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Fossil hunter's passion for prehistory

LIFESTYLE

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By **Natalie Heng**

Masatoshi hunting for dinosaur fossils in Pahang.

A Japanese palaeontologist's thirst for discovery puts Malaysia on the dinosaur fossil map.

It was one o'clock in the morning when Masatoshi Sone's persistence finally paid off.

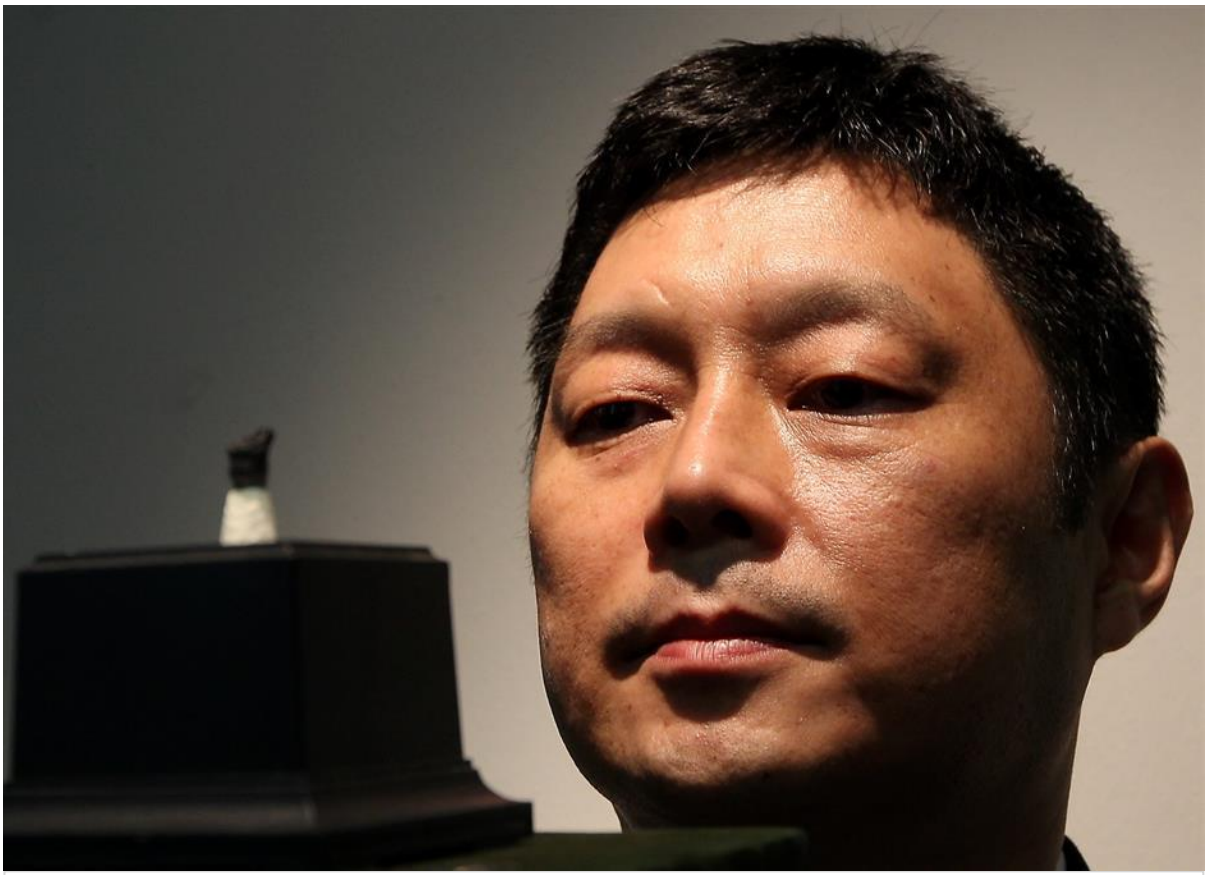
At first, he didn't know it was a dinosaur fossil. He had just cracked open a chunk of rock taken from around the Taman Negara area in Pahang, and something appeared that looked different from the surrounding sediment.

