possessed them, it was all up to natural selection to turn them into the flying descendants they would become over the next hundred million years. Let me explain...

The year was 150 million BC and a certain theropod dinosaur was trying to outrun a predator. **He didn't, but** some of his more feathered relatives did. They managed to escape because their partially feathered forearms acted as running aids, making them faster and more agile. Those theropods who were best adapted to escaping their predators went on to reproduce and pass their genes onto the next generation. In each generation there are likely to be genetic mutations; **it's just the way life is, you can't always make** a perfect copy. So in the next

generation most of the theropods would be partially feathered, however, there would also be some with slightly fewer or shorter feathers and some with slightly more or longer feathers. This generation would be subject to the same predation pressures and natural selection would once again make sure the better adapted theropods would survive and go on to reproduce. And it goes on and on until one day BAM! there goes a flying theropod.

But hey, this is just one scenario and the fact that these changes were induced solely **by predation pressure isn't necessarily so.** There may have been other evolutionary drivers such as competition **for resources and there's always the "tree down" theory.** For instance there is evidence that some theropods lived in trees. Feathery forearms would have allowed them to glide from tree to tree (or tree to ground), helping them escape predators, find food more readily and cushion their falls. Whatever the case, feathered forearms were clearly an advantage and it was inevitable that as natural selection began to favour those who could fly farther instead of merely gliding, leaping or flying for short bursts, flight would soon become one of the most widespread and well used innovations of evolution. The incredible diversity of birds found today is testament to this fact.

Unfortunately, like many other groups, birds have suffered massively as a result of anthropogenic ways. Of the more than 10000 bird species that humans have co-existed with, 150 have become extinct, 189 are critically endangered, and over 1500 are listed as vulnerable or threatened. On the whole, the status of birds worldwide is getting worse and worse every day as more forests are burned, more wetlands are bulldozed, more pesticides are sprayed, more power lines and cell phone towers are erected, more invasive aliens and diseases are spread, and more longline fishing hooks are deployed. The situation is dire, but the important part is that more people are becoming aware and positive change is happening. Still, there are those **who may argue that we don't really need birds, so why waste time and money trying to save them?** Well, then I must exclaim that these people **clearly don't understand or appreciate the significance of life, diversity and the overwhelmingly beautiful products of millions of years of gradual evolution.**

'Unfortunately, like many other groups, birds have suffered massively as a result of anthropogenic ways.'



A BEGINNERS GUIDE TO WALKING ON MARION ISLAND

BY CHRIS OOSTHUIZEN



*‘Walking may be
the only way
forward on the
island,’*

I push the balaclava down another centimeter over my eyebrows. Still, the ice pellets find a way through and keep hitting me in the face. Head down, with one arm shielding my eyes and the other wielding my icy seal-stick, I trudge ahead.

Walking is the only way forward, and when you are at point A, you have no choice but to put one foot in front of the other if you do not relish a night out in the cold. Perhaps it is this knowledge of no way out, which drives people on Marion to accomplish much more here, than anywhere else. The simple life one is able to live in the field also contribute to a focused energy for the job at hand. We drain our energy cylinders to capacity, as many other people do, but are free from the polluting effects of news, television, money and cell phones. Or that is how it used to be – in

the older island days. Today, you can access the internet on your phone in the bar, read the morning news on your laptop, and update your Facebook profile before you settle down for the latest movie. Would the new generation islanders have been able to survive the Marion of old?

Walking may be the only way forward on the island, but one may be tempted to replace ‘forward’ with ‘around’, ‘over’, or ‘through’. The best way to cross a mire for instance, is to go around, not over it. If you do try and cross over, you may end up going through the mire instead, which is a rather frustrating and wet thing to do. In contrast, there is no point trying to go around the black lava of Black Haglet Valley. You go over, just as you go over Azorella, Karookop and Long Ridge. It is on these ‘over’ parts of a walk where one

has the most time to think, ponder and fight your brain battles. There are simply not breaths to spare to talk to your traveling mate, and when you try to (“Wow, it is pretty here” – a simile for “Please, let us rest a while...”), the wind frequently carry your hoarse mumble to the seas.

Our lives on Marion – just as anywhere else – are full of surprises, uncertainties, joy and fear. The grey clouds and rain will always be around, but that also means that a rainbow is often on the horizon. This, and the knowledge that I will never have this day again, makes it easier to put one foot in front of the other. Walking over, around and through paradise. One step at a time.



PERSONAL INTRODUCTIONS

KERSTY HICKLEY

It's our first M68 newsletter and we have all been told to introduce ourselves; so where do I start?

Let's start at the beginning...

Hi I'm Kersti Hickley. I'm a field assistant for the CIB (Centre of Invasion Biology at the Stellenbosch University). I'm 22 years of age and I come from Cape Town, Kuilsrivier. I originally was told I was the youngest in the team but I just found out that I am not LOL (Laugh Out Loud). I did my Biodiversity and Conservation Biology degree at the University of the Western Cape and I graduated two weeks before departure so that was a very nice feeling for me! I grew up in Kuilsriver and attended De Kuilen High School.

Ironically, I got the chance to go to Marion Island with only 2 months before departure; credit to the CIB people (especially Erika) whom from the day Prof Chown called me, made it their priority that I know what to expect and to Mashudu who compiled endless lists of what to take



down & the amounts. When he called and asked me if I was still interested in this adventure, without any doubt I said yes! Not only is this a great boost for my C.V but also an experience of a lifetime for me because I have never been away from my family and at first I thought it would be hard but now it just **seems as if it's very possible.**

I am here in Marion Island to assist Mashudu Mashau, Msc student, who is working on the distribution of alien

vascular plant species along the perennial rivers and the different habitats of this island. We construct Whitaker plots along the catchments and then identify the various vascular plant species found within the plots as well as the percentage cover of the vascular plants pre-made sampling grid.

ZODWA MIYA

My name is Ntombizodwa Miya, I am from a township called Tembisa in the Gauteng Province. I am an Assistant Meteorologist. My job description is doing weather observations which includes; recording the temperature of the sea, the minimum and maximum temperatures in the Stevensons screen at the Met Camp. Doing cloud observations to see how many clouds cover the sky, what type are the clouds and how high they are and then putting all the data in the system that is used for weather observations. It is my first time here at Marion Island and I must say it is a very



beautiful place. The base is **very beautiful and I don't** have any regrets, I have never thought I would travel to a place far away from

home. A place I never thought exists.

WEATHER STATS FOR JULY 2011

Ave Max Pressure	1012.8
Ave Min Pressure	1003.2
Ave Pressure	1008.3
Max Pressure	1028.7
Min Pressure	977.4
Ave Max Temp	7.5
Ave Min Temp	2.3
Ave Temp	4.9
Max Temp	12.2
Min Temp	-2.3
Ave Humidity	82
Max Humidity	100
Min Humidity	31
Max Wind Gust	49.1m/s,95.4knots or 176.6km/h
Total Rainfall	117.1
Highest in 24 Hours	13.9
Total days with rain	23
Total days > 1mm	20
Total Sunshine	95.2

PHOTO FEATURES

BY JOHAN VAN HEERDEN

The **CIB** is inviting candidates to apply for the position of **postdoctoral researcher** with specific application to the migration of the **lesser spotted Tasse** and frequent companion the **silver petit Culler**

You will be required to make recommendations as to the prevention of the aforementioned flocking to the well in the science block.

