



Alberto Valenciano

## Who's who in the prehistoric zoo

**Dr Alberto Valenciano Vaquero with the West Coast Fossil Park's models of *Sivatherium hendeyi*, one of three extinct giraffe species found at the Langebaanweg palaeontological site.**

Palaeontologist Dr Alberto Valenciano Vaquero came to South Africa from Spain in 2018 on a two-year postdoctoral fellowship hosted by the Iziko South African Museum and the University of Cape Town. His mission was to study the museum's collections of fossil carnivores from the palaeontological site of Langebaanweg, situated about 120 km north of Cape Town on the west coast. In June 2020 this research was prominently featured in the news, with headlines about 'wolf-sized otters and leopard-sized wolverines', following the publication of a scientific paper on giant mustelids co-authored by Alberto and Dr Romala Govender, Iziko's Curator of Cenozoic Palaeontology, Research and Exhibitions.

Alberto returned to Spain shortly thereafter to take up a new fellowship at the University of Zaragoza, but on 15 July he presented a webinar as part of a series organised by the Society of Spanish Researchers in South Africa (ACE South Africa) in collaboration with the Spanish Embassy. His presentation, titled "The West Coast of South Africa five million years ago: short-necked long-'horned' giraffes, sabretooth cats, and other beasts", revealed that the Langebaanweg site is a veritable 'zoo' of prehistoric animals.

Alberto explained that between 5.96 and 5.33 million years ago, Africa collided with Europe and the Mediterranean Sea dried out, allowing animals to easily migrate between Eurasia and Africa. At the start of the Pliocene, the sea level rose again, so the Langebaanweg site – now 13 km inland

– would have been very close to the coastline 5.2 million years ago. In fact, it would have been part of the estuary of the Berg River, which today flows into the sea a little further north, at St Helena Bay. The climate would also have been a bit warmer then, so the area would have included riverine forests, grasslands and tidal zones. This provided a rich habitat for a diverse fauna, but it's also clear that some of the fossils at the site are from animals washed downstream from further inland and then entombed in the estuarine mudflats.

The presence of important fossils at the site was first recognised in the late 1950s. At the time it was a quarry, where phosphate rock was mined for fertiliser. But it was only in 1964 that palaeontological research was initiated there, under the leadership of Dr Brett Hendey of the South African Museum (now part of Iziko Museums). Over the next two decades he published extensively on the team's numerous fossil finds, and it became clear that the site has one of the world's richest and best-preserved Neogene (late Miocene/early Pliocene) mammal assemblages.

The mine was eventually closed in 1993 but its owner, Samancor, entered into a public-private partnership with Iziko Museums to form the West Coast Fossil Park, which opened in 1998. The quarry's old office block was renovated into a visitor centre with an informative display area, and research excavations at the site have continued. There is still much to be learnt from fossils unearthed at the site in the past though.



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**Dr Romala Govender, who co-authored the scientific paper on Langebaanweg giant mustelids, at the bonebed displayed at the West Coast Fossil Park.**

Alberto gave a thorough overview of the marine and terrestrial vertebrates represented by fossil finds at the site to date. For example, more than 10 000 bones of birds have been studied by various researchers, and these have been shown to belong to 90 different species.

The herbivores include three species of giraffe, the most important being the short-necked long- 'horned' giraffe – the 'horns' are in fact ossicones formed from ossified cartilage. Its name is *Sivatherium hendeyi*, just one of a number of species named in honour of Hendey (the genus name refers to the fact that the type specimen, *Sivatherium giganteum*, was found in the Siwalik region of the Himalayan foothills in the 1830s). A bonebed in one of the ancient river channels at Langebaanweg is dominated by the giraffe's bones, representing some 500 individual animals.

Other herbivores include, among others, three species of elephants and a huge diversity of bovids, but Alberto's interest lies in the carnivores, which are divided into two suborders, the cat-like Feliformia and the dog-like Caniformia. The former include the cat, hyaena, mongoose and viverrid (genets and civets) families, and all of these are represented at Langebaanweg. Most exciting are the three or possibly four species of sabretooth cat. Alberto explained that unlike modern-day lions that clamp their jaws over the throat of their prey to suffocate it, the elongated canines of the sabretooths would pierce the blood vessels and oesophagus so that the prey would die in seconds rather



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**The extinct giant otter had a more robust dentition than the African clawless otter found in the Cape today.**

## CURRICULUM CORNER

### LIFE SCIENCES: GRADE 10

History of life on Earth



Maggie Newman, GSSA and Wits University

**Maggie Newman's depiction of the Langebaanweg ecosystem five million years ago shows a gigantic wolverine snarling at a primitive hyena as it feeds on a giant pig, while a bear looks on.**

than minutes. This minimised the risk of injury to the predator.

The Caniformia suborder includes dogs, bears, wolves, foxes, jackals, raccoons, badgers, seals and mustelids. Alberto noted that mustelids are his "favourite animal ever", and are the largest living family within the Carnivora, comprising 57 species of weasels, ferrets, badgers, wolverines, otters and martens. He explained that a group of extinct mustelids are called giant mustelids because they are twice the mass of the largest terrestrial form, but they're poorly understood because they are scarce in the fossil record. In the 1970s Hendey identified bone material of a giant otter found at Langebaanweg as *Enhydriodon africanus*, but other researchers subsequently recognised it as a new species and transferred it to a different genus, with the name *Sivaonyx hendeyi*.

In their recently published paper, Alberto and Romala described new material and also re-examined the previously described material. They hypothesised that *Sivaonyx hendeyi* had semi-aquatic locomotion similar to that of the living African clawless otter and Asian small-clawed otter, but with some digging capability too. Its robust dentition suggests its diet was based on armoured catfishes, molluscs, crustaceans or even bones.

They also confirmed that Langebaanweg's wolverine, *Plesiogulo aff. monspesulanus*, is a different species to that of the large-bodied *Plesiogulo botori* from Kenya and Ethiopia, which means that there were at least two large species of wolverine in Africa at the end of the Miocene and beginning of the Pliocene. On the basis of its stout bones and massive teeth, it's likely that the Langebaanweg species was the size of a leopard, and acted as an ambush predator on the grassy plains.

Alberto finished off his webinar presentation by discussing the other caniforms found at the site, including at least 11 individuals of an extinct bear. It was a fascinating virtual tour of the Langebaanweg 'zoo'.

- For more information, see the open access paper by Valenciano and Govender at <https://doi.org/10.7717/peerj.9221>

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