It was bigger, larger and obviously long. His heart skipped a beat. Could it be?

"I thought maybe," he says, holding his breath, recounting the moment.

As the anticipation welled in his chest he kept his cool, took a picture and sent it out by e-mail.

He received an almost immediate response from Prof Ren Hirayama, a fellow palaeontologist based at Waseda University in Japan – someone with actual experience identifying dinosaur fossils.



Pet project: Masatoshi with the second fossilised dinosaur tooth he discovered in Malaysia. The 13mm long and 10.5mm wide tooth is thought to have belonged to a herbivorous Ornithiscian, and was discovered in a Cretaceous sedimentary rock formation in Pahang.

Yes, it did indeed look like a dinosaur tooth, came the confirmation.

Masatoshi, an associate professor specialising in Palaeontology, Sedimentology and Tectonics at the Department of Geology in Universiti Malaya, was overwhelmed.

If proved correct, this would be the first dinosaur fossil discovered in Malaysia. But he knew they would have to proceed with caution.

That was in the middle of last year. He took his time cleaning it, working under a microscope with his miniature hammer, chiselling way at the Cretaceous sediment that clung to his prized possession, and using a pin to deal with the finer traces of rock.

Seven months later he unveiled it for the public to see – a 23mm long, 10mm wide tooth.

Distinctive vertical ridges running down its elongated body indicate it belonged to a member of the Spinasauridae, a family of large bipedal dinosaurs.

Former student Teng Yu He joined Masatoshi's team hunting for dinosaur fossils in Pahang. Here, she is seen processing the rocks they collected to search for fossils.

The group is best known for its type genus Spinasaurus, now acknowledged to have been the largest known predatory dinosaur to have walked the earth, and the subject of last month's cover story in *National Geographic*, which depicted stunning recreations of the creature's crocodile-like skull and conspicuous sail-like structure bristling along its back.

Of course, the most fertile grounds for fossils have traditionally been sprawling desert landscapes in places like the North American continent, northern Africa and northern Asia. Partially because the lack of vegetation makes finding things a lot easier, but also because that's where people looked, often in line with colonial mineral exploration.

There are plenty of places where people haven't looked, like Malaysia – and, in fact, much of the developing world, according to Masatoshi.

"Some were found in Laos," he says, referring to the bones discovered in 1936 by French geologist Josue Heilman Hoffet, which were followed by a few more in the 1990s.

Thailand, however, has been the star. Dinosaur bones were first discovered in the Phu Wiang mountains in 1976. Since then, the country has yielded about 10,000 dinosaur bones in three decades, enough to have given rise to dedicated dinosaur museums.

Malaysia – unexplored

A native of Japan's Niigata prefecture, Masatoshi spent his academic life in Australian universities studying Malaysian geology.

Part of the draw was that far less palaeontological work had been done here than his home country – the idea of discovering something rather more exciting than the ancient marine invertebrates in which he had come to specialise.

Malaysia shares a lot of the geological features, Cretaceous sedimentary rock for example, that characterise the dinosaur fossil hot spots of Thailand.

But it wasn't till he was actually out in the Khorat Plateau in north-eastern Thailand that he made the decision to go back and start really looking.

File pic of a full-size Spinasaurus skeleton featured in a National Geographic special recently. A Spinasauridae tooth was Masatoshi's first fossil discovery in Malaysia.

"That was where I met Prof Ren Hirayama, on a field excursion organised as part of a palaeontology conference three years ago," he recalls.

As he stood in the forest and looked around him, this was the same kind of setting he'd seen a million times before, in Malaysia.

When he got back he made it his pet project.

He reached out to a number of other palaeontologists, but few were inclined to join him on what they thought might end up a wild goose chase.

Some palaeontologists (Hirayama among them) from the Universities of Waseda and Kumamoto in Japan, however, thought booking a flight to go fossil hunting in the tropics of Malaysia sounded like a great idea.

So did ex-undergraduate student Teng Yu He, whom Masatoshi had supervised for her final-year project.

Out of the many geology students at UM where Masatoshi teaches, few choose to specialise in the sub-discipline of palaeontology.

Teng was among two or three who go down that route annually, and even so she ended up working in an oil company, Petronas.

Having missed getting to go out and do field work, she relished the idea. She booked her leave and set off with them, only realising on the trip that the game plan was to look for dinosaur fossils.

Believe it or not, Malaysia is full of potential spots. Much of the bare rock faces you see along the highway from Kuala Lumpur to Kuantan, for example, consist of deep water marine sediments hundreds of millions of years old, pushed up by tectonic uplift but hidden from visibility by vegetation.

The construction of trunk roads and highways has in fact provided a number of excellent rock exposures, some of which may have resided several hundred to a thousand metres below sea level. When you think about it, Masatoshi points out, the Himalayas were once under water, and now they are over 8,000 metres high – "ancient geology" is all around us.

"You might find marine fossils on the top of the Himalayas, just as you might find them on the top of Gunung Tahan. It just makes more sense to look for them somewhere a little more accessible," explains Masatoshi.

Ironically, if it's fossils you are after, a good place to look is upcoming housing developments, because construction work is preceded by the clearing of vegetation, followed by site preparations.

In the process, some or all of the soil mantle is removed, exposing fresh rock face.

It's at sites like this that Masatoshi likes to pick through on weekends, often taking his wife, a willing participant in his palaeontological adventures.

This time, however, they made a serious go of it. Food and accommodation came out of his pocket; and everyone's enthusiasm, right from the heart. It paid off.

Clues to the future

They had over a hundred rocks to work with. Processing them was painstaking and delicate work that would carry on late into the night.

The first dinosaur fossil they discovered was the Spinasauridae tooth he revealed in February.

The second – found in the same general vicinity – was announced just last week, after nine months of cleaning up and verification.

It measures 13mm long and 10.5mm wide in preserved dimensions, and is thought to date 145 to 75 million years back to the Cretaceous, though plans are afoot to use radiocarbon dating of pollen samples from corresponding soil samples to come to a more accurate estimate of the timeline.

Masatoshi believes it belonged to a herbivorous dinosaur under the order Ornithischia, one of two major divisions under the superorder Dinosauria.

Based on the shape of the tooth, he thinks it could have belonged to an armoured family of dinosaurs known as Ankylosauria.

What else is out there? Masatoshi points to a chart with all the familiar *Jurassic Park* characters: from long-necked sauropods, to chunky "T-rex" theropods, and ceratopsids such as Triceratops.

"It's all a matter of how we look, and how much energy we put into it."

As if on cue, just three days after Masatoshi's announcement, representatives from the Government's Mineral and Geoscience Department announced several footprints, bones and teeth, possibly of three different dinosaur species.

The discoveries were made in Mount Gagau, Hulu Terengganu, during an October expedition organised by the department in partnership with the Malaysian Geological Heritage Group, and have sparked fresh talk about transforming the Kenyir Lake area into a protected geopark.

Masatoshi is now in the process of putting together a research proposal to turn his pet project into a fully funded research effort.

Piece by piece, there is a greater puzzle to be constructed, Masatoshi likes how palaeontology allows the bigger picture of our history to unfold.

There is a deeper value to be had, however, that is separate from the romance and novelty of imagining a time when dinosaurs roamed the Earth.

"Dinosaurs were one of the most successful groups of organisms, they ruled the Earth for hundreds of millions of years," he says.

And yet, they were no match for time. In its 4.6-billion-year history, the Earth has seen five mass extinctions.

In each, over 90% of all the living things on land and in the sea were completely wiped out.

These extinctions played out over thousands of years. Modern humans, it is estimated, have walked the Earth for about 200,000 years, yet many scientists argue that we are either entering, or are in the midst of, a sixth anthropogenic mass extinction that will be concentrated over a much shorter time span.

When you put it like that, reading rocks doesn't look like such a dull career to have after all.

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Science Technology , Dinosaur , University Malaya , Ornithischia , Professor Masatoshi Sone

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